GAP ANALYSIS & ESTABLISHING REQUIREMENTS FOR PRODUCT CERTIFICATION (SLS) ON JUJUBES ("GLUCORASA")

by

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03/AS/066

Thesis is submitted in partial fulfillment of the requirement of

the degree of

Bachelor of science (Applied science) in food science & technology –special

Department of Food science & Technology

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DECLARATION

The work described in this thesis was carried out by me at the department of Food science & Technology, Faculty of Applied sciences, Sabaragamuwa university of Sri Lanka, under the supervision of Ms: T.C. Kananke, lecture, department of Food science & Technology, Faculty of Applied sciences, Sabaragamuwa university of Sri Lanka, & Ms: G.A.K. de Fonseka, food Technologist, Uswatta confectionary works LTD, Galle Road, Rathmalana. A report on this has not been submitted to any other university for another degree.

M. Karavita .....

03/AS/ 066 06. 03. 2009

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DEDICATION

Affectionately

Dedicated

To

my parents & teachers

ACKNOWLEDGEMENT

I would like to express my deepest gratitude to my internal supervisor, Ms: T. C. Kananke, lecture, department of Food science & Technology, Faculty of Applied sciences,Sabaragamuwa university of Sri Lanka for her valuable guidance & supervisor throughout the project.

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Finally I also wish to express my deep sense of gratitude to my parents & all those who have helped me during this project for their endless encouragement & heartiest assistance.

ABSTRACT

Product certification, which is popularly known as the "SLS Mark Scheme", is a scheme that gives a third party guarantee on quality of a product. This scheme enables the SLSI to grant permits to local as well as overseas manufacturers producing goods conforming to Sri Lanka Standards to mark the "SLS" mark on their products.

The Certification Mark on a commodity or product signifies that the commodity or product is consistently manufactured in accordance with the relevant Sri Lanka Standard Specification and could be purchased with a reasonable assurance of quality. Compliance with the requirements of the specification is assured through regular monitoring of the quality assurance system and audits carried out by qualified Auditors of the Institution.

This study was focused on identification of gaps and establishing requirements for the product certificate on Jujubes ("Glucorasa"). Jujubes are a gelatin based product, which comes under sugar confectionary and marketed under the brand name "Glucorasa".

According to Sri Lanka Standards for gelatin based confectionary, there are three requirements, which need to be fulfilled by the manufacturer who wants to obtain the product certification as follows. (i.)The composition of the product should comply with the SLS requirements. (ii.)The manufactures who seek the SLS mark for their product should establish, document, implement and maintain the quality system comply with the twelve quality elements, which requires for product certification. (iii.)The product shall be processed, packed, stored & distributed in accordance with code of practice for general principles of food hygiene.

During this project three gaps were identified to obtain the product certification. The analyzed composition of the jujubes was as follows. Moisture (percent by mass) 8.1, sulphated ash (percent by mass) 0.820, acid insoluble ash (percent by mass) 0.125, reducing sugar (calculated as dextrose) (percent by mass) 18.95, total sugar as sucrose (percent by mass) 69.06, gelatin content (percent by mass) 4.31 and SO_2 content 85.3 mg/kg. Moisture and SO_2 content of the product did not comply with the requirements for product certification. According to the standards, required level of moisture should be10-15(percent by mass) and maximum permitted SO_2 level should be70 mg/ Kg.

To maintain the quality system which complies with the twelve quality elements, documented details are required such as quality manual, quality plan & other supported documents. Quality manual, quality plan, procedures & other supported documents were prepared to fulfill the above gap. The product should be processed, packed, stored & distributed in accordance with code of practice for general principles of food hygiene. Procedures, work instructions, & schedules were established to guide the employees and to maintain the hygienic condition of the factory.

CONTENTS

CHAPTER 04: RESULTS AND DISCUSSION

LIST OF ABREVIATIONS

GM	Generai Manager
FM	Factory Manager
FT	Food Technologist
MO	Machine Operator
SK	Store Keeper
QCA	Quality Control Assistant
RCC	Relative Casein Content
RH	Relative Humidity
SLSI	Sri Lanka Standard Institute
SLS	Sri Lankan Standard
w/w	weight to weight

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CHAPTER 01

Introduction

1.1. Introduction

Uswatte Confectionary Works Limited is a company engaged in the process of manufacturing confectionary products & snack foods including jujubes, jellies, toffees, extruded products, biscuits & instant powdered drink.

Jujube is a gelatine based product which comes under sugar confectionary and marketed under the brand name "Glucorasa". In confectionary field, jujubes come under hard gums. These are produce with gum arabic or gelatine. The gelatine is soaked in water. Syrup is prepared by mixing sugar and liquid glucose & boiling to about 113^0C. Gelatine is added followed by colour and flavour.(Booth ,1997)

Nowadays consumers are well aware of their rights to by safe and quality products and also the external pressure on companies to produce such products, by parties like government, relevant authorities, medias, local & international consumers is very high. So there is a world wide trend towards more stringent customer expectations with regard to quality.

So lots of manufactures try to take quality certification & quality marks for their products and services to fulfill their customer requirements. This certification also acts as a marketing tool for the promotion of sales. This also helps to make a product more competitive in the market.

Product certification, which is popularly known as the "SLS Mark Scheme", is a scheme that gives a third party guarantee on quality of a product. This scheme enables the Sri Lanka Standards Institution to grant permits to local as well as overseas manufacturers producing goods conforming to Sri Lanka Standards to mark the "SLS" mark on their products. Sri Lanka Standards Institution Act No.6 of 1984, and the regulations made there under empower the Sri Lanka Standards Institution to issue such permits to manufacturers. (Sri Lanka standards Institution, www.slsi.lk)

The Certification Mark on a commodity or product signifies that the commodity or product is consistently manufactured in accordance with the relevant Sri Lanka Standard Specification and could be purchased with a reasonable assurance of quality.

When a manufacture applies for SLS certification for a product or service, the Sri Lanka Standards Institution consider following things mainly.

1. Composition of the product which comply with the "SLS" specifications.
2. Is the quality system established, implement and maintain complying with the twelve elements of "SLS" mark scheme.
3. Is the production complying with general principles of food hygiene of Sri Lanka Standards.

So manufacture should fulfill the existing gap according to SLS requirements. This project is focused on identifying the gap and present suggestions for fulfill the SLS requirements.

1.2. Overall objective

Performing a gap analysis and establishing requirements for product certification (SLS) in Jujubes "Glucorasa"

1.3. Specific objectives

1. Identify the requirements for Sri Lanka Standard for gelatine based confectionary.
2. Check the composition of the jujubes by testing the sample for compliance with the SLS requirements.
3. Identify requirements for food hygiene for the product.
4. Identify the required documents for SLS mark scheme.
5. Present suggestions for fulfill the above requirements.

CHAPTER 02

Literature review

2.1. General overview

2.1.1. Introduction to Sri Lanka Standards

Product certification, which is popularly known as the "SLS Mark Scheme", is a scheme that gives a third party guarantee on quality of a product. This scheme enables the SLSI to grant permits to local as well as overseas manufacturers producing goods conforming to Sri Lanka Standards to mark the "SLS" mark on their products. Sri Lanka Standards Institution Act No.6 of 1984, and the regulations made there under empower the Sri Lanka Standards Institution to issue such permits to manufacturers.

The Product Certification Scheme is essentially voluntary in nature. However, certification of 20 products locally manufactured or produced has been mandated through the Directions issued by the Commissioner of Internal Trade under the Consumer Protection Act No. 1 of 1979. (The Consumer Protection Act has been repealed by the Consumer Affairs Authority Act No. 9 of 2003.)

The Certification Mark on a commodity or product signifies that the commodity or product is consistently manufactured in accordance with the relevant Sri Lanka Standard Specification and could be purchased with a reasonable assurance of quality. Compliance with the requirements of the specification is assured through regular monitoring of the quality assurance system and audits carried out by qualified Auditors of the Institution.

The general policy of the Institution is to administer the Certification Marks Scheme in such a manner that the responsibility of compliance with the relevant standard lies with the manufacturer. To secure this, a suitable quality assurance system consistent with the guidelines prescribed by the Institution should be adopted by each permit holder. He is responsible for the documentation and the implementation of the quality system and the continued effectiveness of the quality system will be verified by the qualified officers of the Institution at regular intervals.(Sri Lanka standards Institution, www.slsi.lk.)

2.1.2. Issue of permit for Certification Mark Scheme

2.1.2. 1.Assessments and Inspections before granting of the permit

On receipt of an application the Institution will assess the adequacy of manufacturer's arrangements for quality assurance based on information provided in the application.

An inspection of the factory is arranged to examine and verify the quality management system adopted by the applicant. Specific attention will be paid to the availability of testing facilities during this visit.

The applicant should give every assistance to the inspectors of the Institution to collect samples from the factory as may be required for testing. The cost of inspection, cost of samples and testing fees shall be borne by the applicants.

If the product conforms to the requirements of the standard (verified by checking conformity of two consecutive samples) and the quality system is found to be satisfactory, a final inspection will be carried out by a panel to ascertain compliance to criteria for certification

A permit to use the Certification Mark is issued, to the manufacturer by the Director General of the Institution or the authorized officer on behalf of the Institution when the following conditions are fulfilled. Two consecutive samples drawn with a minimum gap of 30 days or 30 batches as the case may be and tested are found to be conforming to the relevant Sri Lanka Standard; A satisfactory quality management system is implemented; and The general and specific permit conditions and conditions for payment of the annual fee are accepted by the manufacturer. Once the license had been granted, the manufacturer shall display the SLS symbol on the product.

2.1.2. 2. Post-permit assessments and inspection

In order to ensure the conformity of the product to relevant Sri Lanka standard specification continuously, satisfactory operation of the quality system and to verify compliance with the permit conditions, periodic audits shall be carried out at the manufacturer's facility. Samples of the product obtained from the manufacturer's facility / open market/parties to whom supplies have been made are also tested to check compliance with the specification.(Sri Lanka standards Institution www.slsi.lk)

2.1.3. Benifits of SLSI Mark

- SLS mark is a major marketing tool for the promotion of sales.
- To differentiate products having the SLS mark from other products
- Enhance competitiveness.
- Definite advantage over manufacturing establishments who does not have SLS mark
- Reduce customer complaints
- State sector will look for SLS marked products, thereby increase the market share
- Image of the company will be improved. Thereby improving the morale of workers.
- Productivity improvement.
- Since the standard incorporate customer and legal requirements, products will be more acceptable
- Customer-Manufacturer-SLSI relationships enhance continuously.
- Foundation to obtain Overseas Certification Marks
- Foundation to obtain Overseas Product Certification Marks such as BS, ISI etc. and SLSI is in a position to grant these marks

2.2. Requirements for SLS mark scheme

The manufactures who seek the SLS mark for their products, should establish implement & maintain the quality system complying with the following 12 elements of ISO 9000: 1994 standard in addition to the existing requirements.

i. Management responsibility
ii. Quality system
iii. Purchasing
iv. Process control
v. Inspection & testing
vi. Control of inspection, measuring & test equipment
vii. Inspection & test status

viii. Control of non conforming product
ix. Handling storage , packaging, delivery
x. Control of quality records
xi. Internal quality audits
xii. Training

2.2.1. Management Responsibility

2. 2. 1. 1. Quality policy

The manufacture's management shall define & document the policy with regard to quality, including objectives for quality. The manufacture shall ensure that this policy is understood implemented and maintained all levels of the organization.

The policy should be written in a simple language to enable everybody in the organization to understand easily to gain necessary commitment from all employees of the organization in the implementation of the policy.

The focus on the company on customers, employees & suppliers in relation to quality, should be reflected in the policy statement.

2. 2. 1. 2. Organization

2. 2. 1. 2. 1. Responsibility & authority

The manufacture shall identify personnel who manage, perform & verify work affecting quality. The manufacture shall also define & document responsibilities of these personnel who should have organizational freedom & authority to

a) Initiate action to prevent the occurrence of any non – conformity relating to the product & the 12 quality system requirements identified for SLS products certification scheme.

b) Initiate recommended or provides solution through designated chances & the importance of their contribution, in achieving quality requirements of products.

Suitable person should be identified and made responsible for monitoring quality of in coming material, in process semi finished products & final products. They should be able to communicate directly with the highest level of the management for reporting quality achievements.

2. 2. 1. 2.2. Resources

The manufacture shall identify resources, requirements & provide adequate resources including trained personal for

a) Managing & performing work

b) Verification activities including testing & internal quality audits.

Verification resources & personnel can be the following,

1. Personnel who perform testing inspection & internal quality audits with adequate training in these areas.
2. Awareness of required or identified standard
3. Awareness of arrangements for inspection, testing & internal audits
4. Providing training in all relevant areas
5. Documented procedures & sufficient time to do work
6. Production schedule with sufficient time allocated for activities such as inspection, testing & internal audits
7. Means to access quality records

2. 2. 1. 2. 2. 3. Management representatives

The manufacture shall appoint a member of the senior management to effectively implement & maintain quality system requirements for product certification. He /she should have the authority to,

a.) Ensure that the quality system is established, implemented and maintained in accordance with the requirements specified in this document;

b.) Report on the performance of the quality (s) to the management for review & improvement of the quality system and

c.) Liaise with external parties (Sri Lanka Standards) on matters relating to the manufactures quality.

In addition to above function the management representatives may have other responsibilities which should not have conflicting interest.

2. 2. 1. 3. Management review

The manufacture's management shall review the quality system at specified intervals sufficient to ensure its continuing suitability & effectiveness in satisfying the quality policy & objectives stated by the manufacturer. Records of review shall be maintained. For this purpose the management review committee comprising the senior management staff chaired by the Chief Executive Officer (CEO) should meet at regular intervals to discuss.

a). Audits reports

b.) Adequacy of staff, testing & other equipment etc.

c.) Internal & external customer feedback (customer complaints) on product performance & delivery ect.

2.2.2. Quality system

Manufacture shall establish, document & maintain a quality system as a means of ensuring that product conforms to requirements of the relevant SLS. The manufacture shall prepare a quality manual covering twelve quality elements specified herein. The quality manual should be supported by several documents of lower level, namely procedures, work instructions, forms, specifications, methods etc. more details could be dealt with in these documents.

The procedure should cover all twelve quality elements given herein. The quality manual, the top level documents, should link to the procedure and procedures to the work instructions, forms etc. The quality manual should not contain any confidential information, and such information could be given in the procedure.

2.2. 2. 1. Procedures

The manufacture shall prepare documented procedure to be in line with the requirement of the product certification scheme and the quality policy of the manufacture. These procedures are required for effective implementation of the quality system.

2. 2. 2. 2. Quality plan

The manufacture shall define and document how the quality of product which is defined by the relevant SLS will be achieved. Quality plans may be in a suitable form (eg:- flow charts) to the manufacturer. The plan should have a sequence of activities in relation to a time frame. The plan also could be at different levels that are for the whole production, testing and inspection, in process testing and inspection, final product testing and inspection etc. The plan should carry information with regards to activities, time schedules, equipment to be used, recording of quality requirements, frequency of testing at different stages & sampling etc.

2.2.3. Purchasing

The manufacture shall establish & maintain documented procedure to ensure that purchased material/ component products conform to specifications of the manufacture, or relevant SLS, national or international standards acceptable to the SLSI and also any regulatory requirements, if applicable.

The manufacture shall maintain quality records of acceptable suppliers. Performance of supplier shall be reviewed at appropriate intervals for updating the list of suppliers.

2.2.3.1. Verification of purchased material

The manufacture shall define and document procedures for verification of all items purchased which will affect the quality of product.

2.2.4. Process control

The manufacture shall identify and plan the production process & ensure that these processes are carried out under controlled conditions. Controlled conditions include the following

a) Documented procedures for processes which could adversely affect the product quality.

b) Use of suitable production, equipment and working conditions.

c) Compliance with standards, code of practice, quality plans & documented procedures.

d) Monitoring & control of suitable process, parameters & product parameters.

e) The approval of processes & equipment

f) Criteria for workmanship, written standards/samples to display the required finish of the product.

g) Suitable maintenance of equipment to ensure continuing process capability.

The process should be controlled to prevent occurring non – conformities. The characteristics that are most critical to the product quality should be identified and controlled. Process control activities may include procedures for acceptance of materials and determining their characteristic while in process. Where suitable process control should include satisfactory process control methods supplemented procedures to maintain the suitability of in process material & activities needed for appropriate storage handling & segregation.

2.2.5. Inspection and testing

The manufacture shall adopt documented inspection and testing procedures for manufacturing process from receiving of materials to final product, in order to verify that the quality levels of different characteristics of the product, as specified by the relevant SLS are met. The inspection and testing procedures shall include each and every inspection or test which, is required to be performed with a view to maintaining the quality of product. Each test and/ or inspection shall be detailed in a quality plan. Records pertaining to all test or/and inspections shall be maintained.

2.2.5.1.Receiving inspection & testing

All incoming raw materials, products or parts thereof shall be inspected or otherwise verified for conformity prior to their use or process with specified requirements. In case any material, product or part thereof is to released on urgent grounds shall be clearly identified & recorded for immediate recall in the event if any nonconformity is found subsequently.

Verification of conformance to specified requirements shall be done in accordance with the Scheme of Testing and Inspection (STI) quality plan or/and the documented procedure.

In case of purchasing of any item from subcontracts, those items may be inspected at the premises of the sub contractor but the amount and nature of receiving inspection & control to be exercised shall be monitored by the manufacturer. In such cases the manufacture shall be provided with documented evidence of conformance. The manufacture shall bear the sole responsibility of this exercise.

2.2.5.3. In process inspection & testing

The manufacture shall inspect & test the product during processing for required quality characteristics as proposed by the STI. Company quality policy & procedures for inspection & testing unless required inspection & test have been completed or necessary reports have been received & verified, continuity of processing of the product should be withheld.

2.2.5.3. Final inspection & testing

The manufacture shall conduct all final inspection & test on the finished product in accordance with the quality policy or procedure for inspection and testing to verify that the product satisfy the requirements of the relevant Sri Lanka Standards. Unless the product is in conformity with the relevant Sri Lanka Standards products shall not be dispatched for further proceeding.

2.2.6.Control of inspection, measuring and test equipment

All inspection, measuring and test equipment used in the manufacturing process shall be controlled calibrated & maintained in order to ensure that the measurement taken with those equipment are consistent & within the specified range. In case when test software or hardware is used for inspection they shall be checked as per a scheduled plan for their capability of verifying the acceptability of products.

All records include technical data with respect to these equipment shall be made available for verification, if necessary.

The manufacture shall establish proper control procedure for use monitoring & maintenance of inspection, measuring and test equipment. As such it is the responsibility of the manufacturer to determine measurement, accuracy required calibration status, frequency of checking etc. These equipment shall be handled or stored as per instructions given their in and to be compatible with necessary environmental conditions. All necessary records shall be maintained.

2.2.6.Inspection & test status

The manufacture shall introduce suitable means to identify products which are a waiting for inspection, inspected and passed or failed. This identification scheme shall be in line with the conduct of inspections and tests as given in the quality policy or procedures for inspection & testing & only those products which have passed the required inspection and test shall be dispatched used or installed. If any product is to be dispatched, used or installed prior to inspection or urgent ground, it shall be clearly identified to be recalled in the event of any nonconformity is found subsequently.

2.2.7.Control of non conforming product

The manufacture shall take suitable step to prevent those products which have failed to conform to the requirements of the relevant SLS are dispatched. Procedures shall be clearly defined to describe how non – conforming products are identified, documented, evaluated, segregated, disposed & notified to relevant parties.

The non conforming products shall be reviewed in order to rework, repair, regarded, reject or scrap in accordance with the procedure. The manufacture shall clearly define who shall take such decision. All repaired &/ or reworked products shall be re inspected in accordance with the quality plane &/ or procedures for inspection & testing.

2.2. 9. Handling, storage, packing, preservation & delivery

The manufacture shall maintain documented procedure for

a) Handling of products
b) Storage of products
c) Packaging of products
d) Preservation of product
e) Delivery of product

2.2. 9. 1. Handling

Manufacture shall identify & document necessary procedures on how to prevent damage or deterioration of the product during handling. This includes in process materials & finished products.

2. 2. 9. 2. Storage

Manufacture shall use designated areas for storage of goods. These areas shall be safe enough to prevent damage to or deterioration of the product due to temperature, humidity or any other undesirable situations. Necessary methods shall be introduced to receive & to dispatch goods from such areas.

