

**MARKETING EVALUATION AND CHEMICAL ANALYSIS OF
BABY CREAMS AND BODY LOTIONS**

By
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03/AS/025

A Research Report Submitted in Partial Fulfillment of the Requirement for
the Special Degree of Bachelor of Science (Applied Sciences)
in Chemical Technology

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March 2009

DECLARATION

This analysis described in this thesis was carried out by my self at the Innovation center of Hemas Manufacturing (Pvt) Ltd under the supervision of Dr.K.D.P.Hemalal and Dr. N.M.Wickramaratne. A report on this has not been submitted to any other university for another degree.

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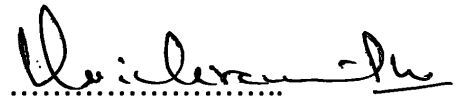
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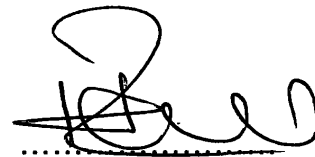
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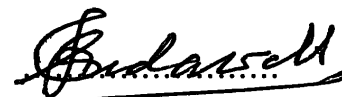
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***AFFECTIONATELY DEDICATED TO
MY PARENTS
AND
TEACHERS***

ACKNOWLEDGEMENT

I wish to express my deepest gratitude to my internal supervisor, Dr. N.M.Wickramaratne, Senior Lecturer, Department of Physical Science & Technology, Faculty of Applied Sciences, Sabaragamuwa University of Sri Lanka, Belihuloya for her assistance, encouragement, guidance and her valuable time to make this study a success.

I wish to extend my heartfelt gratitude to Dr. K. D. P. Hemalal, The Director of Research & Development and Quality Assurance of Hemas Manufacturing (Pvt) Ltd, for granting give this opportunity to undergo the industrial training in the Innovation Centre and also for his valuable support and advices provided to me during the training period.

My special thanks go to Miss. K.S. Kalhari and Mr. Janaka Abeysinghe, Senior Scientist Hemas Manufacturing (Pvt) Ltd, for their kind and patient supervision and guidance during the entire project period.

I would like to declare my heartiest gratitude to Mr. Nushan Indika, Senior Chemist and Mr. Harsha Weeraratne, Assistant Manager Quality Assurance, Hemas Manufacturing (Pvt) Ltd. I also very much appreciate their constructive comments, ideas, kind and patient supervision and guidance and continuous encouragement received during the entire project period.

My special thank goes to Mr. Leslie Peiris, Senior Chemist, Mr. Sanka Mendis, Chemist, Ms. Himali Ranasinghe, Chemist, Ms. Hasitha Ubayasekara, Chemist and Mr. Mohan Attanayake, Quality Assurance Executive, Ms.Piuni Liyanage, Trainee , Ms.Nimali Warnasekara, Trainee, Ms.Chandani Weerakon, Management Trainee , for their tremendous encouragement and highly inspiring guidance and help to make this study a success.

I am also thankful to Mr. Gayan Eranga and Mr. Anuradha Dasanayake, Lab Assistants who helped me in numerous ways during the period of my project.

Finally, I would like to convey my gratitude to all my friends and colleagues who encouraged me in many ways to make this effort success.

ABSTRACT

Sri Lankan market has different brands of baby creams and body lotions from local and foreign manufactures. Objectives of the research are to execute the chemical analysis in order to comply with the Sri Lanka Standard Institute (SLSI) requirements and Consumer Oriented Research Development (CORD) to evaluate the market products, to determine the market position, to identify the improvements of existing products and to generate new product ideas from the consumers.

Sri Lanka Standard Institute requirements for skin care products are, Thermal stability, pH at 27 °C (5.0 to 9.0), Total non-aqueous content (percent by mass-min 15), Water content (percent by mass-max 85), Peroxide value (milliequivalents/kg-max 10).

The results obtained from the research, revealed that the three baby creams are complied with the SLSI standards.