2.2. 9. 3. Packaging

Manufacture shall make sure that the packaging & marketing should provide appropriate protection against damage, deterioration or contamination during storage, transportation or until the management's responsibility ceases.

2.2. 9. 2. Preservation

Manufacture shall ensure that products are preserved, if applicable & segregated.

2.2. 10. Control of quality records

Manufacture shall maintain documented procedure for

a) Identification of quality records

b) b) Collection of quality records

c) Indexing of quality records

d) How to access quality records

e) How to arrange/file quality records

f) How to store quality records

g) Maintenance of quality records

h) Disposition of quality records

All records which demonstrate conformance to specified requirements (those requirements may be company standards) & effective operation of the quality system could be considered as quality records for Ex: Test records, internal quality audit report, management review reports etc.

These quality records shall be stored in a suitable environment to prevent damage, or deterioration & in such a manner that they are readily retrievable. Retention time of

these records shall be determined. Provision shall be made to the customer or interested parties to evaluate these quality records.

2.2. 11. Internal quality audits

Internal quality audits shall be carried out to verify whether quality activities & related results comply with the documented system & also to assess the effectiveness the quality system.

Therefore the manufacture shall maintain documented procedures for

a) Planning of internal quality audits

b) Implementing internal quality audits

The manufacture shall use trained & qualified auditors to carry out audits in the areas (department) where they have no direct responsibility.

Audit findings shall be recorded & brought to the notice of the responsible person in that area for any corrective action. Management shall ensure that corrective action on non conforming are taken on time. Follow up audit shall be carried out to certify the effectiveness of the corrective action.

2.2. 12. Training

The manufacture shall maintain documented procedure for

a) Identification of training needs

b) Provide training for all employees who are performing activities affecting quality.

Employees who are performing special activities shall provide with,

a) Appropriate education b) training & experience as required

All necessary records shall be maintained. The manufacture shall take suitable steps to train employees, in quality & other relevant areas to ensure that their competence is adequate enough to perform the assigned tasks.(Sri Lanka Standards GL- CP01)

2. 2.13.Installation of quality system & follow up.

First analysis the current practices in the organization as far as the 12 quality elements are concerned. Then identify the deviations from the requirements specified by this manual. Identify the key personnel responsible for relevant section pertaining to the 12 quality systems requirements & request them to document the procedures to be in line with the specified requirements in this manual. Implement the documented procedures. Based on the results of implementation amend the existing procedures (if necessary). Conduct internal quality audits on a quarterly basis & discuss the audit report at the management review committee meetings regularly

2.3.Development of process flow & plant lay out

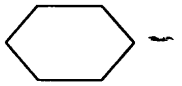
The purpose of a flow diagram is to provide a clear, simple outline of the steps, involved in the process. The scope of the flow diagram must include all steps in the process, which are directly under the control of the establishment. In addition, the flow diagram can include steps in the food chain, which take place before & after the processing that occurs in the establishment.

2.3.1 Flow diagram

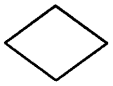
A flow diagram is a schematic representation of the sequence of step or operations used in the production or manufacture of a particular food from raw material receipt to end product sales or service.

2.3.1.1. Flow diagrams symbols

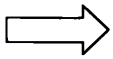
It describes the activities in each process



It indicates a raw material, an ingredient, a by product of the process

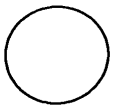


It indicates the decision point in the productive process



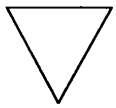
It indicates the flow direction (Arampath *et al*,2005)

2.3.1.2 Flow process chart symbols

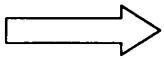


Operation - This symbol represent any kind of operation or group of operations, which result in an intentional change in the form of arrangement of the material which brings it nearer to completion

Inspection - This symbol represent an inspection or decision. Material is examined for identification or verified



Storage - Where material kept. It is kept in an unchanged form & protected against unauthorized removal



Transport - Transportation occurs when a material is moved from one place to another except when such movements are part of operation or are caused an operation at a work station, during an operation or inspection.

(Arampath *et al*,2005)

2.4.Product description

One of the first activities of the study team is to describe the product (which raw materials & ingredients are used & who are the suppliers, which parameters can be influenced to safety (pH ,aw, modified atmosphere, packaging, storage temperature and time, what is the processing conditions, suitable temperature treatment etc, how is the packaging performed & what are the characteristic of packaging material, what are the real condition during distribution, warehousing & sales) .All these information is described in a specific "form" called "product description form"

2.5. Intended use

As intended use of food is define the normal expected use of it (i.e. whether it is ready to eat, to drink or ready to cook, or should be mixed it). On the other hand same terminology is used to determine the consumer or otherwise, where or not the food is intended for infant, the elderly, pregnant woman.(Mortimore &wallace , 1998)

2.6. Raw materials

2.6.1.Gelatine

Gelatin is a translucent, colorless, brittle, nearly tasteless solid substance, extracted from the collagen inside animals' skin and bones. It has been commonly used as a gelling agent in food. Substances containing gelatin or functioning in a similar way are called gelatinous. Gelatin is an irreversibly hydrolyzed form of collagen. Gelatin is classified as a foodstuff, with E number E 441. It is in almost every "gummy" confectionery as well as other products such as marshmallows and some low-fat yogurt. Some dietary customs forbid the use of gelatin from animal sources, and medical issues may limit or prevent its consumption by certain people.

Gelatin is a protein produced by partial hydrolysis of collagen extracted from the bones, connective tissues, organs, and some intestines of animals such as domesticated cattle, and horses. The natural molecular bonds between individual collagen strands are broken down into a form that rearranges more easily. Gelatin melts when heated and solidifies when cooled again. Together with water, it forms a semi-solid colloid gel. Gelatin forms a solution of high viscosity in water, which sets to a gel on cooling, and its chemical composition is, in many respects, closely similar to that of its parent collagen. (Food technical assistance service, 1986)

2.6.2.Liquid glucose

Liquid glucose is a kind of colorless or light yellow, transparent and viscous syrup that is derived from purified corn starch through hydrolysis by the double enzyme method, decoloration, ion exchange and purification. It has a moderately sweet flavor, and is a starch sugar product that is widely used in the food industry. It also has such advantages as anti-crystallinity and a lower freezing point. It is widely used in candy, beverages (carbonic and lactic acid drinks, juice drinks & solid drinks.

2.6.3..Sugar

Sugar refers to sucrose a white crystalline solid disaccharide. Humans most commonly use sucrose as their sugar of choice for altering the flavor and properties (such as mouth feel, preservation, and texture) of beverages and food. Commercially produced table sugar comes either from sugar cane or from sugar beet. Sugar may dissolve in water to form a syrup. A great many foods exist which principally contain dissolved sugar. (Aylward 1999)

2.6.4. Citric acid

Citric acid is colorless translucent crystalline acid, $C_6H_8O_7$, principally derived by fermentation of carbohydrates or from lemon, lime, and pineapple juices and used in preparing citrates and in flavorings and metal polishes. It is available primarily as anhydrous material but also as the monohydrate. The major commercial salts are sodium and potassium, with calcium, diammonium, and ferric ammonium (complex) also available. Citric acid is a relatively strong organic acid, and is very soluble in water. Citric acid and its salts are widely used because they are nontoxic, safe to handle, and easily biodegraded.

Citric acid is widely used in the food and pharmaceutical industries. In foods it is used primarily to produce a tart taste and to complement fruit flavors in carbonated beverages, beverage powders, fruit-flavored drinks, jams and jellies, candy, sherbets, water ices, and wine. It is also used to reduce pH in certain canned foods to make heat treatment more effective, and in conjunction with antioxidants to chelate trace metals and retard enzymatic activity. (en.wikipedia.org/wiki/Citric_acid)

2.7. Hard gums

These are produce with either gum arabic or gelatine. The gum is dissolved in water & strained to remove foreign matter. The gelatine is soaked in water. Syrup is prepared by mixing sugar and starch syrup and boiling to about 250^0F; gum or gelatine is added, followed by colour and flavour. The batch is cast in to starch and the trays are placed in a stove at 120^0F for 3 to 10 days until the required texture is obtained.(Aylward, 1999)

2.7.1. Jujubes

Jujubes are chewy gelatine-based sweets with some similarities to jelly-like confectionery common elsewhere. Traditionally, they are small, squishy, colorful blobs. They usually have a flat base, and are covered in sugar. They can be either hard or soft. Soft jujubes are often half moon shaped. They are also commonly known as,'Jube Jubies, Jubies or just Joobs'. Both gumdrops and wine gums could be considered varieties of jube, as would jelly babies if not for their distinctive shape. Jellie tots here are also shapeless blobs and too could be considered as Joobs(http://en.wikipedia.org/wiki/Jujube)

CHAPTER 03

Methodology

3.1. Identification of the scope

Scope of the SLS study was implemented as a entering to the SLS study. Company policy was recorded as to identify the commitment of the company for its products.

3.2. Study about the company layout, production process, raw material, ingredient and all relevant information.

All relevant information which needs to obtain SLS product certificate was studied & identify the current status of the company and production flow. Those observations were gathered & the company management was aware about the modification and improvements.

3.2.1. Constructions of process flow diagram

Process flow diagram of the product has been identified & constructed.

3.3.Product description and intended use of jujubes

Product features and attributes were understood as much as possible. Full description of the product, such as composition, structure, processing packaging, storage, distribution and expected shelf life were identified. Types of raw materials used were recorded.

Product intended usage were identified as considering it's characteristics and observing catered target market.

3.4.Test for identify composition of the jujubes

Test were carried out according to the Sri Lanka Standard requirements, mentioned in the specification for gelatine based confectionary, SLS 586:1982. Methods were described in appendix 1

3.5. Development of SLS manual

SLS manual was developed to fulfillment of SLS requirements. The manual was developed by twelve quality elements. Procedures & quality plan were developed to support the SLS manual.

3.5.1. Development of quality plan

Quality plan were developed to describe how the quality of product, which is defined by the relevant Sri Lanka Standard will be achieved.

3.5.2. Development of procedures for "Glucorasa" production

Procedures were developed to be in line with the requirement of product certification scheme and the quality policy of the manufacturer. Work for instructions, specifications and schedules were developed as supporting document procedures.

3.6. Identify the hygienic requirement for jujubes production and make suggestions for it.

Hygienic requirements which need to fulfill the requirements for SLS product certification which mentioned in code of practice for general principles for food hygiene were identified. Procedures & work instructions which need to maintain good hygienic condition were developed.

CHAPTER 04

Result & Discussion

4.1. Result

4.1.1. Scope of the SLS study

The SLS manual for Jujubes "Glucorasa"(Gelatine based confectionary) of Uswatte confectionary works LTD at Rathmalana has been developed for implement that to ensure product's quality & safety throughout the raw material reception to the end product.

4.1.2. Identification of company policy

Management of Uswatte group companies & employees are committed to the manufacture, product development & marketing of quality confectionary & snack production to meet the customer requirements. We use the state of the art machinery & modern technology in our production & train our staff for continual improvements in possible areas. Committed to comply with legal and regulatory requirements

Objectives

Increase the turn over
Reduce customer complains
Reduce external rejects
Reduce internal rejects
Reduce down time due to machine breakdown

4.1.3. Identification of product description & intended use

Product description & intended use of jujubes "Glucorasa" is described in page no 23

Product description Process / product type name : Jujubes "Glucorasa"	
1.Products name	Family pack, Gift pack, 70g,40g, 250g, packets, 1.8Kg bottle
2.Important product characteristics(aw, pH, preservatives)	No preservatives
3. Ingredients	Gelatine (halal), sugar, liquid glucose, citric acid ,water
4. Additives	Flavours (apple, pineaple,lemon, strawberry,orange), colours(E112, E102, E124, E140, E133)
5. How it is to be used	Read to eat
6. Packaging	Low density polyethylene. Gift pack& family pack covered with cardboard box
7. Shelf life	4 months
8. Intended use	General public
9. Where it will be sold	Retail
11. Labeling instructions	Ingredients, expiry date, date of manufactured, batch no, brand name, price, address of manufacturer
12. Distribution control	Keep cool and dry place

Table 4.1. Product description

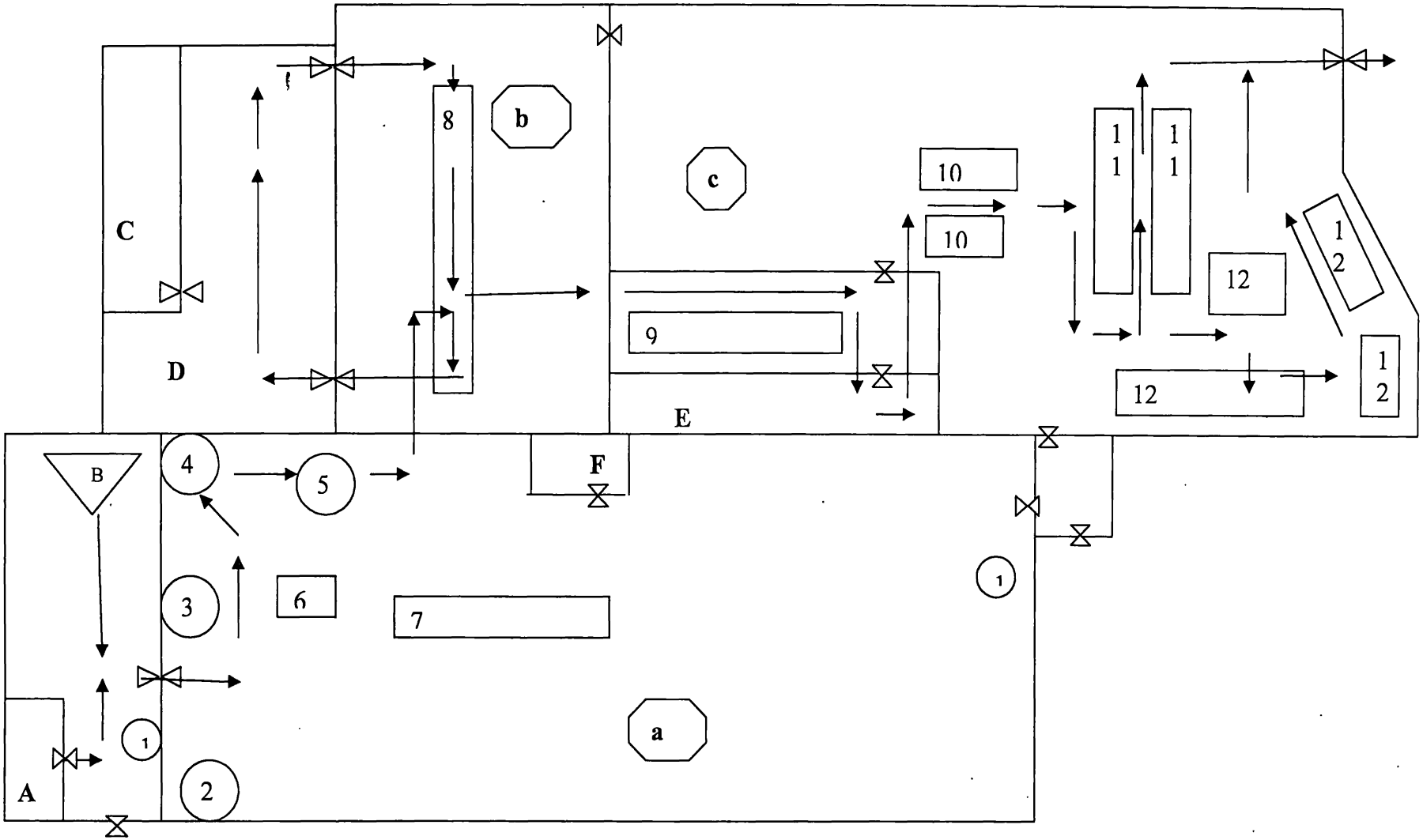


Figure 4.1. Factory layout

Locations indicated by number

1 – Weighing balance

2 – Candy cooker

3 – Jelly cooker

4 – "Glukorasa" cooker

5 – Mixing pan

6 – Gelatine cutting table

7 – Toffee making table

8 – Nid machine

9 – Sander machine

10 – Sorting tables

11 – Packing machine

12 – Packing table

A - Flavour store room

B - Liquid glucose temporary storage

C – Sugar, gelatine, corn starch store room

D – Pieces drying room

E – Sugar coated jujubes store room

F – Gelatine solution store room

a - Cooking area

b - Nid machine room

c - Packing area

⟶ Process flow

4.1.4. Construction of process flow diagram

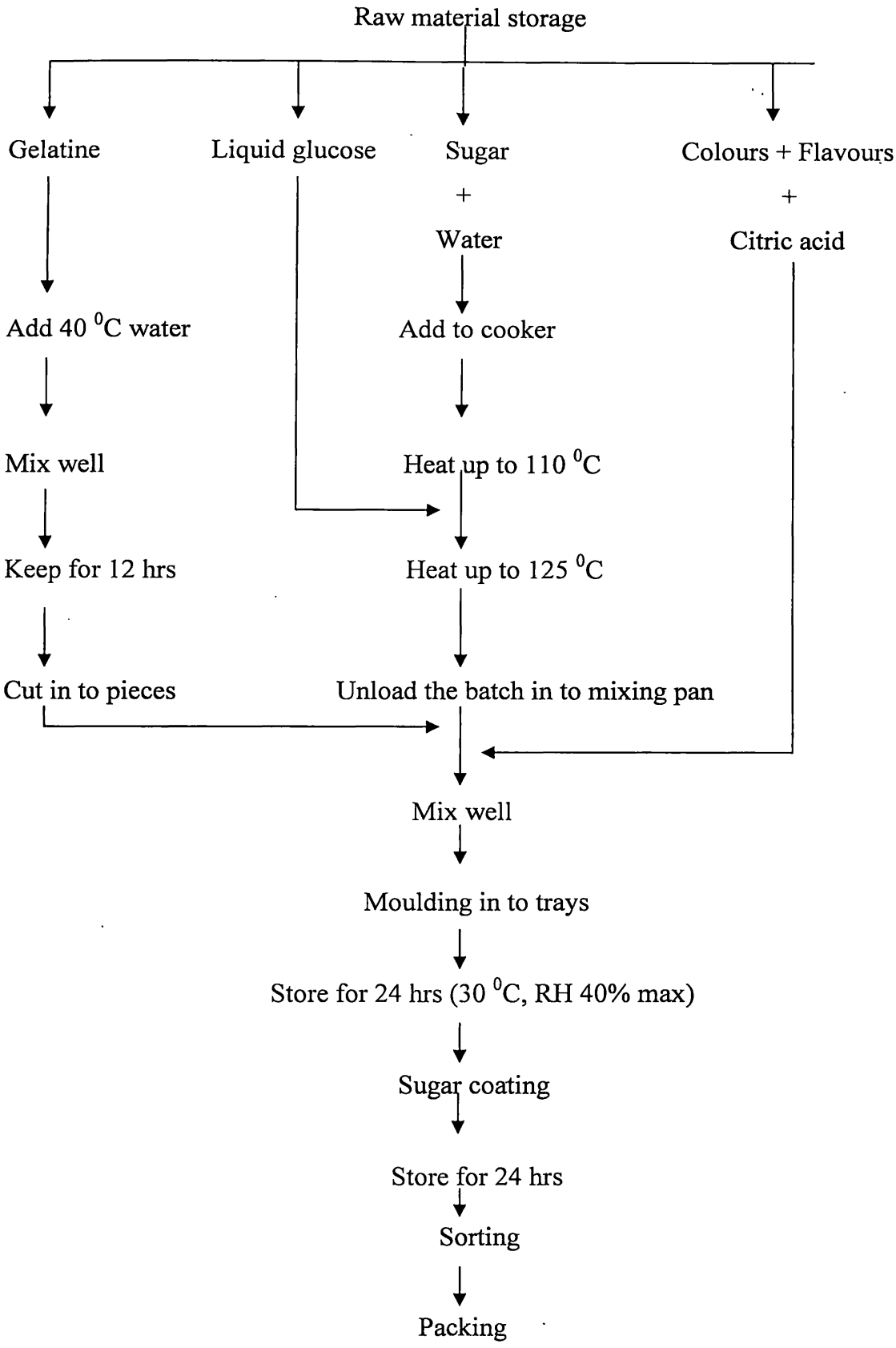


Figure 4.2. Process flow diagram

4.1.5. Composition of jujubes ("Glucorasa")

These results were obtained according to SLS requirements mentioned in the SLS 586:1982 (Method of test for sugar confectionary), in Food science & Technology Laboratory of Faculty of Applied sciences & Livestock laboratory of Faculty of Agriculture.

Characteristics	Composition
Moisture percent by mass	8.1
Sulphated ash percent by mass	0.820
Acid insoluble ash percent by mass	0.125
Reducing sugars (calculated as dextrose) percent by mass	18.95
Total sugars as sucrose percent by mass	69.06
Gelatine content percent by mass	4.31
SO_2 content percent by mass	85.3

Table 4.2. Composition of the jujubes

4.1.6. Development of SLS manual

SLS manual was developed to fulfillment of SLS requirements. The manual was developed by considering 12 quality elements, which need to obtain SLS mark scheme. The prepared SLS manual was as follows.

4.1.6.1. Introduction

Uswatta confectionary works LTD manufacturing range of confectionary items, including snacks, jujubes, jelly, wafers, toffees & instant powdered drink. The products are made to this specification & stored in suitable condition in Uswatta marketing stores until called for & delivered to agents.

4.1.6.2. Scope

The SLS manual for Jujubes "Glucorasa" (Gelatine based confectionary) of that Uswatta confectionary works LTD at Rathmalana has been developed to Implement that to ensure product's quality & safety throughout the raw material reception to the end product.

4. 1. 6.3. Management responsibility

Uswatta confectionary works LTD	Document : 01
Issued date :	Title : **Management responsibility**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

4.6.3.1. Quality policy

Management of Uswatta group companies & employees are committed to the manufacture, product development & marketing of quality confectionary & snack production to meet the customer requirements.

We use the state of the art machinery & modern technology in our production & train our staff for continual improvements in possible areas.

Objectives

Increase the turn over

Reduce customer complains

Reduce external rejects

Reduce internal rejects

Reduce down time due to machine breakdown

4.1.6.3.2. Organization

Overall organizational structure is shown in appendix 2

4.1.6.3.2.1. Responsibility & authority

Functions, responsibilities & authorities of the staff describe in procedure no Doc :UCWL/QP/IT /001

4.1.6.3.3. Management representatives

The Factory Manager (FM) is responsible for the development & implementation of the company quality system. He is appointed as management representative with the responsibilities & authorities for resolving quality problems. His responsibilities includes ensuring that the quality system meet the requirements for SLS mark scheme, maintaining the quality manual & procedures, analysis of audit reports & sources of defected data, the monitoring of corrective action & reporting to senior management with a view to continual improvement of the system.

4.1.6.3.4. Management review

To ensure the effectiveness & suitability of the quality system in satisfying Uswatta confectionary works LTD's quality policy and objective is discussed at least once in six month by a management review meeting. Any deficiencies detected during this review are promptly corrected. The review is carried out in accordance with procedure no Doc:UCWL/QP/ORG/002

4. 1. 6. 4. Quality system

Uswatta confectionary works LTD	**Document : 02**
Issued date :	Title : **Quality system**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

4. 1. 6.4.1. Quality system documentation

Uswatta quality system consists with two parts of documents. This manual defines policy in each of the twelve quality elements required to SLS marks scheme.

4. 1. 6.4.2. Quality system procedures

Detailed procedures are described in the following supporting Uswatta documents, which are made available to staff at their place of work.

Ex :- Incoming inspection procedure Doc :UCWL/QP/IT /001.

Control of non conforming products Doc :UCW/QP/CNC / 001

4. 1. 6.2. 3. Quality plan

Quality assurance arrangement for each generic product line is defined in the quality plan. This procedure ensures the appropriate resources are identified and acquired process through the product design & manufacturing lifecycle are compatible. Methods are updated as necessary, any measurement issues are resolved, verification is undertaken at appropriate stages, standards of acceptability are clear & appropriate quality records are prepared.

4.1. 6.5. Purchasing

Uswatte confectionary works LTD	**Document : 03**
Issued date :	Title : **Purchasing**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

4.1. 6.5.1. General

To ensure that purchased material/ component or products which needs for "Glucorasa " production conforms to specifications of the Uswatte confectionary works LTD or relevant SLS, national or international standard acceptable to the SLSI, the Uswatte confectionary works LTD is established & maintained documented procedure.

4.1. 6.5.2. Responsibility & authority

The purchasing manager has overall responsibility for all purchases.

4.1. 6.5.3. Implementation

Once in three months quotations are obtained from present suppliers & potential suppliers. Evaluate the quotations & test the approved sample against company standard. List of approved suppliers are forwarded to purchasing manager.

Purchasing process is described in procedure no Doc:UCWL/QP/PR /001

4.1. 6.6. Process control

Uswattaeconfectionary works LTD	**Document : 04**
Issued date :	Title : **Process control**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

4.1. 6.6.1. General

Work instructions are provided for all processes & the absence of such instructions would adversely affect quality. These instructions take the form of procedures, & where necessary further written instructions are given for that process relevant to a particular order. Wherever possible the instructions are based in recognized standards & adherence to then is monitored by means of inspection, planned audit &

management review. Detailed process control procedure is described in procedure no: Doc: UCWL/QP/PC /001

All those process control operations are carried under control hygienic condition as prescribed in SLS 143. Process control operations are carried out to ensure the finished product conforming to SLS 585: Part 4: 1990

References

SLS - 143 – General Principal of food hygiene

SLS – 585: Part 4: 1990– Gelatine base confectionary

4.1. 6.7. Inspection & testing

Uswatte confectionary works LTD	**Document : 05**
Issued date :	Title : **Inspection & testing**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

4.1.6.7. 1.General

The criteria for inspection & testing are describe in procedure number Doc: UCWL/QP/IT /001. It includes receiving inspection & testing, in process inspection & testing, final inspection & testing

4.1.6.7. 2. Receiving inspection & testing

Items are normally not released prior to inspection clearance. All batches of incoming goods are inspected visually according to company specifications. Tests carry out in in house or with the help of third party.

4.1.6.7.3. In process inspection & testing

Inspection is carried out during the manufacturing process & records in completion before product is dispatched.

4.1.6.7.4. Final inspection & testing

Before transferring to the Uswatte marketing section, finished products are inspected according to procedure Doc: UCWL/QP/IT /001.The result of this inspection provide evidence that the item conforms to specification. In the presence of any non conformance finished products are rejected or reprocess according to schedule Doc: UCW/QP/CNC/ 001

4.1.6.7. 5. Inspection & test records

Records of all inspection carried out are documented& maintained by the authorized person.

4.1. 6.8. Control of inspection, measuring & test equipment

Uswatte confectionary works LTD	**Document : 06**
Issued date :	Title : **Control of inspection, measuring & test equipment**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

4.1. 6.8. 1. General

Measuring & test requirements are identified & reviewed by the factory manager or his nominee, to ensure adequate facilities & equipment are available to allow effective inspection to be carried out.

4.1. 6.8. 2. Calibration.

Calibration is periodically carried out in accordance with the documented procedure which requires complying with SLS standards. In the event that an instrument is found to be out of calibration, an assessment of the validity of previous inspection result will be made. Calibration process describe in procedure no Doc: UCWL/QP/CLB/ 001

4.1. 6.9. Inspection & test status

Uswatte confectionary works LTD	**Document : 07**
Issued date :	Title : **Inspection & test status**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

The inspection status is identified by label, stamp or accompanying documentation, as describe in procedure number Doc: UCWL/QP/ITS/ 001

4.1. 6.10. Control of non conforming product

Uswatte confectionary works LTD	**Document : 08**
Issued date :	Title : **Control of non conforming product**
Revised date:	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

4.1. 6.10.1. General

Items which are found not to conform to specification are identified & rework or reject according to procedure number Doc: UCW/QP/CNC / 001

4.1. 6.10.2. Non conforming product review & disposition

Food Technologist or his nominee is responsible for the review & disposition of non conforming items. Below mention actions are taken to non conforming products.

a) Rework or sorted to meet the required standard
b) Regarded for alternative applications
c) Rejected & return to the supplier
d) Rejected & scrapped

4.1. 6.11. Handling, storage, packaging & delivery

Uswatte confectionary works LTD	**Document : 09**
Issued date :	Title : **Handling, storage, packaging & delivery**:
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

4.1. 6.11. 1. General

Arrangement for proper handling, storage, packaging & delivery are made in order to prevent deterioration of items. It is the responsibility of the storekeeper to ensure that products are properly protected prior to and during dispatch to customer. Procedure for handling, storage, & packaging are describe in procedure no Doc: UCWL/QP/HSPD / 001

4.1. 6.11.2. Handling

Adequate actions & procedures is taken to prevent damage or deterioration of finished goods & raw material

4.1. 6.11.3. Storage

Adequate storage facilities are provided to the raw material stores & finished goods stores. The condition of products & stores are periodically reviewed by store keeper.

4.1. 6.11. 4. Packaging

Packaging of finished product is controlled to safety & quality of finished product.

4.1. 6.11.5. Delivery

Up to agencies company vehicles are used for delivery.

4.1. 6.12. Control of quality records

Uswatte confectionary works LTD	**Document : 010**
Issued date :	Title : **Control of quality records**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Uswatta quality records are collected, filled, maintained & kept for a minimum of one year as describe in procedure no Doc: UCWL/QP/CQR / 001. All records are stored in a suitable environment & can be readily retrieved.

4.1. 6.13. Internal quality audit

Uswatte confectionary works LTD	**Document : 011**
Issued date :	Title : **Internal quality audits**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

In order to verify that activities comply with plan arrangements, work is regularly audited. A program is drawn up by the FM to ensure that all aspects of the quality system are audited at least once in a six months. The frequency of audit of any particular activity is defined by FM based on the experience of past audits and its relative importance.

Audit is conducted under the direction of the management representative by staff trained in auditing & suitably qualified in specialist skills where necessary. Procedures are defined in process no Doc :UCW/QP/IQA / 001 .Verification that corrective action has been taken is carried out by the auditor.

4.1. 6.14. Training

Uswatte confectionary works LTD	**Document : 012**
Issued date :	Title : **Training**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Uswatte confectionary works LTD contain staff with appropriate education training & experience to carry out their duties. In addition to that training & special courses for special duties are arranged according to requirements, in order to increase the quality & safety of the product. Procedure for training is describe in procedure no Doc :UCWL/QP/TRI/001

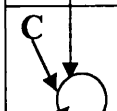
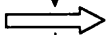
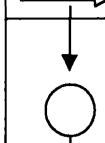
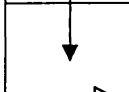
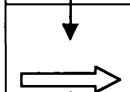
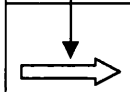
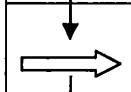
4.1.7. Development of quality plan

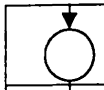
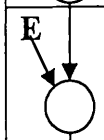
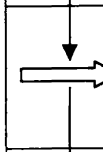
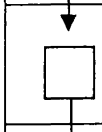
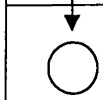
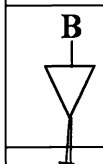
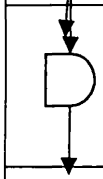
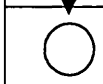
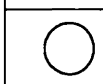
Quality plan was developed to describe how the quality of products which is defined by the relevant Sri Lanka Standards will be achieved. The prepared quality plan was as follows.

Uswatte confectionary works LTD	Document : UCWL/QP/PC/QPL/00i
Issued date :	Title : **Quality plan**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Flow chart	Activity	Monitoring parameter	Frequency	Responsibility	Method	Record	Remarks
	Raw material	Supplier certification Product certification	At each receiving	Q.C.A./ F.T.	Visual inspection UCWL/QP/WRI/IT/ARC/001	UCWL/ARC/001/001	
	Water	pH	Daily	Q.C.A./ F.T.	SLS 614	UCWL/ARC/001/002	In house lab
		Microbial quality	Once in 6 months				3rd party lab
		Chemical quality	Once in year				3rd party lab
	Glucorasa cooker	Cleaning of cooker	Daily	M.O.	Cleaning schedule	UCWL/HM/DSA/001	
		Working condition of cooker	Daily		UCWL/QP/WRI/001/002	UCWL/CW/001/001	
	Nid machine	Cleaning of machine	Daily	M.O	Cleaning schedule	UCWL/HM/DSA/001	
		Working condition of machine	Daily		UCWL/QP/WRI/001/003	UCWL/CW/001/002	
	Sugar coating	Cleaning of machine	Daily	M.O.	Cleaning schedule	UCWL/HM/DSA/001	

	coating machine	machine					
		Working condition of machine	Daily		UCWL/QP/WRI/001/004	UCWL/CW/001/003	
	Sorting table	Cleaning of table	Daily	Supervisor	Cleaning schedule	UCWL/HM/DSA/001	
	Packing machine	Cleaning of table	Daily	M.O.	Cleaning schedule	UCWL/HM/DSA/001	
		Working condition of machine	Daily		UCWL/QP/WRI/001/004	UCWL/CW/001/004	
▽	Store sugar in cooking area	Storage condition	Daily	Store Keeper	UCWL/QP/PC/WRI/STG/001	UCWL/SK/001/001	
		Pest harborage			Pest treatment schedule	UCWL/HM/DSA/001	
○	Weighing of sugar & water	Condition of balance	At every batch	Supervisor	UCWL/QP/PC/WRI/001/007	UCWL/CW/001/00	
		Formula			UCWL/QP/FORM/001		
○	Sugar & water add to cooker	Condition of cooker	At every batch	M.O.	UCWL/QP/WRI/001/002	UCWL/CW/001/001	
○	Cooking of sugar solution	Condition of cooker	At every batch	M.O.	UCWL/QP/WRI/001/002	UCWL/CW/001/001	
○ B	Add liquid glucose	Temperature of the cooker	At every batch	M.O.	UCWL/QP/WRI/001/002	UCWL/CW/001/001	
○	Unload the batch	Temperature of the cooker	At every batch	M.O.	UCWL/QP/WRI/001/002	UCWL/CW/001/001	
		Brix value	At every batch	F. T.			
⇨	Solution	Condition of the	At every	M.O.	UCWL/QP/WRI/001/002	UCWL/CW/001/001	

	transfer to mixing pan	solution	batch				
C  D	Add gelatine, citric acid , colour & flavour	Condition of gelatine pieces, citric acid colours,& flavours	At every batch	M.O.	UCWL/QP/WRI/001/002	UCWL/CW/001/001	
	Transfer to Nid machine	Condition of the solution	At every batch	M.O.	UCWL/QP/WRI/001/002	UCWL/CW/001/001	
	Moulding	Condition of the solution Condition of the machine	At every batch	M.O.	UCWL/QP/WRI/001/003	UCWL/CW/001/002	
	Trays transfer to store room	Temperature of store room RH of store room Storage condition Pest harborage	Three times per day	Q.C.A./ F.T.	UCWL/QP/WRI/STG/001/002 Pest treatment schedule	UCWL/SK/001/001 UCWL/HM/DSA/001	
	Trays transfer from store room to Nid machine	Condition of the machine Condition of the pieces	At every batch	M.O.	UCWL/QP/WRI/001/004	UCWL/CW/001/003	
	Pieces transfer to sugar coating drum	Condition of sugar coating drum Pressure of the steam	At every batch	M.O.	UCWL/QP/WRI/001/004	UCWL/CW/001/003	
	Trays transfer to store room	Storage condition Pest harborage	Three times per day	Q.C.A./ F.T.	UCWL/QP/WRI/STG/001/003 Pest treatment schedule	UCWL/SK/001/001 UCWL/HM/DSA/001	
	Sorting	Size, shape,	At every	Charge hand/	UCWL/QP/WRI/001/005	UCWL/CW/001/004	

		colour& condition f sugar coating	batch	Q.C.A.			
E 	Packing jujubes according to weight	Weight of the packets Condition of the packaging material	At every one hour	Q.C.A.	UCWL/QP/WRI/001/006	UCWL/CW/001/004	
	Transfer to finished good stores	Storage condition	Once a day	Store Keeper	UCWL/QP/WRI/STG/001/004 Pest treatment schedule	UCWL/SK/001/001 UCWL/HM/DSA/001	
	Finished product is testing	Composition of the product	Once in six months	F.T.	SLS 586:1982	UCWL/FPR/01	3rd party lab
	Finished product delivery	Condition of packaging	At every batch	Marketing manager	UCWL/QP/WRI/DEL/001	UCWL/QR/DEL /001	
B 	Store in store room	Storage condition	Daily	Store Keeper	UCWL/QP/PC/WRI/STG/001 Pest treatment schedule	UCWL/SK/001/001 UCWL/HM/DSA/001	
	Temporary store in cooking area	Storage condition	Daily	Supervisor	UCWL/QP/WRI/STG/001/004 Pest treatment schedule	UCWL/SK/001/001 UCWL/HM/DSA/001	
	Weighing	Formula	At every batch	Supervisor	Formula	UCWL/CW/001/00	
	Add to cooker	Temperaturenof cooker	At every batch	M.O.	UCWL/QP/WRI/001/002	UCWL/CW/001/001	
C	Store in	Storage condition	Daily	Supervisor	UCWL/QP/WRI/STG/001/001	UCWL/SK/001/001	

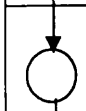
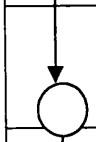
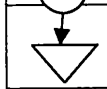
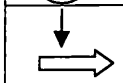
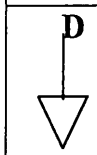
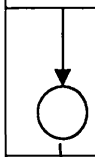
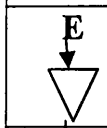
	storeroom						
	Weighing	Formula	At every batch	Supervisor	Formula	UCWL/CW/001/00	
	Dissolving of gelatine	Condition of the solution	At every batch	supervisor	UCWL/QP/WRI/STG/001/002	UCWL/CW/001/00	
	Keep in store room	Storage condition Pest harborage	Daily	Store Keeper	UCWL/QP/WRI/STG/001/002	UCWL/SK/001/001	
	Cut in to pieces	Size of the pieces	At every batch	Supervisor	UCWL/QP/WRI/001/002	UCWL/CW/001/001	
	Transfer to mixing pan	Condition of the solution	At every batch	M.O.	UCWL/QP/WRI/001/002	UCWL/CW/001/001	
 D	Store in store room	Storage condition Pest harborage	Daily	Store Keeper	UCWL/QP/WRI/STG/001/003 Pest treatment schedule	UCWL/SK/001/001 UCWL/HM/DSA/001	
	Weighing of citric acid, colours, flavours	Formula	At every batch	Supervisor	Formula	UCWL/CW/001/00	
	Transfer to mixing pan	Condition of the solution	At every batch	M.O.	UCWL/QP/WRI/001/002	UCWL/CW/001/001	
 E	Store in store room	Storage condition	Daily	Store Keeper	UCWL/QP/WRI/STG/001/001	UCWL/SK/001/001	
		Condition of packaging	At every batch	M.O.	UCWL/QP/WRI/001/006	UCWL/CW/001/004	

Table 4.3. Quality plan

4.1.8. Development of procedures for "Glucorasa" production

Procedures were developed to be in line with the requirement of product certification scheme and the quality policy of the manufacturer. Work instructions, specifications & schedules were developed as supporting documents for procedures. The prepared quality plan was as follows.

4.1. 8.1. Procedure for management Review

Uswatte confectionary works LTD	**Document Doc:UCWL/QP/ORG/002 :**
Issued date :	Title : **Procedure for management Review**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

The company under the chairmanship of the Managing director of Uswatta confectionary works LTD will review the quality system to assure & ensure that the requirement coming under the SLS product certification scheme is followed. The committee will have in its agenda inputs for review & will make decisions to take action on quality related issues.

Responsibility & authority

- Managing Director has overall responsibility for management review
- GM , FM, Food Technologist, Finance Manager, Marketing Manager & Personnel Manager are functionally responsible.

Implementation

- Management Review committee is assembled with Managing director of Uswatte confectionary works LTD as the chairman. In the absence of Chairman of Uswatte confectionary works LTD, GM will chair the meeting.
- Management representatives send a memo to the members at least one week before the meeting

- Inputs to the review will include results of audits, customer feedback & products' non- conformities.
- Committee meets at least once in a six month
- Attendance & minutes will be maintained

References

- Minutes of the management review committee Doc:UCWL/QP/ORG/ MMG/001
- Memo to members calling the meeting Doc:UCWL/QP/ORG/ MMG/002

4.1. 8.2. Procedure for purchasing

Uswatte confectionary works LTD	**Document Doc:** UCWL/QP/PR /001
Issued date :	Title : **Procedure for purchasing**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

To purchase quality raw materials which needs to production of high quality "Gluorasa" which conforms to SLS & company specifications, documented procedure is maintained by the Uswatta confectionary works LTD.