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CHAPTER 01

INTRODUCTION

1.1 Background

Cream is a topical preparation usually for application to the skin. Creams for application to mucus membranes such as those of the rectum or vagina are also used. Creams may be considered pharmaceutical products. Cosmetic creams are based on techniques developed by pharmacy and unmediated creams are highly used in a variety of skin conditions. (Randy and Terry, 2003)

A lotion is low - to medium in viscosity comparatively creams, topical preparation intended for application to unbroken skin; creams and gels have a higher viscosity. Most lotions are oil-in-water emulsions using a substance such as Cetearyl alcohol to keep the emulsion together, but water-in-oil lotions are also formulated. Lotions are usually applied to external skin with bare hands, a clean cloth, cotton wool or gauze; creams and gels usually only with one's fingers or palms. Many lotions, especially hand creams and face cream are formulated not as a medicine delivery system, but simply to smooth and soften the skin. These are particularly popular with the aging and aged demographic groups, and in the case of face usage, can also be classified as a cosmetic in many cases. (Randy and Terry, 2003)

There are main ingredients which is use to make skin care products. Carbomer, Cetyl alcohol, Dimethicone, Fragrance, Glycerin, Glycol stearate, Imidazolidinyl Urea, Methylparaben, Mineral oil/ Paraffinum liquidum, Propyl paraben, Stearic acid, Triethanolamine, Water, Tocopherol (Vitamin E) and etc. (Randy and Terry, 2003)

Quality parameters which is used to check the quality of skin care products, Thermal stability, pH at 27 °C (5.0 to 9.0), Total non-aqueous content (percent by mass - min15), Water content (percent by mass - max 70), Peroxide value (mill equivalents/kg - max 10).(Sri Lanka Standard 742:1986-baby cream & 743:1986 - body lotion)

The pH of substances indicates its overall acid / alkaline level. If a solution is too acidic or too basic it may be considered an irritant or can even cause tissue also. The amount of peroxides present in edible fats and oils is an index of their primary oxidative level and consequently of its tendency to go rancid. The peroxide value test used is an index of its status of preservation. In fact, the lower is the peroxide value; the better is fat or oil quality and its status of preservation.

Market and survey researchers gather information about what people think. Market, or marketing, research analysts help companies understand what types of products people want and at what price. They also help companies market their products to the people most likely to buy them. Gathering statistical data on competitors and examining prices, sales, and methods of marketing and distribution, they analyze data on past sales to predict future sales. (Beri, 2002)

1.2 Objectives

Analyze the chemical parameters of baby creams and body lotions and carrying out a marketing evaluation for creams & lotions

1.2.1. Specific Objectives:

- Development of method to detach the oil portion in baby creams
- To analyze whether the baby cream samples contains the Peroxide value
- To determine the market position
- To find out what are the popular brands which are available in Sri Lanka
- To identify the improvements of existing products
- To generate new product ideas from the consumers

CHAPTER 02

REVIEW OF LITERATURE

2.1 Skin

The skin is the outer covering of the body, also known as the epidermis, of an animal. It is the largest organ of the integument system made up of multiple layers of epithelial tissues, and guards the underlying muscles, bones, ligaments, internal organs. Because it interfaces with the environment, skin plays a very important role in protecting (the body) against pathogens. Its other functions are insulation, temperature regulation, sensation, synthesis of vitamin D, and the protection of vitamin B folates. Severely damaged skin will try to heal by forming scar tissue. This is often discolored and depigmented. In humans, skin pigmentation varies among populations, and skin type can range from dry to oily. (Alexeyer, 1985)

2.1.1 Function of the skin

Skin functions are, Control the loss of valuable water from the body, Protect the body from the harmful radiations of the sun, Control the entry of foreign materials, Prevent the entry of harmful microorganisms, Cushion the body against the mechanical shock from bumps and knocks, Regulate the loss of heat from the body, Receive information from the environment and relay it to the brain and by its colour, texture and odour, transmit social and sexual signals to others. (Alexeyer, 1985)

2.2 Creams and Lotions

All these creams and lotions are used for the skin of human being. Therefore it is important to carry out quality assurance of product by third party laboratory as well as by manufacturer. It is important to carry out a research on all creams and lotions of market products in order to have a better understanding about the consumer as well as the competitor.