Responsibility & authority

- Purchasing manager is overall responsible for planning & implementation
- FM, Food Technologist & Store Keeper are functionally responsible

Implementation

- Once in three months quotations are obtained from present suppliers or potential suppliers
- Evaluate the quotations
- Evaluation is done on the basis of company specifications, SLS quality standards, price & delivery time

- Test the approved sample against company standards
- Test is done with the help of third party
- List of approved suppliers are forwarded to FM & Purchasing Manager
- Purchasing is done on the basis of requirement of the Store Keeper
- Store Keeper forward purchase requirements to Purchasing manager
- FM, Food Technologist forward required specifications & quality standards to Purchasing manager
- Purchasing manager forward purchasing order to approved supplier.

References

✓ Purchasing order Doc:UCWL/QP/PR / PO/001

4.1. 8.3. Procedure for Process Control

Uswatte confectionary works LTD	**Document Doc:** UCWL/QP/PC /001
Issued date :	Title : **Procedure for Process Control**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Process Control

To identify & plan production, which affects the quality & quantity to ensure that these process are carried out under controlled condition to obtain the right finished product in the first instance. Delivery is controlled to preserve the product up to the consumer.

To conduct the process in conductive environment safety aspect of employees and hygiene & sanitary aspects are monitored.

Responsibility & authority

- GM is overall responsible for planning & responsible.
- FM, Food Technologist, Finance Manager, Marketing Manager & Personnel Manager are functionally responsible.

Implementation

- Planning is done on the basis of sales forecast.
- Marketing section gives the annual sales forecast to GM
- GM & FM establish the plan according to sales forecast
- GM prepare the monthly production plan
- Production & marketing plan changes according to requirements.
- Proper infrastructure such as building, electricity, water supply, work spaces, process equipment & supporting services such as communication, transportation are provided.
- Process control shall be carried out according to production plan & quality plan.
- Every step is controlled & monitored. To move from one step to other, it is necessary to comply with inspection standards.
- Adequate workers should be used for production & machine operation and adequate work instructions are given
- Skilled workers are used to special process
- These processes are monitored continually.
- Maintenance department conduct a proper maintenance program according to maintenance schedule
- Inspection & test status shall be carried out according to inspection & testing procedure
- Packing , handling, storage shall be carried out according to prevent damage deterioration or contamination according to procedure
- Checked finished products stored in the company finished good storage.
- Food Technologist, Quality Control Assistant & production staff shall be conducted quality control throughout the procedure
- Delivery of finished goods shall be carried out through a net of agents & sales representatives

- Proper hygienic safe environment through the production maintained according to food hygiene manual
- Process steps shall be carefully controlled, monitored, recorded & properly maintained

References

- ✓ Machinery & equipment for production Doc :UCWL/QP/PC / ME/001
- ✓ Quality plan Doc :UCWL/QP/PC / QPL/001
- ✓ Work instruction Doc :UCWL/QP/PC / WRI/001
- ✓ Process for inspection Doc :UCWL/QP/IT /001.
- ✓ Machine operating instruction Doc : UCWL/QP/PC / MOI/001
- ✓ Maintenance schedule Doc :UCWL/QP/PC/ MS/ 001
- ✓ Process for inspection, handling, storage & delivery Doc :UCWL/QP/HSPD / 001
- ✓ Food hygiene procedures Doc :UCWL/QP/FH/ 001

4.1. 8.4. Procedure for inspection & testing

Uswatte confectionary works LTD	**Document Doc:** UCWL/QP/IT /001
Issued date :	Title : **Procedure for inspection & testing**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Inspection & training

Uswatte Confectionary Works Limited has established & maintains documented procedures of inspection & test activities for coming, in process & finished product in order to verify that the specified requirements of the products are met to get the consistent quality products right in the first instance & also to ensure that it stays right throughout shelf life.

Responsibility & authority

- Food technologist is overall responsible for all inspection & test activities
- QCA are functionally responsible to the Food technologist

Implementation

❖ **Incoming Inspection & training**

- Uswatte Confectionary Works Limited ensure that incoming items are used, until it has been inspected & tested or otherwise verified as conforming to specified requirements.
- Verification is in accordance with the documented procedure.
- Designated employee (Q.C.A) who has well experience & training done the incoming inspection
- When incoming product is released for urgent production purpose, prior to verification, it will be positively identified & recorded in oder to recall & replacement in the event of non conformity to specification
- Uswatte Confectionary Works Limited also carried out test on samples during approval of new supplier

❖ **Inprocess Inspection & training**

- Inspect and test the product as required by the quality plan
- Hold product until the required inspection have been completed or the necessary reports have been received & verified.
- Uswatte Confectionary Works LTD also carry out test on non conformities.

❖ **Final Inspection & training**

- Uswatte Confectionary Works LTD carry out all inspection & test in accordance with the quality plan to complete the evidence of conforms the finished products to the specified requirements.

- It s necessary that all specified inspection & test including those specified either receipt of product or in process have been carried out & that the result meet specified requirement.
- No product is released until all the above activities have been satisfactorily completed.
- Non conforming products are handling according to the documented procedure.
- All test records are documented & maintained

References

- ✓ Work instruction for incoming inspection Doc :UCWL/QP/WRI/ II/001/001
- ✓ Quality plan Doc :UCWL/QP/PC / QPL/001
- ✓ Work instruction for final inspection Doc :UCWL/QP/ WRI/ FI/001/002
- ✓ Procedure for control of non conforming products. Doc :UCWL/QP / CNC/001
- ✓ Procedure for quality records Doc :UCWL/QP/CQR/001

4.1. 8.5. Procedure for control of inspection, measuring & test equipment

Uswatte confectionary works LTD	**Document Doc :**UCWL/QP/IMT /001
Issued date :	Title : **Procedure for control of inspection, measuring & test equipment**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Uswatte Confectionary Works Limited has established, documented & maintained procedure to control, calibrate maintain monitoring & measuring device to demonstrate, the conformance of products to the specified requirements.

Responsibility & authority

- FM is overall responsible for control & calibration of equipment.
- Food Technologist is functionally responsible.

Implementation

- Calibration of equipment shall be done according to the documented calibration schedule.
- Calibration is carried out to conform to national standards
- Uswatte Confectionary Works Limited is maintained quality records of calibration

References

- ✓ Calibration schedule
- ✓ Procedure for control of quality records Doc :UCWL/QP/CQR/001

4.1. 8.6. Procedure for control of inspection & test status

Uswatte confectionary works LTD	**Document Doc :**UCWL/QP/ITS /001
Issued date :	Title : **Procedure for control of inspection & test status**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Uswatte Confectionary Works Limited has defined established & maintained a procedure to indicate the conformance & non conformance of products with regard to inspection & test performed.

Responsibility & authority

- Food Technologist is overall responsible.
- Q. C. A. & Store Keeper is functionally responsible.

Implementation

- Identification of inspection of test status, through out the production & storage is carried out to ensure that only product that has passed the inspection & tests are used in production & dispatched.
- Those which need for inspection & testing are kept in a specific area & indicated by Black colour tag
- The product or material which can rework , shall be placed in a specific area & indicated by Green colour tag
- Product or material which are rejected shall be indicated with Red colour tag
- Product or material which passed from the inspection shall be indicated with Blue colour tag
- These tags are maintained in both stores & processing areas.
- Non conforming products (rejected products) shall be disposed according to procedure for control of non conforming procedures

References

- ✓ Procedure for control of non conforming products. Doc :UCWL/QP / CNC/001

4.1. 8.7. Procedure for control of non conforming products

Uswatte confectionary works LTD	**Document Doc :**UCWL/QP/CNC /001
Issued date :	Title : **Procedure for of control non conforming products**
Revised data :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Uswatte Confectionary Works Limited control non conforming product by preventing them from unintended use in the production as well as prevent non conforming product being dispatched to the customer.

Responsibility & authority

- Food Technologist is overall responsible.
- Q. C. A. & Store Keeper are functionally responsible.
- Some actions shall be taken by the management review meeting

Implementation

- Below mention actions take to non conforming products.
    - Reworked or sorted to meet the required standards
    - Rejected & returned to the supplier
    - Regarded for alternative application
    - Rejected & scrapped
- Control of non conforming products shall be done according to schedule

References

- ✓ Schedule for control of non conforming products

4.1. 8.8. Procedure for control of non conforming products

Uswatte confectionary works LTD	**Document Doc :**UCWL/QP/HSPD /001
Issued date :	Title : **Procedure for handling , storage, packaging & delivery**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

To ensure the quality & wholesomeness of incoming material, in process material & finished goods, Uswatte Confectionary Works Limited define, established, implement & maintain procedure for handling, storage, packaging & delivery. This helps to prevent damage, deterioration of the products

Responsibility & authority

- ➢ Food Technologist is overall responsible.
- ➢ Q. C. A. & Store Keeper are functionally responsible

Implementation

- Handling shall be done according to work instructions.
- Storage shall be done according to work instructions
- Packaging shall be done according to work instructions
- Delivery shall be done according to work instructions

References

- ✓ Work instructions for handling Doc: UCWL/QP/WRI/HND/001

- ✓ Work instructions for storage Doc: UCWL/QP/WRI/STG /001
- ✓ Work instructions for packaging Doc: UCWL/QP/WRI/001 /006
- ✓ Work instructions for delivery Doc: UCWL/QP/WRI/DEL/001

4.1. 8.9. Procedure for control of quality records

Uswatte confectionary works LTD	**Document Doc :**UCWL/QP/CQR /001
Issued date :	Title : **Procedure control of quality records**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Records are controlled & maintained to provide evidence of conformity to requirements of the SLS product certification standards. Records from suppliers are also considered as quality records. Procedures provide for readily identification, access, fillings, storage & retrivability of quality records.

Responsibility & authority

- ➢ FM is overall responsible.
- ➢ Responsible persons from other sections are functionally responsible(Ex SK, FT, Q.C.A)

Implementation

- Responsible persons in each section shall be identified necessary quality records
- These records shall be filled, collected & put a index to identify them readily
- Records shall be stored to prevent any loss or damage
- Records shall be kept in specific designated area to easy retriveble
- The person who enter the quality records shall be with good knowledge & done it in a legible manner

- All quality records shall be kept for a minimum of one year or a specific retention time period as required in the section.
- At the completion of retention period in the section, they are forwarded to FM for transfer to the record room
- In the record room they shall be kept for a specified retention time. The records which are needed for legal knowledge shall be retained for specific period as determined by the FM.
- Quality records are disposed in a manner to prevent misuse & generally incinerated after the retention period

4.1. 8.10.Procedure for conducting internal quality audits.

Uswatte confectionary works LTD	**Document Doc :**UCWL/QP/IQA /001
Issued date :	Title : **Procedure for conducting internal quality audits**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Uswatte Confectionary Works Limited define, establish, document, implement & maintain procedure for internal quality audits to verify whether quality activities & related results comply with the planned arrangements & to determine the effectiveness of quality system. It also enables to make corrective action to move towards the zero defects, in the system & it lead to continual improvement.

Responsibility & authority

- FM is overall responsible.
- FT is functionally responsible

Implementation

- Internal quality audits shall be carried out at least once in three months to cover all twelve elements of the quality system.
- Independent trained team, who can perform audit independently, shall be appointed by the management representative.
- Audit shall be carried out according to annual audit plan.
- Result of the audit shall be documented in specific audit forms & discussed with the FM & FT.
- Corrective action & preventive action shall be carried out according to corrective action procedure.
- The audit report shall be reviewed at the management review meetings.

References

- ✓ Procedure for corrective action Doc: UCWL/QP/PR/C.A./001/
- ✓ Daily sanitation audit form **Doc:**UCWL/HM/DSA/001
- ✓ Monthly sanitation audit form **Doc:**UCWL/HM/DSA/002

4.1. 8.11. Procedure for corrective action

Uswatte confectionary works LTD	**Document Doc :**UCWL/QP/PR /M.C.A./001
Issued date :	Title **Procedure for corrective action**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

General

Uswatte confectionary works LTD has established documented and maintained a procedure for implementation and review of corrective action to prevent reoccurrence of non conforming including customer complains & returns.

Responsibility & authority

- GM is overall responsible
- FM is functionally responsible

Implementation

- All non conforming materials, finished products, machines and equipments are investigated.
- GM and FM take corrective action to eliminate causes & prevent reoccurrence
- Records of Corrective Actions are maintained and informed directly to those who are responsible
- GM will forward Corrective Action form to the management review meeting

4.1. 8.12.Procedure for training.

Uswatte confectionary works LTD	**Document Doc :**UCWL/QP/TRI /001
Issued date :	Title : **Procedure for training**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Uswatte Confectionary Works Limited define, establish, document, implement & maintain procedure for identify training needs and provide required training to all workers performing activities affecting quality. This increase knowledge & experience in the workers. So quality of the product continually improve with zero defects

Responsibility & authority

- Personnel manager is overall responsible.

➢ GM, FM & FT are functionally responsible

Implementation

- Management shall be identified training needs and requirements of the workers & training program shall be arranged according to the requirements.
- Training shall be done according to the scheduled program including all the levels of the organizational hierarchy.
- For annual training plan personnel manager shall be sent a memo to Fm & FT to requesting training needs of the section.
- Personnel manager prepare the plan according to needs of the section.
- Every employee shall be acknowledged each task and duties of the process & instructions set of the each task.
- All new recruits undergo on the job training under the supervision of supervisor.
- After the training, effectiveness shall be monitored by the immediate supervisor or manager.
- All training requirements & measurements of training effectiveness shall be documented.

References

✓ Training schedule

✓ Training records Doc: UCWL/QP/TRI/TR/001

4.1. 9. Work instructions

4.1. 9.1. Work instructions for gelatine soak

Uswatte confectionary works LTD	**Document Doc :**UCWL/QP/PC/ WRI/001/001
Issued date :	Title : **Work instructions for gelatine soak**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Follow up the hygiene instructions
- Wash basins with boiling water
- Mix gelatine and water (Follow up the formula)
- Mix well till gelatine fully dissolved.
- Cover with clean lids & keep in store room for 24 hours.

Reference

- Hygiene instructions for workers UCWL/QP/PC/HM/ 001

4.1. 9.2. Work instructions for make "Glucorasa" solution

Uswatte confectionary works LTD	**Document Doc :**UCWL/QP/PC/ WRI/001/002
Issued date :	Title : **Work instructions for make "Glucorasa" solution**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Follow up the hygiene instructions
- Follow up the cooker operating instructions.
- Remove the gelatine from the basin.
- Cut gelatine in to pieces using knife & cutting board.
- Add weighed water and sugar into cooker.

- Heat till 110^0C & add liquid glucose
- Unload the batch when temperature reach to 125^0C
- Add gelatine pieces in to sugar solution.
- Mix till pieces fully dissolve
- Add citric acid, colours, flavours & mix well
- Transfer the solution in to Nid machine using buckets.

Reference

- Hygiene instructions for workers UCWL/QP/PC/HM/ 001
- Cooker operating instructions UCWL/QP/PC/WRI/OI/ 001

4.1. 9.3. Work instructions for Nid machine

Uswatte confectionary works LTD	**Document Doc :**UCWL/QP/PC/ WRI/001/003
Issued date :	Title : **Work instructions for Nid machine**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Follow up the hygiene instructions
- Follow up the Nid machine operating instructions
- Feed trays in to Nid machine.(Trays should be cleaned, properly filled with starch and without any previous pieces.)
- Pour "Glucorasa" solution in to hopper.
- Take the trays with pieces & stack on the trolley.
- Trolley store in a store room according to storage work instructions for 24 hours.
- After 24 hours feed the trays with jujubes into Nid machine.

Reference

- Hygiene instructions for workers UCWL/QP/PC/HM/ 001
- Nid machine operating instructions UCWL/QP/PC/WRI/OI/ 002

4.1. 9.4. Work instructions for Sander

Uswatte confectionary works LTD	**Document Doc :**UCWL/QP/PC/ WRI/001/004
Issued date :	Title : **Work instructions for Sander**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Follow up the hygiene instructions
- Follow up the Sander operating instructions
- Feed sugar in to sander
- Switch on the sander
- Collect sugar coated pieces in to trays.(Tray should contain only one colour)
- Trays store in a store room according to storage work instructions for 24 hours.
- After 24 hours feed trays in to sander (per batch two trays from each colour) to remove excess sugar.
- Transfer jujubes in to basins.
- Transfer jujubes in to sorting tables

Reference

- Hygiene instructions for workers UCWL/QP/PC/HM/ 001
- Sander operating instructions UCWL/QP/PC/WRI/OI/ 003

4.1. 9.5. Work instructions for sorting

Uswatte confectionary works LTD	**Document** **Doc :**UCWL/QP/PC/WRI/001/005
Issued date :	Title : **Work instructions for sorting.**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Follow up the hygiene instructions
- Remove below mention pieces as waste.

  Pieces which has two or more several colours

  Pieces which not match to proper size or shape

  Pieces with high starch content & starch lumps
- Transfer the good quality pieces in to packing machine or packing table

Reference

- Hygiene instructions for workers UCWL/QP/PC/HM/ 001

4.1. 9.6. Work instructions for packing

Uswatte confectionary works LTD	**Document** **Doc :**UCWL/QP/PC/WRI/001/006
Issued date :	Title : **Work instructions for packing**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Follow up the hygiene instructions
- Follow up the packing machine operating instructions
- Check the condition of packaging material
- Package shall be printed with brand name, approved design and picture, amount, ingredients, address of the manufacturer & batch no.

- Weight of the packets shall be frequently monitored and recorded by Q.C.A.
- Q.C.A. shall be checked packets for the batch number, manufacturing date, expiry date & details shall be recorded.
- Samples shall be taken from each batch & keep separately for further analysis purposes.

4.1. 9.7. Work instructions for raw material weighing

Uswatte confectionary works LTD	**Document Doc :**UCWL/QP/PC/ WRI/001/007
Issued date :	Title : **Work instructions for raw material weighing**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Follow up the hygiene instructions
- Follow up the weighing balance operating instructions
- Weigh raw material according to formula
- After weighing keep raw material in proper place to avoid mixing with foreign matter,
- Employee shall be evaluated the organoleptic properties for off flavours, odours, discoloration and improper appearance and should be reported to the Q.C.A.

Reference

- Hygiene instructions for workers UCWL/QP/PC/HM/ 001
- Sander operating instructions UCWL/QP/PC/WRI/OI/ 002

4.1. 9.8. Work instructions for handling

Uswatte confectionary works LTD	**Document** **Doc :**UCWL/QP/WRI/HND/001
Issued date :	Title . **Work instructions for handling**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Raw material shall be handled with care to avoid damage and deterioration to raw material or packaging material
- Trolley or buckets which use to transfer the raw material should be clean
- Raw material shall not be dragged on the floor
- During processing product shall be handled with care to avoid the cross contamination

4.1. 9.9. Work instructions for delivery

Uswatte confectionary works LTD	**Document Doc :**UCWL/QP/WRI/DEL/001
Issued date :	Title . **Work instructions for delivery**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Marketing executive shall be evaluated and documented the condition of the vehicle prior to loading product
- Workers shall be aware and trained regarding safe handling of products during loading
- Product shall be dispatched from the stores based on the batch no
- Marketing executive & store keeper shall be monitored and recorded the batch no with issued customer details

- Product identification shall be maintained through loading and distribution to ensure that the product can be traced, if needed for recall or market withdrawal purposes.

4.1. 9.10. Incoming inspection method

Uswatte confectionary works LTD	**Document Doc :**UCWL/QP/PC/ WRI/II/001
Issued date :	Title **.Incoming inspection method**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Raw material and packing material receiving area shall be cleaned and to be kept in good condition
- Designated employee (Q.C.A) shall be verified that the raw material and packaging material from a company approved suppliers.
- Q.C.A. shall be evaluated and documented on a raw material receiving log, the condition of vehicle.
- If vehicle condition is acceptable, the Q.C.A. shall be verified that incoming material meet the company purchase specifications.
- If the product meet the purchase specifications then the Q.C.A. shall be evaluated the actual condition of raw materials and documented on a receiving log.
- The organoleptic property of the raw material shall be evaluated and documented on a receiving log.
- Raw material shall be well packed during receiving log and condition of packages shall be monitored.
- The Q.C.A. based on acceptance/ rejection criteria of the company shall be accepted the raw material or packaging material.