Creams are semi-solid emulsions that are mixtures of oil and water. They are divided into two types, oil-in-water (O/W) creams which are composed of small droplets of oil dispersed in a continuous aqueous phase, and water-in-oil (W/O) creams which are composed of small droplets of water dispersed in a continuous oily phase. Oil-in-

water creams are more comfortable and cosmetically acceptable as they are less greasy and more easily washed off using water. Water-in-oil creams are more difficult to handle but many drugs which are incorporated into creams are hydrophobic and will be released more readily from a water-in-oil cream than an oil-in-water cream. Water-in-oil creams are also more moisturizing as they provide an oily barrier which reduces water loss from the stratum corneum, the outmost layer of the skin. (John and Steren, 1993)

2.2.1 Uses of creams

Creams are help to, the provision of a barrier to protect the skin (may be a physical barrier or a chemical barrier as with sunscreens), aid in the retention of moisture (especially water-in-oil creams), cleansing, emollient effects and as a vehicle for drug substances such as local anesthetics, anti-inflammatory (NSAIDs or corticosteroids), hormones, antibiotics, antifungal or counter-irritants. (John and Steren, 1993)

Lotions are usually applied to external skin with bare hands, a clean cloth, cotton wool or gauze; creams and gels usually only with one's fingers or palms. Many lotions, especially hand creams and face cream are formulated not as a medicine delivery system, but simply to smooth and soften the skin— these are particularly popular with the aging and aged demographic groups, and in the case of face usage, can also be classified as a cosmetic in many cases. (John and Steren, 1993)

The key components of a skin care lotion, cream or gel emulsion (that is mixtures of oil and water) are the aqueous and oily phases, an emulgent to prevent separation of these two phases, and, if used, the drug substance or substances. A wide variety of other ingredients such as fragrances, glycerol, petroleum jelly, dyes, preservatives, proteins and stabilizing agents are commonly added to lotions.

Lotions can be used for the delivery to the skin of medications such as: Antibiotics, Antiseptics, Antifungal, Corticosteroids, Anti-acne agents, Soothing, smoothing and moisturizing or protective agents (such as calamine). It is not uncommon for the same drug ingredient to be formulated into a lotion, cream and ointment. Creams are the most convenient of the three but are inappropriate for application to regions of hairy skin such as the scalp, while a lotion is less viscous and may be readily applied to

these areas (many medicated shampoos are in fact lotions). Historically, lotions also had an advantage in that they may be spread thinly compared to a cream or ointment and may economically cover a large area of skin, but product research has steadily eroded this distinction. Non-comedogenic lotions are recommended for use on acne prone skin. (Randy and Terry, 2003)

2.2.2 The benefits of pH balanced creams and lotions

An acidic ingredient such as citric acid in lemon creams or lactic acid in buttermilk cream will restore the skin's acidity and combat the dryness aggravated by the alkaline soap. Such creams are often called pH balancing creams. (Randy and Terry, 2003)

2.3 Emulsions

An emulsion is a mixture of two immiscible (unbendable) liquids. One liquid (the dispersed phase) is dispersed in the other (the continuous phase). Many emulsions are oil/water emulsions, with dietary fats being one common type of oil encountered in everyday life. Examples of emulsions include butter and margarine, milk and cream, and vinaigrettes; the photo-sensitive side of photographic film, magmas and cutting fluid for metal working. In butter and margarine, fat surrounds droplets of water (a water-in-oil emulsion). In milk and cream, water surrounds droplets of fat (an oil-in-water emulsion). In certain types of magma, globules of liquid NiFe may be dispersed within a continuous phase of liquid silicates. Emulsification is the process by which emulsions are prepared. (Alexeyer, 1985)

Emulsion is also a term used in the oil field as untreated well production that consists primarily of crude oil and water. Emulsions tend to have a cloudy appearance, because the many phase interfaces (the boundary between the phases is called the interface) scatter light that passes through the emulsion. Emulsions are unstable and thus do not form spontaneously. Energy input through shaking, stirring, homogenizing, or spray processes are needed to form an emulsion. Over time, emulsions tend to revert to the stable state of the phases comprising the emulsion. Surface active substances (surfactants) can increase the kinetic stability of emulsions greatly so that, once formed, the emulsion does not change significantly over years of

storage. Vinaigrette is an example of an unstable emulsion that will quickly separate unless shaken continuously. This phenomenon is called coalescence, and happens when small droplets recombine to form bigger ones. Emulsions can also suffer from creaming, the migration of one of the substances to the top of the emulsion under the influence of buoyancy or centripetal force when a centrifuge is used. (Alexeyer, 1985)

Emulsions are part of a more general class of two-phase systems of matter called colloids. Although the terms colloid and emulsion are sometimes used interchangeably, emulsion tends to imply that both the dispersed and the continuous phase are liquid. There are three types of emulsion instability: flocculation, where the particles form clumps; creaming, where the particles concentrate towards the surface (or bottom, depending on the relative density of the two phases) of the mixture while staying separated; and breaking and coalescence where the particles coalesce and form a layer of liquid. (John, 1989)

Whether an emulsion turns into a water-in-oil emulsion or an oil-in-water emulsion depends on the volume fraction of both phases and on the type of emulsifier. Generally, the Bancroft rule applies: emulsifiers and emulsifying particles tend to promote dispersion of the phase in which they do not dissolve very well; for example, proteins dissolve better in water than in oil and so tend to form oil-in-water emulsions (that is they promote the dispersion of oil droplets throughout a continuous phase of water). (John, 1989)

The basic colour of emulsions is white. If the emulsion is dilute, the Tyndall effect will scatter the light and distort the colour to blue; if it is concentrated, the colour will be distorted towards yellow. This phenomenon is easily observable on comparing skimmed milk (with no or little fat) to cream (high concentration of milk fat). Microemulsions and nanoemulsions tend to appear clear due to the small size of the disperse phase. (John, 1989)

2.4 Emulsifier

An emulsifier (also known as an emulgent) is a substance which stabilizes an emulsion, frequently a surfactant. Examples of food emulsifiers are egg yolk (where the main emulsifying chemical is lecithin), honey and mustard, where a variety of chemicals in the mucilage surrounding the seed hull act as emulsifiers; proteins and low-molecular weight emulsifiers are common as well. In some cases, particles can stabilize emulsions as well through a mechanism called Pickering stabilization. Both mayonnaise and Hollandaise sauce are oil-in-water emulsions that are stabilized with egg yolk lecithin. Detergents are another class of surfactant, and will chemically interact with both oil and water, thus stabilizing the interface between oil or water droplets in suspension. This principle is exploited in soap to remove grease for the purpose of cleaning. A wide variety of emulsifiers are used in pharmacy to prepare emulsions such as creams and lotions. Common examples include emulsifying wax, cetearyl alcohol, polysorbate 20, and cetareth 20. (Susan and Joy, 1998)

Sometimes the inner phase itself can act as an emulsifier, and the result is nanoemulsion - the inner state disperses into nano-size droplets within the outer phase. A well-known example of this phenomenon happens when water is poured in a strong alcoholic anise-based beverage, such as ouzo, pastis or raki. The anisolic compounds, which are soluble in ethanol, now form nano-sized droplets and emulgate within the water. The colour of such diluted drink is opaque and milky. (Susan and Joy, 1998)

2.5 Moisturizers

A moisturizing creams or lotions contains a humectant. This is a substance which is able to hold moisture in upper layer of the epidermis and prevent it evaporating. Humectants used in moistures include oily water soluble substances such as glycerol, propylene glycol or sorbitol. Many of the natural ingredients used in skin cream such as soluble collagen, soluble elastin, vitamin E or oestrogen, have a humectants action too. If humectant is used, a much lighter film of oil will now adequately waterproof the skin against water loss. Moisturizing creams have relatively low oil content. (Randy and Terry, 2003)