Reference

Specifications for raw material UCWL/QP/SPE/001-006

Specifications for raw material UCWL/QP/SPE/007-008

Acceptance rejection criteria UCWL/QP/WRI/ II/ARC/ 001

4.1. 9.11. 1. Acceptance rejection criteria

Uswatte confectionary works LTD	**Document Doc :**UCWL/QP/WRI/II/ ARC/001
Issued date :	Title . **Acceptance rejection criteria**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Accept lot if	**Reject lot if**
Comply with the company specifications	Not comply with the company specifications
Contain acceptable colour, flavour, odour or appearance	Contain unacceptable colour, flavour, odour or appearance
Free from foreign bodies such as stones, sand, plastic etc..	Presence foreign bodies such as stones, sand, plastic etc..
Not exceed expiry date	Exceed expiry date

Table 4.4. Acceptance rejection criteria

4.1. 9.12. Method for final inspection

Uswatta confectionary works LTD	**Document Doc :**UCWL/QP/WRI/FI/ 001/002
Issued date :	Title : **Method for final inspection**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Packing area shall be cleaned and kept in a good condition
- Q.C.A. shall be verified that the finished product comply with the company specifications.
- Seal integrity shall be frequently monitored by Q.C.A.

- Q.C.A. shall be checked the packaging for the batch no manufacturing date, expiry date & other details shall be recorded.
- Weight of the packets shall be frequently monitored and recorded by Q.C.A.
- Samples shall be taken from each batch & keep separately for further analysis purposes.
- Products which not comply with the finished product specifications shall be rejected.

4.1. 9.13. Work instructions for storage

4.1. 9.13.1. Work instructions for raw material storage

Uswatte confectionary works LTD	**Document Doc :**UCWL/QP/WRI/STG/001/001
Issued date :	Title : **Work instructions for raw material storage**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Product shall be stored separately
- Poisonous substances such as pesticides, lubricants and cleaning agents are labeled and stored properly in separate cupboards away from the food ingredients
- First In First Out system shall be applied for stores during issue of ingredients for production.
- Stores shall be cleaned according to cleaning schedule
- Keep stores free from pest according to pest treatment schedule

Reference

- Cleaning schedule
- Pest treatment schedule

4.1. 9.13.2. Work instructions for drying room

Uswatte confectionary works LTD	**Document** **Doc :**UCWL/QP/WRI/STG/001/002
Issued date :	Title : **Work instructions for drying room**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Maintain the temperature below 30^0C and RH below 40%
- Keep trolleys with trays away from walls
- Don't keep trolleys under the A.C. machine
- Door shall not be left for extended period and shall be closed immediately after use
- Keep stores free from pest according to pest treatment shedule
- First In First Out system shall be applied for stores during issue of ingredients for production.
- Stores shall be cleaned according to cleaning schedule

Reference

- Cleaning schedule
- Pest treatment schedule

4.1. 9.13.3. Work instructions for sugar coated jujubes storage

Uswatte confectionary works LTD	**Document Doc :**UCWL/QP/WRI/STG/001/003
Issued date :	Title : **Work instructions for sugar coated jujubes storage**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Keep trays separately according to colours
- Keep trays away from walls
- Keep stores free from pest according to pest treatment schedule

- First In First Out system shall be applied for stores during issue of ingredients for production.
- Stores shall be cleaned according to cleaning schedule

Reference

- Cleaning schedule
- Pest treatment schedule

4.1. 9.13.4. Work instructions for finished product storage

Uswatte confectionary works LTD	**Document Doc :**UCWL/QP/WRI/STG/001/004
Issued date :	Title : **Work instructions for finished product storage**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Finished product shall be stored in the stores until the product load in to the distribution vehicle.
- End product shall not be stacked directly on the floor
- During loading the product shall be transported using well cleaned trolleys
- Keep stores free from pest according to pest treatment schedule
- First In First Out system shall be applied for stores during issue of ingredients for production.
- Stores shall be cleaned according to cleaning schedule

Reference

- Cleaning schedule
- Pest treatment schedule

4.1. 9.14. Machine operating instructions

4.1. 9.14.1. Weighing balance operating instructions

Uswatta confectionary works LTD	**Document Doc :**UCWL/QP/PC/MOI/ 001/001
Issued date :	Title: **Weighing balance operating instructions**
Revised data :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Inspect the machine
- Connect the balance in to power supply
- If indicator show value, except zero, press tare button (blue colour)
- Follow up the formulation chart
- Use dry containers for material weighing
- Take the weight of dry container prior to take the weight of material and adjust the weight of material
- Disconnect the power supply after weighing of raw material
- Follow up the cleaning schedule
- Maintain the balance according to maintenance schedule

Reference

- Maintenance schedule

4.1. 9.14.2. "Glucorasa" cooker operating instructions

Uswatta confectionary works LTD	**Document Doc :**UCWL/QP/PC/MOI/ 001/002
Issued date :	Title: **"Glucorasa" cooker operating instructions**
Revised data :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Inspect the cooker
- Connect the cooker in to power supply

- Connect the cooker in to steam supply
- Add water and sugar in to cooker according to formula
- Heat till 110^0C and add liquid glucose
- When temperature reach to 125^0C and brix 83% disconnect stem and power supply and transfer the solution in to mixing pan
- Operator shall be evaluated the organoleptic properties such as off flavours, odours, discoloration and improper appearance of raw material and prepared solution
- If any defects obtain, should be reported to the Q.C.A.
- The defects of machine should be reported to the supervisor
- At the end of the production clean the cooker according to cleaning schedule
- Maintain the cooker according to maintenance schedule

Reference

- Maintenance schedule

4.1. 9.14.3. Nid machine operating instructions

Uswatta confectionary works LTD	**Document Doc :**UCWL/QP/PC/MOI/ 001/003
Issued date :	Title: **Nid machine operating instructions**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Inspect the cooker
- Connect the cooker in to steam supply
- Fix the appropriate mould in to machine according to days production
- Connect the cooker in to power supply
- Check whether trays properly fill with starch and cavities should be in order
- The machine should not be over fed with trays

- Control the speed of moving trays and hopper as well as deposit per tray in order to obtain pieces with proper size and shape
- Maintain the hopper temperature in between 80 ^{0}C- 90 ^{0}C
- Operator shall be evaluated the organoleptic properties such as off flavours, odours, discoloration and improper appearance of solution and pieces.
- If any defects obtain, should be reported to the Q.C.A.
- The defects of machine should be reported to the supervisor
- At the end of the production clean the machine according to cleaning schedule
- Maintain the machine according to maintenance schedule

Reference

- Maintenance schedule

4.1. 9.14.4. Sander machine operating instructions

Uswatta confectionary works LTD	**Document Doc :**UCWL/QP/PC/MOI/ 001/004
Issued date :	Title: **Sander machine operating instructions**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Inspect the cooker
- Switch on the power supply
- Connect the machine in to steam supply
- Maintain the pressure of the steam at 2 Kg /cm^2 in the input conveyer.
- When less sugar coating, increase the steam supply by adjusting the pressure.
- Operator shall be evaluated the organoleptic properties such as off flavours, odours, discoloration and improper appearance of pieces.
- If any defects obtain, should be reported to the Q.C.A.
- The defects of machine should be reported to the supervisor

- At the end of the production clean the machine according to cleaning schedule
- Maintain the machine according to maintenance schedule

Reference

- Maintenance schedule

4.1. 9.14.5. Packing machine operating instructions

Uswatte confectionary works LTD	**Document Doc :**UCWL/QP/PC/MOI/ 001/005
Issued date :	Title: **Packing machine operating instructions**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Inspect the cooker
- Check the condition of packing material such as brand name, approved design and colours, product name, ingredients, weight etc..
- Fix the wrapper holder with correct packing material according to weight
- Set the coder with the manufactured date, expiry date and price
- Check the proper sealing of packets.
- Check the manufactured date, expiry date and price
- If any defects in package, remove the package and repack the product
- At the end of the product disconnect the power supply
- At the end of the production clean the machine according to cleaning schedule
- Maintain the machine according to maintenance schedule

Reference

- Maintenance schedule

4.1. 9.15. Purchasing order.

Uswatta confectionary works LTD	**Document Doc :**UCWL/QP/PR /PO/001
Issued date :	Title : **Purchasing order**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

PURCHASING ORDER.				
Material	**Quantity**	**Specifications**	**Required date**	**Remarks**
Gelatine		UCWL/QP/SPE/001		
Sugar		UCWL/QP/SPE/002		
Liquid glucose		UCWL/QP/SPE/003		
Citric acid		UCWL/QP/SPE/004		
Flavours		UCWL/QP/SPE/005		
Colours		UCWL/QP/SPE/006		
Packing material		UCWL/QP/SPE/007		
Cartoons		UCWL/QP/SPE/008		

4.1. 9.16.Machine and equipment for production.

Uswatte confectionary works LTD	**Document Doc :**UCWL/QP/PR /PO/001
Issued date :	Title : **Machine and equipment for production**
Revised date:	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Steam jacketed cooker ("glucorasa" cooker)

Sander

Buckets

Trolleys

Scale

Nid machine

Packing machine

Baskets

Trays

4.1. 9.17. Product specifications

4.1. 9.17.1. Specification for finished goods

Uswatte confectionary works LTD	**Document Doc :** UCWL/QP/SPE/FIG/001
Issued date :	Title : **Specification for finished goods**
Revised date:	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Product name : Jujubes "Glucorasa"
- Colour of the pieces : Red, Green, White, Orange and yellow
- Flavour of the pieces;
    - Red – Strawberry
    - Green – Lemon
    - Yellow – Pineapple
    - White – Apple
    - Orange - Orange
- Chemical composition
    - Moisture percent by mass 10.00 – 15.00
    - Sulphated ash percent by mass max 1.00
    - Acid insoluble ash percent by mass max 0.2
    - Reducing sugars (calculated as dextrose) percent by mass min 10.0
    - Total sugars as sucrose percent by mass min 65
    - Gelatine content percent by mass 4-7
    - SO_2 mg/Kg max 70

- Pieces should have uniform shape
- Weight of the piece should around 4.5 – 5.0 g
- Pieces should contain only one colour
- Pieces should have uniform size
- Pieces should not contain starch
- Pieces should coated with white sugar

- Texture should be soft and firm
- Packages

  40g – Polythene packets

  70g – Polythene packets

  250g - Polythene packets

  175g – (Family pack) - Polythene packet covered with cardboard

  300g – (Gift pack) -- Polythene packet covered with cardboard

  1.8 kg – pack in PET bottle

4.1. 9.17.2. Specification for gelatine

Uswatta confectionary works LTD	**Document Doc :** UCWL/QP/SPE/001
Issued date :	Title : **Specification for gelatine**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Approved supplier:
- Product description :
  - Product name : Food grade halal gelatin
  - Colour : Pale yellow colour
  - Appearance : Coarse to fine translucent powder
  - Odour : Characteristic odour
  - Free from dirt or any extraneous matter
  - Partially insoluble in cold water. But swell and soft when immersed in it.
  - In hot water 5 to 10 times of it's own mass of water
- Analytical specification
  - Gel strength (6.67% - 10^0C)
  - Viscosity (6.67% - 60^0C) 2.5 – 6.5 m.Pa. s.
  - Partical size – 20
  - Loss on drying – 10.8% - 13%

- Residue in ignition (550^0C) – 1 – 2%

- Chemical requirements
  - Moisture percent by mass max 15.0
  - Total ash percent by mass max 3.00
  - SO_2 mg/Kg max 70
  - Nitrogen (dry basis) percent by mass min 15.0
  - pH at 27^0C +/- 2^0C 4.0 – 6.3

- Microbial limits
  - Aerobic plate count Not more than 500 per g
  - E Coli Absent in 1g
  - Salmonella Absent in 1g
  - Sulfite reducing anaerobes Not more than 10 CFU/g

- Trace metal limits
  - Zinc mg/Kg max 100
  - Arsenic mg/Kg max 2
  - Lead mg/Kg max 5
  - Copper mg/Kg max 30

- Packaging : Should be delivered in air tight bag
- Storage : Should be stored in cool and dry place
- Shelf life – 05 years

4.1. 9.17.3. Specification for coating sugar

Uswatta confectionary works LTD	**Document Doc :** UCWL/QP/SPE/002
Issued date :	Title : **Specification for coating sugar**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Approved supplier:
- Product description :
    - Product name : Sugar
    - Colour : white
    - Appearance : Crystals
    - Free from dirt or any extraneous matter
- Analytical specification
    - Polarization 05 min 99.7
    - Particle size – 20
    - Loss on drying for 3 hours at 105^0C percent by mass max 0.1
    - Colour in ICUMSA units max 60
- Chemical requirements
    - Moisture percent by mass max 0.1
    - SO_2 mg/Kg max 70
    - Invert sugar percent by mass min 0.04
- Trace metal limits
    - Arsenic mg/Kg max 1
    - Lead mg/Kg max 2
    - Copper mg/Kg max 2
- Packaging : Should be delivered in polythene or gunny bag with inner polythene bag
- Storage : Should be stored in cool and dry place
- Shelf life – 06 months

4.1. 9.17.4. Specification for liquid glucose

Uswatta confectionary works LTD	**Document Doc :** UCWL/QP/SPE/003
Issued date :	Title : **Specification for liquid glucose**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Approved supplier:
- Product description :
  - Product name : Liquid glucose
  - Colour : Colourless, transparent
  - Appearance : Semi liquid
  - Free from dirt or any extraneous matter
- Analytical specification
  - Polarization 05 min 99.7
  - Particle size – 20
  - Loss on drying for 3 hours at 105^0C percent by mass max 0.1
  - Colour in ICUMSA units max 60
- Chemical requirements
  - DE equivalent value 0.1
  - SO_2 200 – 400 ppm
  - pH 4.8 – 5.5
  - Baume value 45^0C

- Packaging : Should be delivered in metal or plastic drum
- Storage : Should be stored in cool and dry place
- Shelf life – 02 years

4.1. 9.17.5. Specification for citric acid

Uswatta confectionary works LTD	**Document Doc :** UCWL/QP/SPE/004
Issued date :	Title : **Specification for citric acid**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Approved supplier:
- Product description :
  - Product name : Citric acid
  - Colour : Colourless or white
  - Appearance : Granular to fine crystals
  - Odour : odourless
  - Flavor : Strong acid flavour
  - Free from dirt or any extraneous matter
  - Freely soluble in water & form clear solution in water.

- Chemical requirements
  - Citric acid percent by mass (as monohydrate) min 98.5
  - Sulphate as (SO_4) ppm max 100
  - Halides as (Cl) ppm max 100
  - Sulphated ash percent by mass max 0.1
  - Hevy metals as (Pb) ppm max 10
  - Moisture percent by mass max 8.8

- Trace metal limits
  - Zinc mg/Kg max 10
  - Arsenic mg/Kg max 1
  - Lead mg/Kg max 2
  - Copper mg/Kg max 3

- Packaging : Should be delivered in air tight bag
- Storage : Should be stored in cool and dry place
- Shelf life – 02 years

4.1. 9.17.6. Specification for flavours

4.1. 9.17.6.1. Specification for orange flavour

Uswatta confectionary works LTD	**Document Doc :** UCWL/QP/SPE/005/001
Issued date :	Title : **Specification for orange flavour**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Approved supplier:
- Product description :
  - Product name : Orange flavour
  - Colour : yellow
  - Appearance : Clear liquid
  - Odour : Orange odour
  - Flavor : Orange flavour
  - Free from dirt or any extraneous matter

- Analytical specification
  - Specific gravity ($20/4^0C$) 0.8380- 0.8580
  - Refractive index (20^0C) 1.4625 – 1.4825
  - Flash point 52^0C
- Chemical requirements

Flavoring material	approximately %(w/w)
o Nature identical flavouring	100

- Packaging : Should be delivered in brown colour bottles
- Storage : Keep it in original package, tightly closed protected from air & light at room temperature
- Shelf life – 01 years

4.1. 9.17.6.2. Specification for Pineapple flavour

Uswatta confectionary works LTD	**Document Doc :** UCWL/QP/SPE/005/002
Issued date :	Title : **Specification for Pineapple flavour**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Approved supplier:
- Product description :
    - Product name : Pineapple flavour
    - Colour : Colourless to pale amber
    - Appearance : Clear liquid
    - Odour : Pineapple odour
    - Flavor : Pineapple flavour
    - Free from dirt or any extraneous matter

- Analytical specification
    - Specific gravity ($20/4^0C$) 1.0230 – 1. 0330
    - Refractive index (20^0C) 1.4270 – 1.4370
    - Flash point 43^0C
- Chemical requirements

Flavoring material	Approximately %(w/w)
Nature identical flavouring	12
Propylene glycol(Solvent/carrier)	88

- Packaging : Should be delivered in brown colour bottles

- Storage : Keep it in original package, tightly closed protected from air & light at room temperature
- Shelf life – 01 years

4.1. 9.17.6.3. Specification for Strawberry flavour

Uswatta confectionary works LTD	**Document Doc :** UCWL/QP/SPE/005/003
Issued date :	Title : **Specification for Strawberry flavour**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Approved supplier:
- Product description :
  - Product name : Strawberry flavour
  - Colour : Colourless to pale amber
  - Appearance : Clear liquid
  - Odour :Strawberry odour
  - Flavor : Strawberry flavour
  - Free from dirt or any extraneous matter
- Analytical specification
  - Specific gravity ($20/4^0C$) 0.8200 – 0. 8536
  - Refractive index (20^0C) 1.4750 – 1.4823
  - Flash point 45^0C
- Chemical requirements

Flavoring material	Approximately %(w/w)
o Nature identical flavouring	22
o Propylene glycol(Solvent/carrier)	78

- Packaging : Should be delivered in brown colour bottles

- Storage : Keep it in original package, tightly closed protected from air & light at room temperature
- Shelf life – 01 years

4.1. 9.17.6.4. Specification for Apple flavour

Uswatta confectionary works LTD	**Document Doc :** UCWL/QP/SPE/005/004
Issued date :	Title : **Specification for Apple flavour**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Approved supplier:
- Product description :
  - Product name : Apple flavour
  - Colour : Colourless to pale amber
  - Appearance : Clear liquid
  - Odour : Apple odour
  - Flavor : Apple flavour
  - Free from dirt or any extraneous matter

- Analytical specification
  - Specific gravity ($20/4^0C$) 1.0200 – 1. 0300
  - Refractive index (20^0C) 1.4190 – 1.4340
  - Flash point 47^0C

- Chemical requirements

Flavoring material	Approximately %(w/w)
Nature identical flavouring	20
Propylene glycol(Solvent/carrier)	80

- Packaging : Should be delivered in brown colour bottles
- Storage : Keep it in original package, tightly closed protected from air & light at room temperature
- Shelf life – 01 years

4.1. 9.17.6.5. Specification for Lemon flavour

Uswatta confectionary works LTD	**Document Doc :** UCWL/QP/SPE/005/005
Issued date :	Title : **Specification for Lemon flavour**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Approved supplier:
- Product description :
    - Product name : Lemon flavour
    - Colour : Colourless to pale amber
    - Appearance : Clear liquid
    - Odour : Lemon odour
    - Flavor : Lemon flavour
    - Free from dirt or any extraneous matter

- Analytical specification
    - Specific gravity ($20/4^0C$) 1.0954 – 1. 09782
    - Refractive index (20^0C) 1.4250– 1.4386
    - Flash point 49^0C
- Chemical requirements

Flavoring material	Approximately %(w/w)
o Nature identical flavouring	22
o Propylene glycol(Solvent/carrier)	78

- Packaging : Should be delivered in brown colour bottles
- Storage : Keep it in original package, tightly closed protected from air & light at room temperature
- Shelf life – 01 years

4.1. 9.17.7. Specification for colours

4.1. 9.17.7.1. Specification for Yellow colour

Uswatta confectionary works LTD	**Document Doc :** UCWL/QP/SPE/007/001
Issued date :	Title : **Specification for Yellow colour**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Approved supplier:
- Product description :
  - Product name : Tartrazine
  - E number: E 102
  - Appearance : Powder
  - Colouring matter consist essentially of trisodium salt of 5-hydroxy-1-(p-sulphophenyl)-4-(p- sulphophenylazo)-pyrazole-3-carboxilic acid
  - Free from dirt or any extraneous matter

- Analytical specification
  - Total dye content corrected for sample dried at 105^0C +/-1^0C 105^0C +/-1^0C for 2 hours, percent by mass min 85
  - Matter volatile at 135^0C, percent by mass max 10
  - Matter insoluble in water percent by mass max 0.3
  - Chlorides & sulphates as sodium salts,total percent by mass max 5.0
  - Dye intermediates 0.5

- Trace metal limits
    - Arsenic mg/Kg max 1.0
    - Lead mg/Kg max 10
    - Copper mg/Kg max 10
- Packaging : Shall be packed in suitable container which not affect to nature & composition of the material within
- Storage : Keep it in original package, tightly closed protected from air & light at room temperature
- Shelf life – 01 years

4.1. 9.17.7.2. Specification for Orange colour

Uswatta confectionary works LTD	**Document Doc :** UCWL/QP/SPE/007/002
Issued date :	Title : **Specification for Orange colour**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Approved supplier:
- Product description :
    - Product name : Sunset yellow
    - E number: E 110
    - Appearance : Powder
    - Colouring matter consist essentially of disodium salt of 1-(4-sulphophenylazo)- 2- naphthol -6- sulphonic acid
    - Free from dirt or any extraneous matter

- Analytical specification
    - Total dye content corrected for sample dried at 105^0C +/-1^0C 105^0C +/-1^0C for 2 hours, percent by mass min 85
    - Matter volatile at 135^0C, percent by mass max 10
    - Matter insoluble in water percent by mass max 0.1
    - Chlorides & sulphates as sodium salts,total percent by mass max 5.0

- Trace metal limits
    - Arsenic mg/Kg max 1.0
    - Lead mg/Kg max 10
    - Copper mg/Kg max 10

- Packaging : Shall be packed in suitable container which not affect to nature & composition of the material within
- Storage : Keep it in original package, tightly closed protected from air & light at room temperature
- Shelf life – 01 years

4.1. 9.17.7.3. Specification for Red colour

Uswatta confectionary works LTD	**Document Doc :** UCWL/QP/SPE/007/003
Issued date :	Title : **Specification for Red colour**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Approved supplier:
- Product description :
    - Product name : Erythrosine BS
    - E number: E 127
    - Appearance : Powder

- Colouring matter consist essentially of disodium or dipotassium salt of 2:4:5:7:- tetraiodofluorescein
- Free from dirt or any extraneous matter

- Analytical specification
    - Total dye content corrected for sample dried at 105^0C +/-1^0C 105^0C +/-1^0C for 2 hours, percent by mass min 85
    - Matter volatile at 135^0C, percent by mass max 12
    - Matter insoluble in water percent by mass max 0.2
    - Chlorides & sulphates as sodium salts,total percent by mass max 2.0

- Trace metal limits
    - Arsenic mg/Kg max 1.0
    - Lead mg/Kg max 10
    - Copper mg/Kg max 10
    - Inorganic iodide 1000

- Packaging : Shall be packed in suitable container which not affect to nature & composition of the material within
- Storage : Keep it in original package, tightly closed protected from air & light at room temperature
- Shelf life – 01 year

4.1. 9.17.7.4. Specification for Green colour

Uswatta confectionary works LTD	**Document Doc :** UCWL/QP/SPE/007/004
Issued date :	Title : **Specification for Green colour**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Approved supplier:

- Product description :
  - Product name : Green S
  - E number: E 142
  - Appearance : Powder
  - Colouring matter consist essentially of 5-(4-dimethyl amino –α- (4-dimethyl iminocyclohexa -2,5- dienylidene) benzyl) -6- hydroxyl-7-sulfonatonaphthalene-z-sulphonate
  - Free from dirt or any extraneous matter

- Analytical specification
  - Total dye content corrected for sample dried at 105^0C +/-1^0C 105^0C +/-1^0C for 2 hours, percent by mass min 80
  - Matter volatile at 135^0C, percent by mass max 20
  - Matter insoluble in water percent by mass max 0.2
  - Chlorides & sulphates as sodium salts,total percent by mass max 2.0

- Trace metal limits
  - Arsenic mg/Kg max 3
  - Lead mg/Kg max 10

- Packaging : Shall be packed in suitable container which not affect to nature & composition of the material within
- Storage : Keep it in original package, tightly closed protected from air & light at room temperature
- Shelf life – 01 years

4.1.9.18 . Schedules

4.1.9.18.1. Schedule for control of non conforming products

Uswatta confectionary works LTD	**Document Doc : Schedule for control of non conforming products**
Issued date :	Title : **control of non conforming products**
Revised data :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Section	Product	Procedure	responsibility	Monitoring responsibility
Raw material receiving	Raw material	Reject & return to the supplier product which comply with rejection criteria	Q.C.A.	F.T.
	Packing material	Reject & return to the supplier product which comply with rejection criteria	Q.C.A.	F.T.
	Sugar or gelatine, which only contains foreign bodies. Other requirements	Sieve &remove foreign bodies and use for production	Q.C.A.	F.T.
Cooking	"Glucorasa" solution which not comply with standards	Destroy the product	Q.C.A.	F.T.
Sorting	Jujubes which out of shape	Cut into small pieces and sell in lower price or Sell as animal feed	Q.C.A.	F.T.
	Jujubes which out of proper size			
	Jujubes which mix with two or several colours			
	Pieces with high starch coat & starch lumps			
Packing	Poor sealing	Product repack	Q.C.A.	F.T.
	Weight not comply with standards	Product repack		
	Absence of price, batch code or other data	Paste missing data using labels		

4.1.9.18.2. Schedule for calibration

Uswatta confectionary works LTD	**Document Doc : Calibration schedule**
Issued date :	Title : **Calibration**
Revised data :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Equipment /Instrument	**Identification No**	**Method of calibration**	**Procedure**	**Frequency**	**Corrective action**	**Responsibility**	**Monitored by**
Scale		Against standard weight	Place the known weight on the scale. Check the display reading. Check for the deviation.	Once every batch	Inform to FT Call maintenance	Charge hand & Q.C.A.	FT
		External expertise	Send the scale to the external resource place to perform calibration	Once six months	-	FT	FM

Equipment /Instrument	Identification No	Method of calibration	Procedure	Frequency	Corrective action	Responsibility	Monitored by
pH meter		According to the instructions provided with the instrument	-	Daily	-	Q.C.A.	FT
"Glucorasa" cooker temperature indicator		Core temperature against thermo couple by external Temperature against digital thermometer by external	Check the temperature with the calibrated thermocouple and digital thermometer Check for the deviations	Three times per day	Inform to FT Inform to appropriate service personnel to get the error corrected	Machine operator	FM
Refractometer		External expertise	Send the scale to the external resource place to perform calibration	Once six months	-	Q.C.A.	FM

Table 4.6. Calibration schedule

4.1.9.18.3. Schedule for maintenance

Uswatta confectionary works LTD	**Document Doc : Maintenance schedule**
Issued date :	Title : **Maintenance**
Revised data :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Section	**Machine/ equipment**	**Maintenance procedure**	**Frequency**	**Corrective action**	**Responsibility**	**Monitoring responsibility**
Kitchen	"Glucorasa" cooker	Check the power connection	Daily	Inform to engineer assistant. Call maintenance department. Take action to avoid the error	M.O./ Engineer assistant	Engineer assistant/ Factory manager
		Check the temperature indicator	Daily			
		Check the steam supply	Daily			
		Check the leakage of steam	Daily			
		Check the leakage of solution	Daily			

		Check the working condition of agitator	Daily			
		Full service of the machine	Once a year			
Machine room	Nid machine	Check the power connection and water connection to hopper	Daily	Inform to engineer assistant. Call maintenance department. Take action to avoid the error	M.O./ Engineer assistant	Engineer assistant/ Factory manager
		Check the condition of wire mesh of hopper	Daily			
		Check the steam supply	Daily			
		Check the leakage of steam	Daily			
		Check the condition of brushes, scrapper & tray conveyer belt	Daily			
		Check the	Daily			

		condition of powder drum				
		Check the condition of nipple	Daily			
		Check the speed of hopper	Daily			
		Check the conveyer belt that take pieces to sander	Daily			
		Full service of machine	Once a year			
Sugar coating room	Sander machine	Check the power connection	Daily	Inform to engineer assistant. Call maintenance department. Take action to avoid the error	M.O./ Engineer assistant	Engineer assistant/ Factory manager
		Check the steam supply	Daily			
		Check the leakage of steam	Daily			
		Check the condition of steam conveyer belt	Daily			
		Check the condition of	Daily			

		brushes				
		Check the condition of sugar coating drum	Daily			
		Full service of machine	Once a year			
Packing section	Packing machine	Check the power connection	Daily			
		Check the condition & function of sensor	Daily			
		Check the condition of conveyer	Daily			
		Check the sealing integrity	Daily			
		Check the function of coder	Daily			
		Full service of machine	Once a year			

Table 4.7. Maintenance schedule

4.1.9.18.4. Schedule for training

Uswatta confectionary works LTD	**Document Doc : Training schedule**
Issued date :	Title : **Training**
Revised data :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Training topic	**Target group**						**Location**	**Details of trainee**	**Past record**	**Date of training**
	W	**MO**	**FT**	**S**	**SK**	**Q.C.A.**				
Basic concept & company quality policy	*	*	*	*	*	*	In house	GM		
Production process			*	*		*	In house	FM		
Responsibility of each employee	*	*	*	*	*	*	In house	GM		
Personnel hygiene	*	*		*	*	*	In house	FT		
Process control and maintain document			*	*		*	In house	FM		
Food contamination sources	*	*		*	*	*	In house	FT		
Maintenance procedure		*		*			In house	FM		
Calibration procedure		*	*				In house	FM		
5 S concept	*	*	*	*	*	*	In house	External source		
Attitude changing program	*	*	*	*	*	*	In house	External source		
Waste management			*				Internal	External source		
Preparation of cleaning chemicals & cleaning procedure	*	*	*				Internal	FT		

W- Worker MO- Machine operator FT – Food Technologist S- Supervisor SK – Store Keeper Q.C.A. –Quality Control Assistant

Table 4.8. Training schedule

4.1.10. Development of procedures for good hygienic practices

Procedures were developed according to SLS 143(Code of practice for general principles of food hygiene) to fulfill the SLS requirements for product certification.

4.1.10.1. Establishment

Uswatte confectionary works LTD	**Doc :**UCWL/QP/PR /FH /001
Issued date :	Title : Establishment
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

4.1.10.1.1. Location

- Uswatte Confectionary Works LTD establishment shall be located in areas not subject to regular and frequent flooding & shall be from objectionable odours, smoke, dust and other contaminents

4.1.10.1.2. Building and facilities

- Uswatte Confectionary Works LTD establishment shall provided adequate working space for the satisfactory performance of all operations
- The constructions shall be sound and ensure adequate ventilation, good natural and artificial lightning & easy cleaning. All construction material shall be such that they do not transmit any undesirable substance to the jujubes.
- The establishment shall be laid out & equipped so as to facilitate proper supervision of product hygiene including performs of inspection and control.
- The establishment shall be of such construction as to protect against the entrance of harboring of insects, birds, rodents, or other vermin as well as the entry of environmental contaminants such as smoke, dust.
- Building and facilities shall be designed to provide separate by partition, location, or other effective means, between those operations, which may cause cross contamination

- Establishment shall be laid out & equipped so as to ensure that products do not come in to contact with floors, walls, or other fixed structure except
- Those which are specially design for contact with jujubes or raw material.
- In rooms where production is under taken
- Floors shall be water proof, non absorbent, washable material, without crevices and should be easy to clean.
- Ceiling shall be so designed, constructed and finished as to prevent the accumulation of dirt and those which open shall be fitted with insect proof screen. Screen shall be easily movable for cleaning and kept in good repairs.
- Doors shall have smooth, non absorbent surfaces and, where appropriate, be self closing and close fittings
- Windows shall be easy to clean and glass shall be laminated in order to minimize the hazards when breakage occurs.
- Tube lights shall be covered in order to minimize the introduction of glass materials to the food.

4.1.10.1.3. Equipment

- Equipment & reusable containers coming in to contact with food shall be designed and constructed to ensure the safety of the food, adequate cleaned, dispatched, and maintained to avoid the contamination of food.
- The equipment and containers shall be made from stainless steel to ensure the safety of the food processing.
- Equipment shall be design to allow temperature to be monitored and controlled.
- Food grade lubricants shall be used for the equipments and machineries to ensure the safety.
- Necessary equipment/ machines shall be calibrated according to the documented calibrated schedule.
- Proper preventive maintenance program shall be maintained for the machineries

Reference

- Calibration schedule
- Maintenance schedule

4.1.10.2. Sanitary facilities

Uswatte Confectionary Works LTD	**Doc :**UCWL/QP/FH/ 002
Issued date :	Title :Sanitary facilities
Revised date :	Prepared by:
Revision no :	Reviewed by **:**
Page no :	Approved by:

4.1.10.2.1. Effluent & waste disposal

- Uswatte Confectionary Works LTD establishment shall have an efficient effluent and waste disposal system.
- All effluent lines shall be large enough to carry peak loads & shall be constructed in such a manner as to avoid contaminations of potable water.

4.1.10.2.2. Facilities for storage of waste and inedible material

- Facilities shall be provided for the storage of waste and inedible material prior to removal from the establishment.
- These facilities shall be design to prevent access to avoid contamination as food, potable water, equipment or building in the premises.
- Containers for waste, by products and inedible substance shall be identifiable, suitably constructed & properly covered with lid.

4.1.10.2.3. Changing facilities & toilets

- Adequate, suitable and conveniently located changing facilities & toilets shall be provided in all establishments.
- Toilets shall so design as to ensure hygienic removal of waste.

4.1.10.2.4. Hand washing facilities in processing area

Adequately and conveniently located facilities for hand washing shall be provided.

4.1.10.2.5. Cleaning and disinfection facilities

- All rooms used for preparing packing or other handling of jujubes shall be equipped with adequate facilities for cleaning and disinfecting implements, conveniently located for the use of personnel during operations.
- All facilities for cleaning, implements shall be of such nature and size to permit proper cleaning & disinfections.
- These facilities shall be constructed for corrosion resistant material & shall be capable of easily cleaned.

4.1.10.2.6. Lightning

- Adequate natural or artificial lightning shall be provided throughout the establishment, where appropriate the lightning shall not alter colours and the intensity & the intensity should not be

✓ 540 lux at all inspection room

✓ 240 lux at works room

- Light bulbs and fixtures suspended over production area shall be of a safety type & protected to prevent contamination of products in case of breakage.

4.1.10.2.7. Storage & disposal of waste

- Waste material shall be handled in such manner as to exclude contamination of food or potable water.
- Precautions shall be taking to prevent access to waste by pest.
- Waste shall be removed from the production area at intervals & at least daily. At least daily the waste storage area shall also be cleaned.

4.1.10.2.8. Discharge of waste water

- Waste water treatment plant shall be maintained & functioned properly in order to ensure the quality of the discharge water from the company to surrounding.

4.1.10.3. Incoming material

Uswatte Confectionary Works LTD	**Doc :**UCWL/QP/FH/ 003
Issued date :	Title :Incoming material
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

4.1.10.3.1. Incoming material

Reference UCWL/ QP/ IT /001

4.1.10.3.2. Water

- Use chlorine water according to SLS 971: 1982.
- Only potable water used in handling & processing.

4.1.10.3.3. Packaging

- Packaging design and material shall be provided adequate protection for products to minimize contamination, prevent damage.
- Packing material shall be non toxic and not pose a threat to the food safety & suitability of food under the specified condition, storage and use.
- Food grade packaging material shall be used to pack the final product.

4.1.10.4. Pest control

Uswatte Confectionary Works LTD	**Doc :**UCWL/QP/FH/ 004
Issued date :	Title : **Pest control**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

4.1.10.4.1. Preventing access

- Building shall be kept in good repair & condition to prevent pest access and to eliminate potential breeding sites.
- Holes, drains and other places where pests are likely to gain access shall be kept sealed.
- Where sealing is not possible measures like wire mesh screens shall be in place to reduce the problem of pest entry.

4.1.10.4.2. Monitoring & infestation

- There shall be an effective continuous program for the insects, birds, rodents or other vermin.
- Establishment & surrounding area shall be regularly examined for evidence of infestation and record shall be kept.

Reference

- Pest treatment schedule

4.1.10.4. Personal hygiene & health requirement

Uswatte Confectionary Works LTD	**Doc :**UCWL/QP/FH/ 005
Issued date :	Title : **Personal hygiene & health requirement**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

4.1.10.5.1. Hygiene training

- Managers shall be arranged adequate & continuing training for every worker.

4.1.10.5.2. Medical examination

- Persons who come in to contact with in the course of their work shall have a medical examine prior to their employment, if the official agency having jurisdiction acting on medical advice, consider that this is necessary, whether because of epidemiological considerations and medical examinant of product handler should be carried out at other times when clinically or epidemiologically indicated.

4.1.10.5.3. Injuries

- Any person who has cut or a wound shall be discontinued working with products and until he is suitably bandaged should not engage in the preparation, and handling, packaging or transportation of product.
- No person working in any establishment should wear exposed bandage unless the bandage is completely protected by water proof covering which is conspicuous in colour and is if such a nature that it cannot become accidently detached.
- Adequately first aid facilities should provided for this purpose
- When personnel in minor injury are permitted to continue working, cuts and wounds shall be covered by suitable water proof dressings.

4.1.10.5.4. Washing hands

- Hands shall always be washed before starting work, immediately after using the toilets hands should be washed immediately.
- Employees shall be washed their hands with permitted sanitizer as recommended procedure.

4.1.10.5.5. Personnel cleanliness

- Employees shall maintain high degree of personnel cleanliness and should wear uniform, apron, head covering during the processing.
- Wearing of gloves does not exempt the operator from having thoroughly washed hands.
- Gloves shall be made for an impermeable material except where there usage would be inappropriate or incompatible with the work involve.

4.1.10.5.6. Personal behavior

- Employees shall be retrained from behavior, which could result in contamination of food, such as smoking, sneezing, chewing or eating or coughing over an unprotected food.
- Personnel effect such as jewellery, watches, pins or other items shall not be worn or brought in to food handling areas.
- Employees shall not be directly touched the food item after handling of tools, floors and non food items.

4.1.10.5.7. Visitors

- All visitors shall be wear safety kits and shall wash their hands before enter in to processing area.

4.1.10.6. Cleaning and disinfection

Uswatte Confectionary Works LTD	**Doc :**UCWL/QP/FH/ 006
Issued date :	Title : **Cleaning and disinfection**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

4.1.10.6.1. Cleaning chemical

- Cleaning chemical shall be handled and used carefully and in accordance with manufactures instructions.
- Food grade cleaning chemical shall be used for cleaning purposes to avoid the risk of residuals leaving in the food item.
- Cleaning chemicals shall be stored separately from foods, in clearly identified containers to avoid the risk of contamination of food.

4.1.10.6.2. Cleaning program

- The cleaning method shall be specified and documented
- The cleaning program shall be daily assessed by responsible person and suitable corrective action shall be taken immediately.

Reference

- Cleaning schedule

4.1.10.7. Hygiene processing requirements

Uswatte Confectionary Works LTD	**Doc :**UCWL/QP/FH/ 007
Issued date :	Title : **Hygiene processing requirements**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

4.1.10.7.1. Prevention of cross contamination

- Effective measures shall be taken to prevent cross contamination of product and raw materials by direct or indirect contact with material at an earlier stage of process.
- Entry of the other workers to the department shall be restricted or limited and people who enter in to another section shall be removed their shoes and wear the shoes provided by the department.
- Any person handling raw material or semi processed product capable of contaminating the end product shall not come in to contact with any finished product unless and until they have cleaned all utensils used by them during the handling of raw material or semi processed products.
- Equipment such as trays, buckets, table shall not be used interchangeably for raw products and process products unless it is completely cleaned.

4.1.10.8. Process control

Uswatte Confectionary Works LTD	**Doc :**UCWL/QP/FH/ 008
Issued date :	Title : process control
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Reference

- Process Control -Doc /UCWL/QP/PC/001

4.1.10.9. Training and awareness

Uswatte Confectionary Works LTD	**Doc :**UCWL/QP/FH/ 009
Issued date :	Title : Training and awareness
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Reference

- Procedure for training - Doc /UCWL/QP/TRI/001
- Training schedule

4.1.10.10. Product information and labeling product

Uswatte Confectionary Works LTD	**Doc :**UCWL/QP/FH/ 010
Issued date :	Title : **Product information and labeling product**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

4.1.10.10.1. Product information

- Product shall bear a permanent marking in code or in clear to identify the factory and lot
- All product shall be accompanied by or bear adequate information to enable the next person in the food chain to handle, display, store and use the product safety.

4.1.10.10.2. Recall procedure

- Managers shall ensure the effective procedures are in place to deal with any safety and quality failures, rapid recall any implicated batch of finished product from the market.
- Receiving and dispatch report for the finished goods shall be maintained during the dispatched of finished product to the market to the record the issued batch no of the product.
- Recalled product shall be held under supervision until they are destroyed, used the purposes other than human consumption.

4.1.10.11. Transport of end product

Uswatte Confectionary Works LTD	Doc :UCWL/QP/FH/ 011
Issued date :	Title : Transport of end product
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Reference

- Procedure for delivery

4.1.11. Development of methods for good hygienic practices.

Methods were developed as supporting documents for hygienic procedures according to SLS 143(Code of practice for general principles of food hygiene) to fulfill the SLS requirements for product certification.

4.1.11.1. Safety of water

Uswatte Confectionary Works LTD	Doc :UCWL/QP/FH/ MTD/001
Issued date :	Title : Safety of water
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Uswatte Confectionary Works Limited will use city water throughout the processing. Well water will use only for the cleaning process.
- The Q.C. A. will daily monitor the visual parameters & pH of incoming water before use of production.

- Uswatte Confectionary Works Limited will perform microbiological analysis for both city & well water according to Sri Lanka Standards in every six months.
- Q.C.A. will perform monthly inspection to determine that no cross contamination exist between potable & waste systems.
- The results of the inspection will be recorded on the monthly sanitation audit form.

Reference

- Monthly sanitation audit form.
- Daily sanitation audit form.
- Records about water quality

4.1.11.2. Condition/ cleanliness of food contact surfaces

Uswatte Confectionary Works LTD	Doc :UCWL/QP/FH/ MTD/002
Issued date :	Title :**Condition/ cleanliness of food contact surfaces :**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Presently metal part of food contact surfaces of all equipment and utensils are made from stainless steel.
- Prior to replacing any major pieces of equipment quality control, production & maintenance departments will meet to evaluate the equipment.
- The Q.C.A. will evaluate the condition of plant, equipment, & utensils monthly. The results of these evaluations will be recorded on the monthly sanitation audit form.
- The company will issue workers apron, caps & gloves
- The supervisor will ensure that his or her employees are issued this gear.

- Employees are not allowed to use personnel gear in place of these items unless authorized by the supervisor.
- Employees are require maintain this gear in a sanitary and operatable condition and if necessary, must replace through the supervisor.
- Supervisor will check this gear at the beginning of each day.

Reference

- Monthly sanitation audit form.
- Daily sanitation audit form.

4.1.11.3. Prevention of cross contamination

Uswatte Confectionary Works LTD	Doc :UCWL/QP/FH/ MTD/003
Issued date :	Title : **Prevention of cross contamination**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Employees work on raw material handling area, cooking area or other section will not be assign to work on the packing area.
- If such an assignment necessary, supervisors must ensure that those employees clean and sanitize their hands, gloves & outer garments before working in packing area.
- Employees should remove their shoes and use slippers provided by the company in the processing area
- These practices will be observed by the supervisor and recorded in a daily sanitation audit form.

Reference

- Daily sanitation audit form.

4.1.11.4. Hand washing and sanitizing

Uswatte Confectionary Works LTD	Doc :UCWL/QP/FH/ MTD/004
Issued date :	Title : **Hand washing and sanitizing**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- Hand washing stations will be located at entrance to the process flow.
- The hand washing facilities will checked by the Q.C.A. for adequate supplies before production begins.

4.1.11.5. Protection from adulteration

Uswatte Confectionary Works LTD	Doc :UCWL/QP/FH/ MTD/005
Issued date :	Title : **Protection from adulteration**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- All cleaning compounds & sanitizing agents used by Uswatte Confectionary Works LTD are clearly identified & stored away from the process area and any other lubricants or chemical.
- The cleaning chemical supply company will provide quality assurance certificate.
- All food grade lubricants will be stored separately from non food grade lubricants and should be properly labeled.
- The maintenance department store and properly labeled all non food lubricants within the maintenance area. No fuels stores within the facility.

- The Q.C.A. will inspect the processing area daily during operation for possible contamination sources and make sure, toxic compounds are labeled & stored properly.
- These results are documented on the daily sanitation audit form.
- Supervisor must also ensure that no floor splashes occur in processing area during cleaning.
- They must also make sure that the area is cleaned, sanitized and inspected before restarting production

Reference

- Doc: UCWL/QP/PC/WRI/STG/001

4.1.11.6. Proper labeling and storage

Uswatte Confectionary Works LTD	Doc :UCWL/QP/FH/ MTD/006
Issued date :	Title : **Proper labeling and storage**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Reference

- Doc: UCWL/QP/PC/WRI/STG/001
- Doc : UCWL/QP/PC/MOI/ 001/005

4.1.11.7. Control of employee health condition

Uswatte Confectionary Works LTD	Doc :UCWL/QP/FH/ MTD/007
Issued date :	Title : **Control of employee health condition**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- As a part of new employee orientation, staff will be briefed on the need to notify immediate supervisors of any illness or injury that may lead to contamination of any part of process.
- Employees must notify immediate supervisors, if they have been exposed to a conformed disease outbreak of salmonella, hepatitis A or shigella especially when they are asymptotic.
- It is the responsibility of all supervisors to observe the apparent well being of their personnel.
- Employees should be reviewed for signs of medical problems, daily before operations begin by the supervisor.
- At any indication of injury or illness that may compromise the process due to contamination, the supervisor will remove that person from the process & report to personnel manager.
- If that employee cannot be assigned other duties, he or she will be sent home until the situation is alleviated or medical authority states that he may return to work.
- Observation will be recorded on the daily sanitation audit form.
- Separate toilet facilities are provided for males and females.
- During production hours, Q.C.A. check that toilet facilities are sanitary and well stocked.
- The maintenance department keep toilet facilities operable & in good repair.

Reference

- Daily sanitation audit form

4.1.11.8. Pest control system

Uswatte Confectionary Works LTD	Doc :UCWL/QP/FH/ MTD/008
Issued date :	Title : **Pest control system**
Revised date :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

- The presence of rodents, insects, birds or other pest in the plant is unacceptable.
- Pest control done according to schedule

Reference

- Daily sanitation audit form
- Pest treatment schedule

4.1.12. Schedules for hyigiene

4.1.12.1. Schedule for Pest treatment

Uswatta confectionary works LTD	**Document Doc : Pest treatment schedule**
Issued date :	Title : **Pest treatment schedule**
Revised data :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Type of pest	**Treatment**	**product**	**Chemical used**	**Method of application**	**Frequency**	**Monitoring responsibility**
Rodents	Bait traps	Finaly Rentiokill	Difeancuom based fentrol chemical	Solid material are allowed for ingest in all drainages, out side & selected areas	Continuously	Supervisor
	Traps	-	-	Keep in selected areas	Continuously	Supervisor
Cockroach, ants, flies & other insects	Insecticides liquid spray	Finaly Rentiokill	Carbonates, phyrothyroid based insecticides	Spray liquid to all drainages, outside & premises	Once in month	Supervisor
Flies & insect	Electronic fly catcher	-	-	Use wall mounted lamps	Continuously	Supervisor

Table 4.9. Pest treatment schedule

4.1.12.2. Schedule for cleaning

Uswatta confectionary works LTD	**Document : Cleaning schedule**
Issued date :	Title **Cleaning schedule**
Revised data :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Equipment /Tool/Location	**Method**	**Tools**	**Chemical**	**Strength**	**Procedure**	**Frequency**	**responsibility**
Floor	Dry cleaning	Broom	-	-	Sweep the floor with broom	End of production, when necessity occurs	Supervisor
	Wet cleaning	Mop, water, bucket	Teepol	5%	Wet the floor with cleaning chemical Rinse with water till chemical remove	End of production, when necessity occurs	Supervisor
Walls	Dry cleaning	Broom	-	-	Remove cob webs with broom	End of production	Supervisor
	Wet cleaning	Water, wiper, bucket, spray	Teepol	5%	Put chemical & water in to spray. Spray in to walls Remove water using wiper	End of production	Supervisor
"Glucorasa cooker"	Wet	Hot water,	-	-	Rub inside & out side of	End of production	Supervisor

	cleaning	brush			the cooker with brush Rinse with hot water Use separate brushes for inside & out side		
Basins use for gelatine making	Wet cleaning	Hot water, brush	-	-	Rub with brush Rinse with hot water	End of production	Supervisor
Bucket, cups & spoons use for sugar, liquid glucose transport	Wet cleaning	Hot water, brush	-	-	Rub with brush Rinse with hot water	End of production	Supervisor
Pan use for mix gelatine, flavour & colour	Wet cleaning	Hot water, brush	-	-	Rub with brush Rinse with hot water	End of production	Supervisor
Cups & spoons use for flavours & colours	Wet cleaning	Hot water, brush	-	-	Rub with brush Rinse with hot water	End of production	Supervisor
Knives & cutting boards use for gelatine cutting	Wet cleaning	Hot water, brush	-	-	Rub with brush Rinse with hot water	End of production	Supervisor
Weighing balance	Dry cleaning	brush	-	-	Remove dirt with brush	End of each weighing	Supervisor
Bucket use for transfer the "Glucorasa" solution	Wet cleaning	Hot water, brush	-	-	Rub with brush Rinse with hot water	End of production	Supervisor
Trays	Dry cleaning	Brush, scraper	-	-	Remove all flour & pieces adhere to trays by using brush	Once a week	Supervisor
Machine chamber							Supervisor

Mould	Dry cleaning	Brush,	-	-	Remove all flour adhere to mould by using brush	Daily	Supervisor
Hopper	Wet cleaning	Hot water, brush	-	-	Remove all retain solution in the wire mesh of hopper using the brush	End of production of each colour jujubes	Supervisor
Nipple	Wet cleaning	Hot water,	-	-	Remove all retain solution in the nipple using the hot water	End of production of each colour jujubes	Supervisor
Brushes inside the drum	Dry cleaning	Brush,	-	-	Remove all flour adhere to brush by using brush	Daily	Supervisor
Chain	Wet cleaning	Hot water, brush	-	-	Remove all retain solution in the chain using the brush	End of production of each colour jujubes	Supervisor
Conveyer belt	Dry cleaning	Brush,	-	-	Remove all flour & pieces adhere to belt by using brush	Once a week	Supervisor
Input conveyer belt	Wet cleaning	Hot water, brush	-	-	Remove all retain pieces in the belt using the brush	End of production	Supervisor
Sander machine	Dry cleaning	Brush,	-	-	Remove all sugar & pieces adhere to drum by using brush	End of production	Supervisor
	Wet cleaning	Hot water, brush	-	-	Remove all retain pieces & sugar in the drum using brush & hot water	Once a week	Supervisor
Trays & basins use to transfer the jujubes	Wet cleaning	Brush, water	-	-	Remove all sugar using brush	End of production	Supervisor

Sorting table	Wet cleaning	Piece of cloth, water	-	-	Remove all sugar using wet cloth	End of production	Supervisor
Hopper of packing machine	Wet cleaning	Piece of cloth, water	-	-	Rub with wet cloth dip in hot water & remove sugar	End of production	Supervisor
Bucket conveyer	Wet cleaning	Piece of cloth, water	-	-	Rub with wet cloth dip in hot water & remove sugar	End of production	Supervisor
Wrapper holder	Dry cleaning	Compressed air	-	-	Remove all dirt	End of production	Supervisor
Former	Dry cleaning	Compressed air	-	-	Remove all dirt	End of production	Supervisor
Sealing joss	Wet cleaning	Piece of cloth, water	-	-	Rub with wet cloth dip in hot water & remove sugar	End of production	Supervisor
Store rooms	Dry cleaning	Broom, brush	-	-	Sweep the floor with broom	daily	Supervisor

Table 4.10. Cleaning schedule

4.1.13.3. Daily sanitation audit form

Uswatte Confectionary Works LTD	Document :
Issued date :	Title : **Daily sanitation audit form**
Revised data :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Location	**Time**			**Comments**
	8.00 a.m.	**12.00**	**4.00 p.m.**	
1. Equipment cleaning & sanitation a) Equipment cleaned & sanitized before start up b) Product residues removes from equipment & clean according to cleaning schedule at the end of the production				
2. Employee attire a) Gloves, aprons, uniform & head cap in good condition				
3.Cross contamination a) Employee hand, gloves, equipment & utensils that contact unsanitary objects are washed & sanitized before contacting product. b) Employees on raw side wash hand, gloves and aprons before moving to packing side 3. Hand washing facilities				

a) Adequate water supply b) Adequate sanitizer supply				
4. Protection from hazards a) Cleaning compounds labeled & stored properly b) Lubricant labeled & stored properly c) Pesticides labeled & stored properly				
5. Employee health a) Employee do not show signs of medical problems that could compromise product				
6. Toilet facilities a) Toilets are clean & properly functioning				
7. Pest a) No pest in the processing area				

Table 4.11 Daily sanitation audit form

4.1.13.3. Monthly sanitation audit form

Uswatte Confectionary Works LTD	Document : **Doc:**UCWL/HM/DSA/001
Issued date :	Title : **Monthly sanitation audit form**
Revised data :	Prepared by:
Revision no :	Reviewed by :
Page no :	Approved by:

Location	**Condition**	**Comments**
1. No cross connection exist between potable & waste water system		
2. Condition of plant equipment & utensils		
3. Plant layout & structure does not occur any aspect of cross contamination		
4. No pest in factory premises		

Table 4.12. Monthly sanitation audit form

4.1.14. Hygiene instruction for workers

Uswatte Confectionary Works LTD	**Doc :**UCWLHM/HIW/ 011
Issued date :	Title : **Hygiene instruction for workers**
Revised data :	Prepared by:
Revision no :	Reviewed by **:**
Page no :	Approved by:

Wear clean uniform, aprons, hair caps & gloves in the processing area.

Wear hair caps properly. Hair should not come out.

Gloves should be clean

Aprons, caps, uniforms, gloves & slippers should not were in outside.

Wear clean uniform, aprons, hair caps & gloves before enter to processing area

Keep uniform, aprons, hair caps & gloves at proper place before go to outside.

Keep finger nails short & clean.

Rings, wrist watches & bangles should not wear in the processing area.

Wounds or cuts should properly cover with water proof material

Avoid from touching of nose, mouth, hair & skin during food handling.
Avoid from eating and drinking inside the processing area.
Workers should free from GI diseases and flu.
Workers should properly wash & dry their hands after going to the toilets.
Workers should properly wash their hands using sanitizer before start the work

4.2. Discussion

This study was mainly focus on identifying of the gap and establishing requirements for product certification (SLS) for jujubes. Jujubes is a gelatine based confectionary product marketed under brand name "Glucorasa"

Product certification which is known as the "SLS mark scheme" is a scheme that gives a third party guarantee on quality of a product This scheme enables the Sri Lanka Standards Institution to grant permits to local as well as overseas manufacturers producing goods conforming to Sri Lanka Standards to mark the "SLS" mark on their product.

According to Sri Lanka Standards for gelatine based confectionary (Sri Lanka Standards 585: Part 4 :1990) there are three requirements which need to fulfill by the manufacturer who wants to obtain the product certification.

(i.)The composition of the product should comply with the SLS requirements.

The analysis of composition of jujube was done in accordance to SLS 586 in the in Food science & Technology Laboratory of Faculty of Applied sciences & Livestock laboratory of Faculty of Agriculture. The results which obtained from the above analysis are as follows.

Characteristics	Requirements of SLS	Analyzed composition
Moisture percent by mass	10-15	8.1
Sulphated ash percent by mass max	1.00	0.820
Acid insoluble ash percent by mass max	0.2	0.125
Reducing sugars (calculated as dextrose) percent by mass min	10	18.95
Total sugars as sucrose percent by mass	65	69.06
Gelatine content percent by mass	4.0-7.0	4.31
SO_2 content percent by mass max	70	85.3

Table 4.13. Comparison between SLS requirement & analyzed composition

According to above results moisture and SO_2 content of the final product do not comply with the SLS requirements. So a gap is occurred in between the composition of the product & SLS requirements.

(ii) The manufacturer who seeks the SLS mark for their product should establish, document, implement and maintain the quality system complying with the twelve elements which are mentioned below.

(I)Management responsibility, (II) Quality system, (III) Purchasing, (IV) Process control, (V) Inspection & testing, (VI) Quality planning, (VII) Inspection & test status (VIII) Inspection & testing, (IX) Control of inspection, measuring & test equipment, (X) Control of non conforming products, (XI) Handling storage, packaging, delivery (XII) Training

The management should need documented details, which describe quality system as a means of ensuring that product conforms to requirements of the relevant Sri Lanka Standards should cover the 12 elements. So quality manual was prepared and it has been shown in chapter 4.1.8.

To obtain a proper quality product according to SLS, employees need better knowledge and awareness. It need quality plan, procedures, work instructions and schedules, which complying the SLS requirements. To fulfill the above gap quality

plan, procedures, work instructions, schedules and specifications which shown in chapter 4.1.9., 4.1.10. & 4.1.11. were prepared.

(iii) The product shall be processed, packed, stored and delivery in accordance with code of practice for general principles of food hygiene. (SLS143)

The manufacturer should establish, document, implement and maintain the good hygiene practices during the production process. To fulfill the above gap procedures, work instructions & schedules were prepared. It is been shown in chapter 4.1.11., 4.1.12., & 4.1.13

Location of the store room for sugar and gelatine should change to avoid cross contamination .Because it located in side the pieces drying room. When transport sugar and gelatine to cooking area it has possible to occur cross contamination. Building construction of kitchen should change to avoid cross contamination, to control of pest & to facilitate the cleaning process. Facilities which need to increase the personnel hygiene also should be provided in satisfactory level. These requirements will be discussed in details in recommendation part.

CHAPTER 05

Conclusion and recommendations

Conclusion

- Product certification which is properly known as the SLS mark scheme is a scheme that gives third party guarantee on quality of products.
- Three gaps were identified which associated with the jujubes production with reference to Sri Lanka Standards.

1. SO_2 & moisture composition were not comply with the SLS requirements
2. Neither the process nor the documentation did comply with the required twelve elements.
3. Absence of required documents of the production process regarding cord of practices for general principles of food hygiene.

- The identified gaps were filled by formulating the appropriate documents according to twelve elements required by Sri Lanka Standards.
- The documents which required filling the gap regarding the food hygiene accordance with code of practices for general principles of food hygiene were formulated.

Recommendations

- Production process is needed to be changed in order to maintain the SO_2 & moisture levels according to SLS requirements.
- Location of the store room for sugar & gelatine needed to be changed to avoid the cross contamination.

Building construction of kitchen needed to be changed in order to avoid cross contaminations and to control of pest.

- Construction of ceiling needed for kitchen.
- Screen is needed for two entrance in the kitchen to control the pest
- The floor of the kitchen should be built without cracks & crevices to avoid retention of water & facilitate the cleaning.

- Training program should be carried out for all levels of workers in the organization.
- Laboratory facilities should be located in side the plant in order to increase the quality of products.

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Appendix 1

Preparation of sample

Mince as quickly as possible with a sharp-edged knife or grind in a dry pestle and motar 150 g of the sample on a clean porcelain slab. Mince thoroughly to secure a uniform sample. Store the minced sample immediately in air tight glass container and use this wherever the use of prepared sample is indicated.

1. Determination of So_2

1 .1 - Reagents

1.1.1 . – Iodine standard volumetric solution 0.05 mol/l

Dissolve 20g of potassium iodide (analytical reagent grade) in 40ml of water in a glass stoppered one liter flask. Weight about 12.7g of iodine (analytical reagent grade) and transfer it by means of small dry funnel in to the prepared potassium iodide solution. Insert the glass stopper into the flask and shake until all the iodine has dissolved. Make up to the mark with distilled water. Standardized the iodine solution against a standard 0.05 mol/l solution of arsenic (III) oxide or a against a standard 0.01 mol/l solution of sodium thiosulphate.

1. 1. 2 – Concentrated HCl

1. 1. 3 – Starch 10g/l solution

1. 2 - Procedure

Set up the apparatus as in figure 1. Weight to the nearest milligram about 50g of the prepared sample and transfer using 200ml of recently boiled and cooled distilled water in to the distillation flask. Connect up the apparatus. Place a sufficient quantity of recently boiled and cooled distilled water in the beaker. Add 0.25 ml of starch solution (A.1. 3). Add 0.25 ml of iodine solution (A.1. 1) drop wise from the burette while stirring until a pale blue colour is produced. Place the beaker so that the end of

the condenser dips in the solution. Add through the tap funnel 20ml of HCl (A .1. 2). Heat the flask over the naked flame of a burner. So that the liquid boils in not more than 2 ½ min. Add iodine solution (A .1. 2) from the burette in to the receiving beaker. So that the pale blue colour is maintained throughout the titration. Continue the titration until the colour due to 0.1 ml of iodine persists for at least one minute. This shall be reached within a boiling time of 10 minutes.

Interference from sulfides may be prevented by adding 0.2g of copper acetate prior to the addition of HCl

1ml of 0.05 mol / l iodine is equivalent to 0.0016g of SO_2.

Note – Care shall be taken to prevent charring the sample at the bottom of the distillation flask.

1 . 3 - Calculation

$$SO_2 \text{ mg/ Kg} = \frac{V^* 0.0016^* 10^6}{m}$$

V = volume in ml , of 0.05 mol/ l iodine required for titration

m = is the mass in grams of the sample taken for test

2 . Determination of moisture

2. 1. Procedure

Weight to the nearest milligram about 5g of prepared sample in to a tared weighing bottle having a diameter of about 40 mm and a height of 25mm. distributed the material as evenly as practicable over the bottom of the bottle by gentle sidewise movements. Place the bottle in a vacuum oven, remove the cover of the bottle and dry the material for 6 hours at 80 +/- 1 ^{0}C at a pressure not exceeding 5mmHg. Allow to bottle to cool to room temperature and weigh.

2. 2. Calculation

$$\text{Moisture percentage by mass} = \frac{100\,(m-m_1)\,g}{m\ g}$$

m.- Mass of the prepared sample taken for the experiment

m_1- Mass in grams of the material after drying 6 hours

3 . Determination of sulphated ash

3. 1. Reagents

3.1.1 – Concentrated H_2SO_4 (sp. gr. 1.84)

3. 2. Procedure

Weigh to the nearest milligram about 5g of prepared sample in to a 9 cm diameter platinum or silica dish. Add few drips (about 1.5 ml of conc: H_2SO_4 to the material in the dish. Gently heat the dish on a hot plate until the material is well carbonized and then increase the heat until the evolution of sulphuric acid fumes ceases. Ash the carbonized matter in a muffle furnace at 600 +/-20^{0}C .

Cool the ash and moisten it with a few drops of conc: H_2SO_4, heat strongly on a hot plate until sulphuric acid fumes ceases to be evolved and finally ash the muffle furnace at 600 +/-20^{0}C. Repeat the process of heating in the muffle furnace for 30 minutes cooling and weighing till the difference between two successive weighing is less than 10 mg. Record the lowest weight.

3 . 3. Calculation

$$\text{Sulphated ash percentage by mass} = \frac{100\,m_1\,g}{m\ g}$$

m_1- Mass in grams of the ash

m.- Mass in grams of the of the prepared sample

4 . Determination of acid insoluble ash

4. 1. Reagents

4.1.1 – Dil: HCl acid , approximately 5N (Prepared from Conc: HCl)

3. 2. Procedure

Weigh to the nearest milligram about 20g of prepared sample in to tared, clean and dry porcelain dish. Ignite the material in the dish with the flame of a Mekar burner for about one hour. Complete the ignition by keeping in a muffle furnace at 600 +/- 20^0C until grey ash result. Cool in a dedicator. To the ash, add 25 ml of the dil: HCl acid. Cover with a watch glass and heat on a water bath for 10 minutes. Allow to cool and filter the contents of the dish through Whatman filter paper No 42 or its equivalent. Wash the filter with water until the washings are free from chlorides.

Return the filter and the residue to the dish. Keep it an air oven maintained at 105 +/- 2^0C for about 3 hours. Ignite in the muffle furnace at 600 +/- 20^0C for 1 hour. Cool the dish in a dedicator and weigh. Heat again for 30 minutes in the muffle furnace. Cool and weigh. Repeat this process of heating for 30 minutes. Cooling and weighing till the difference between two successive weighing is less than 1mg. Note the lowest weight.

4 . 3. Calculation

$$\text{Acid insoluble ash percentage by mass} = \frac{100\,(m_2 - m)\ g}{(m_1 - m)\ g}$$

m_1- Mass in grams of the porcelain dish with the acid insoluble ash

m.- Mass in grams of the of the empty porcelain dish

m_2 - Mass in grams of the of the empty porcelain dish with the prepared sample taken for the experiment

5 . Determination of gelatin content

5. 1. Reagents

5.1.1 – Catalyst mixture

Mix intimately 400g of Na_2SO_4 , 16 g of hydrated copper. sulphate and 3of Selenenium dioxide

5.1.2 – Screened methyl red indicator

Dissolve 0.016g of methyl red & 0.083g of bromocresol green in. 100ml of alcohol

4. 2. Procedure

Weight out a suitable quantity of the material & transfer it to a dry 500ml- 800ml kjeldhal digestion flask. Add 8g of catalyst mixture & 20ml – 25ml of conc : nitrogen free H_2SO_4 acid & mix by swirling. Heat the flask fitted with a loose pear stopper in an inclined position in fume cupboard. Apply heat gently at first, but when the initial frothing has subsided, increase the gas supply gradually until the liquids at a moderate rate. Swirl & shake the flask time to time in oder to wash down any charred material adhering to the flask.

Continue the heating for one hour after the liquid has become clear. Allow the flask to cool. Dilute the mixture not more than 200 ml of tap water & transfer it to a one liter distillation flask. Wash the mixture with several small volumes of tap water until the total volume is about 400ml. To the 500ml receiving flask add 50 ml of 2% boric acid solution & a few drops of screened methyl red indicator. Add one large piece of granulated zinc to the distillation flask & connect the apparatus to the delivery tubes dipping below the boric acid solution. Ensure that all the joints are tight. Add through the tap funnel 75 ml of 50% NaOH solution. Close the funnel & confirm that the liquid is alkaline after mixing. Boil the alkaline liquid in the flask, taking care to prevent undue frothing in the early stages, and distill over about 300ml. Open the tap funnel before turning off the gas, wash down the delivery tube into the receiver & titrate cold distillate with 0.1 N H_2SO_4 acid. A blank should be carried out from time to time

5. 3. Procedure

$$\text{Total Nitrogen} = \frac{\text{A-B} * 0.0014 * 100}{\text{nm}}$$

Gelatine content = Total Nitrogen * 5.55

where

A = Volume in ml of 0.1 N H_2SO_4 need for titration

B = Volume in ml of 0.1 N H_2SO_4 need for blank titration

Nm = Mass in gram , of the material taken for the test

One ml of 0.1 N H_2SO_4 acid = 0.0014g of nitrogen

7. Determination of Redusing sugar

7. 1. reagents

7. 1. 1. Stock solution of dextrose

Weigh accurately 10g of anhydrous dextrose in to 1 liter graduated flask and dissolve in water. Add to this solution, 2.5g of benzoic acid, shake to dissolve the benzoic acid and make up the volume to the mark with water. (This solution shall not be used after 48 hours.)

6. **1. 2. Standared dextrose solution.**

Dilute a known aliquot of the stock solution of dextrose (See 7. 1. 1.) with water containing 0.25%(m/v) of benzoic acid to a such a concentration that more than 15ml but less than 50 ml of it will be required to reduce all the copper in the Fehlings solution take for titration. Note concentration of anhydrous dextrose in this solution as milligrams per 100 ml. Prepare this solution a fresh every day.

Note – When 10ml (see 6. 3. 1. 1.) of Fehling's solutions are taken for titration a standared dextrose solution containing 0.11% to 0.30% (m/v) of anhydrous dextrose is convenient for use.

7. 1. 3. Methylene blue indicator solution

Dissolve 0.2 g of Methylene blue in water and dilute to 100ml.

7. 1. 4. Fehlings solution

Prepared by mixing immediately before use, equal volumes of solution A & solution B

7. 1. 4. 1. Solution A

Dissolve 34.639g of copper sulphatein water, add 0.5 ml of consentrated H_2SO_4 (sp.gr. 1.84) and dilute to 500ml in a graduated flask. Filter the solution through prepared asbestose.

7. 1. 4. 2. Solution B

Dissolve 173g of potassium sodium tartrate and 50 g of NaOH in water , dilute to 500ml in a graduated flask and allow the solution to stand for two days. Filter the solution through prepared asbestose.

8. 1. 4. 3. Standardization of Fehlings solution

Pour standared dextrose solution (see 7. 1. 2)in to a 50 ml burette (see note 3 under 7. 2. 3.). Find the titre (i. e. the volume of standared dextrose solution required to reduce all the copper in 10 ml of Fehlings solution) corresponding to the concentration of standared dextrose solution from table 1.(If for ex : the standared dextrose solution contains 167.0 mg of anhydrous dextrose per 100ml the corresponding titre would be 30ml) Pipette 10ml (See 7. 3.1. 1.) of Fehlings solution in to a 300ml conical flask and run in from the burette almost the whole of standared dextrose solution required to effect reduction of all the copper , so that no more than 1ml will be required later to complete. Heat the flask containing the mixture over a wire gaze. Gently boil the contents of the flask for two minutes. At the end of the two minutes of boiling add without interrupting boiling 1ml of methylene blue indicator solution, while the contents of the flask continue to boil began to add standared dextrose solution (1or 2 drop at a time) from the burette till the blue colour of the indicator just disappears (the titration should be completed within 1 minute , so that the content of the flask boil altogether for three minutes without interruption. (see note 2 under 7. 2. 3.). Note the titre (i.e. the total volume in ml of standared dextrose solution used for the reduction of all the copper in 10 ml of Fehlings solution).

Multiply the titre (obtained by direct titration) by the number of mg of anhydrous dextrose in 1ml of the standared dextrose solution to obtain the dextrose factor. Compare this factor with the dextrose factor given in table 1 determine correction., if any , to be applied to the dextrose factor derived from table 1.

7. 2. Procedure

7. 2. 1. Preparation of solution

Weigh to the nearest mg about 3 -4 g of the prepared sample (See 3. 1. 1.) in soxhlet extraction thimble and extract the fat in a soxhlet apparatus using per ether. Take out carefully the thimble along with the fat free material from the soxhlet apparatus and dry the same to be free from the pet ether. Dissolve carefully the entire fat free sample in a small quqntity of water in a beaker. If necessary add water to the thimble and dissolve the adhering material. Collect the washings in to the beaker. Warm to temperature of 50 – 60 ^{0}C. Cool it. Filter through a Whatman paper no 40 or its equivelant. Collec the filterate in a 100ml graduated flask. Wash the filter paper and insoluble starch residue, if any, on the filter paper carefully.Collect the washings in to the graduated flask. Make up to the mark with water.

7. 2. 2. Incremental method of titration

Pour the prepared solution (see 7. 2. 1.)in to a 50 ml burette (see note 3 below 7. 2. 3.)pipette 10 ml of Fehling solution into 300 ml of conical flask and run in from the burette 15 ml of the pre pared solution. Without further dilution, heat the contents of the flask over a wire gauze and boil. (After liquid has been boiling for about 15 seconds it will be possible to judge if almost all the copper is reduce by the red colour imparted to the boiling liquid by the suspended cuprous oxide.) When it is judged that nearly all the copper is reduced add 10 ml of methylene blue indicator solution (see note 1 below). Continue boiling the contents of the flask for 1 or 2 minutes. From the commencement of ebullition and then add the prepared solution in small quantities (1ml or less at time), allowing the liquid to boil for about 10 second, between successive additions, till the blue colour of the indicator just disappears (see the note 2 below 7. 2. 3.) In case there still appears to be much unreduced copper after the mixture of Fehling solution with 15 ml of the prepared solution has been boiling for

15 seconds, add the prepared solution from the burette, in large increment(more than 1ml at a time according to judgment) and allow the mixture to boil for 15 seconds after each addition. Repeat the addition of prepared solution at intervals of 15 seconds until it is considered unsafe to add a large increment of the prepared solution. At this stage, continue the boiling for an additional 1 or 2 minutes, add 1 ml of methylene blue indicator solution and complete the titration by adding the prepared solution in small quantities (1ml or less at time) (see note 2 below)

Notes

1. It is advisable not to add the indicator until the end point has been nearly reached , because the indicator retains its full colour until the end point is almost reached and thus gives no warning to the operator to go slowly.

7. 2. 3. Standard method of titration

Pipette 10 ml of Fehling solution into 300 ml of conical flask and run in from the burette almost the whole of the pre pared solution required to effect reduction of all the copper. (Determine under 7. 2. 2.). So that if possible, not more than 1 ml will be require latter to complete the titration. Gently boil the contents of the flask for 2 minutes. At the end of 2 minutes of boiling, add without interrupting boiling 1ml of methylene blue indicator solution, while the contents of the flask continue to boil began to add prepared solution (1or 2 drop at a time) from the burette till the blue colour of the indicator just disappears (the titration should be completed within 1 minute , so that the content of the flask boil altogether for three minutes without interruption.

In the case of doubt, the flame may be removed from the wire gauze for 1 or 2 seconds and the flask held against a sheet of white paper.(A holder of paper , suitably fixed around neck of the flask, without the risk of overblanching it). The top edge of the liquid would appear bluish, if indicator is not completely decolourised. It is unadvisable to interrupt the boiling for more than a few second as the indicator undergoes back oxidation rather rapidly, when air is allowed free access in to the flask, but there is no danger of as long as a continous stream of steam is issuing from the mouth of the class.

7. 3. Calculations

7. 3. 1.

Refer to table 1 for the dextrose factor corresponding to the titre (determined as given under 7. 2. 3.) and apply the correction previously determined under 7. 1. 5. 3. calculate the dextrose content of the prepared solution(See 7. 2. 1. as follows)

7. 3. 1. 1

Instead of using 10 ml of Fehlings solution, a 25 ml portion may also be substituted throughout the procedure (including standardization of Fehlings solution under 7. 1. 5. 3.) In this case, the standared dextrose solution of the material (See 7. 2.1.) shall contain 0.25 % to 0.75 % (m/v) of anhydrous dextrose and table 2 shall be used for all calculations.

7. 3. 2.

$$\text{Reducing sugars percentage by mass} = \frac{m * 100}{M}$$

Where

m = milli grams of anhydrous dextrose in 1 ml of the solution of the material (See 6. 3. 1.)

M = mass in g of the prepared sample used for making 100ml of solution

8. Determination of sucrose

8. 1. Reagents

8. 1. 1. Conc : HCl acid sp. gr. 1. 16 analytical reagent grade

8. 1. 2. Fehlings solution

Prepared by mixing immediately before use, equal volumes of solution A & solution B

8. 1. 2. 1. Solution A

Dissolve 34.639g of copper sulphate in water, add 0.5 ml of consentrated H_2SO_4 (sp.gr. 1.84) and dilute to 500ml in a graduated flask. Filter the solution through prepared asbestose.

8. 1. 2. 2. Solution B

Dissolve 173g of potassium sodium tartrate and 50 g of NaOH in water , dilute to 500ml in a graduated flask and allow the solution to stand for two days. Filter the solution through prepared asbestose.

Note Table 1 and 2 show for the standared method of titration, the values corresponding to integral ml of the sugar solutions intermediate values being obtained by interpolation

8. 2. Procedure

Take 10 ml of the prepared solution (See 6. 2. 1.) in a conical flask add 1.5 ml of the conc : HCl acid and about 10ml of water. Heat the flask at 60^0C – 70^0C for 10 minutes in a water bath. Cool immediately and neutralized with 30 % NaOH (m/v) and transfer quantitatively the neutralized inverted solution to a graduated flask and make up the volume to 100 ml

Determine the reducing sugar in the inverted solution as described in 7

8. 3. Calculations

8. 3. 1. Sucrose percentage by mass $= (Q - R) * 0.95$

Where

Q = Total sugar (after inverting)

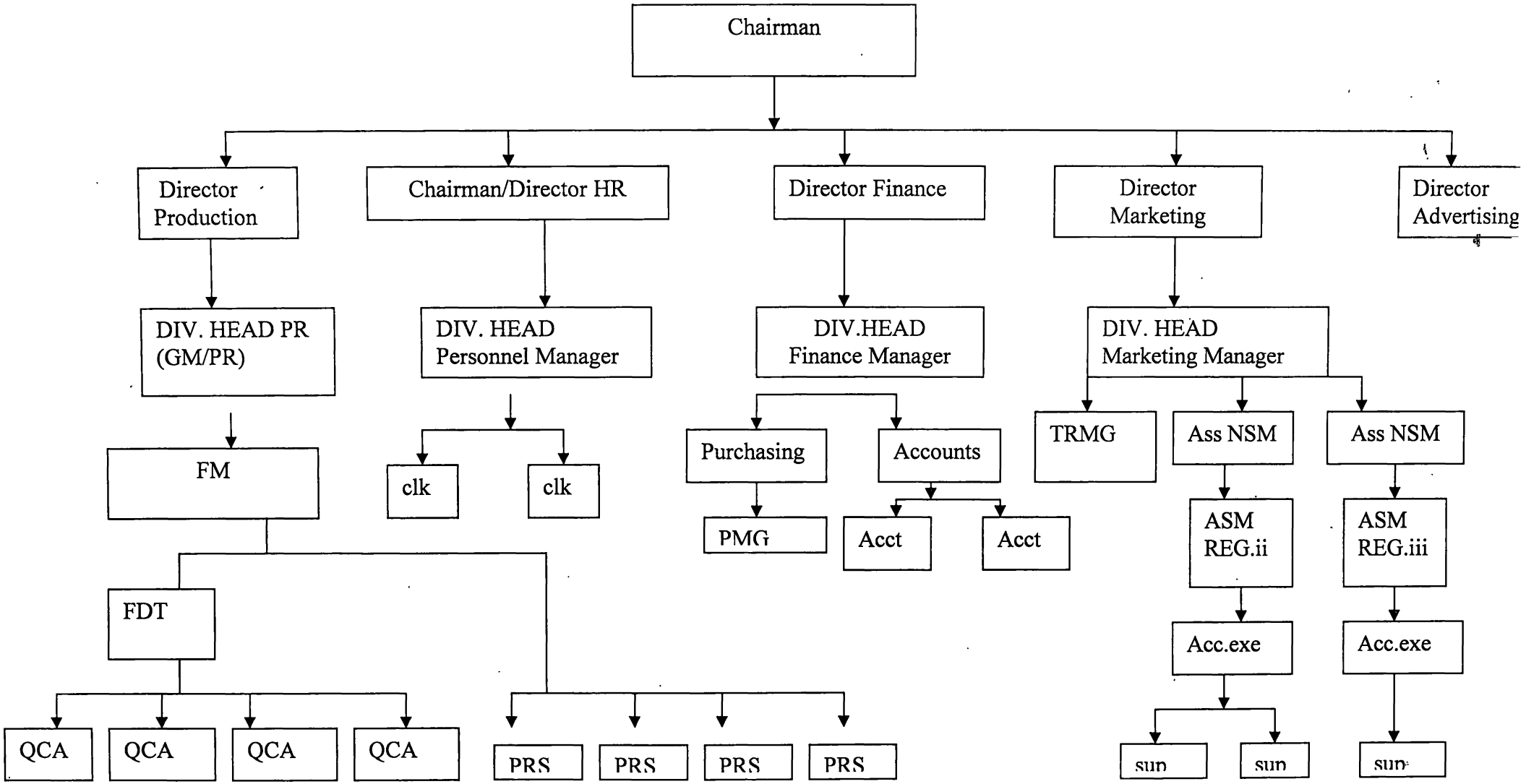
R = Reducing sugar (before inverting)

Appendix 2

ORGANISATIONAL CHART - ABBREVIATIONS

⟹	DPR	-	Director Production	⟹	FM	- -	Factory Manager
⟹	PR	-	Production	⟹	EXEC	-	Executive
⟹	MR	-	Management Representative	⟹	HRM	-	Human Resources Manager
⟹	GMPR	-	General Manager Production	⟹	ACCT	-	Accountants
⟹	FM	-	Factory Manager	⟹	PMG	-	Purchasing Manager
⟹	MM	-	Marketing Manager -	⟹	FM	-	Finance Manager
⟹	FIN	-	Finance	⟹	FDT	-	Food Technologist
⟹	MGR	-	Manager	⟹	ASST	-	Assistant
⟹	NSM	-	National Sales Manager	⟹	ASM	-	Assistant sales Manager
→	QCAS	-	Quality Control Assisstant	⟹	PRS	-	Production Supervisor

TITLE: ORGARNISATIONAL CHART



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