2.5.1 Risks of moisturizers

A recent study found that the application of certain moisturizers increases the incidence of skin cancer in mice. Four popular moisturizers were tested, providing the same result. It is not yet known if the same applies to humans. A fifth moisturizer, specially prepared without mineral oil and sodium lauryl sulphate, had no such effect. Some people are sensitive or allergic to certain products, and this can cause outbreaks. There is a risk of moisturizers being contaminated with bacteria that can cause disease. (Randy and Terry, 2003)

2.6 The ingredients of skin creams

2.6.1 Glyceryl Stearate

Glyceryl Stearate and Glyceryl Stearate SE (Figure 2.1) are esterification products of glycerin and stearic acid. Glyceryl Stearate is a white or cream-colored wax-like solid. Glyceryl Stearate is a Self-Emulsifying form of Glyceryl Stearate that also contains a small amount of sodium and or potassium stearate. In cosmetics and personal care products, Glyceryl Stearate is widely used and can be found in lotions, creams, powders, skin cleansing products and sunscreen products.

Glyceryl Stearate acts as a lubricant on the skin's surface, which gives the skin a soft and smooth appearance. It also slows the loss of water from the skin by forming a barrier on the skin's surface. Glyceryl Stearate, and Glyceryl Stearate SE help to form emulsions by reducing the surface tension of the substances to be emulsified.

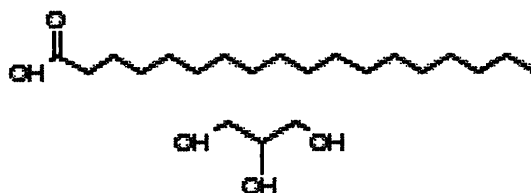


Figure 2.1 Glyceryl Stearate

2.6.2 Sorbitan Stearate

Sorbitan Stearate, Sorbitan Laurate, Sorbitan Sesquioleate, Sorbitan Oleate, Sorbitan Tristearate, Sorbitan Palmitate and Sorbitan Trioleate (Figure 2.2) are white to tan-colored solids. In cosmetics and personal care products, Sorbitan Esters are used in a variety of products including skin care products, skin cleansing products, moisturizers, eye makeup and other makeup. Their function as surfactant - emulsifying agents.

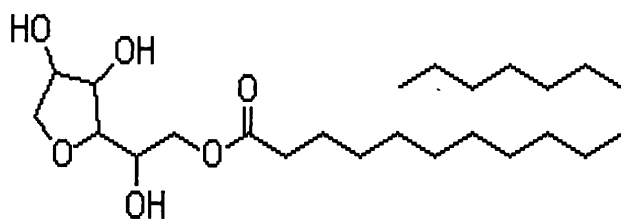


Figure 2.2 Sorbitan Stearate

2.6.3 Cetyl alcohol

Cetyl alcohol is also known as hexadecan-1-ol, palmityl alcohol, n-cetyl alcohol, n-hexadecanol, and hexadecyl alcohol. Cetyl alcohol (Figure 2.3) is a fatty alcohol which is used as secondary emulsifiers, viscosity and foam boosters in cleaning products, hair conditioners, creams and other cosmetics. It is also an opacifier. Cetyl alcohol is a white waxy solid with a faint odour. It is stable but is incompatible with strong oxidising agents. It is an eye irritant and harmful if ingested in quantity.



Figure 2.3 Cetyl alcohol

2.6.4 Dimethicone

Other names used to describe dimethicone are silicone rubber, latex, dimethylpoly-siloxane, simethicone, dimethyl silicone, and dermafilm (Figure 2.4). Dimethicone takes the form of a clear, viscous liquid. It is effective at very low concentrations and is inert, so it doesn't interfere with any actual processes that are occurring. It is also non-toxic to human life.

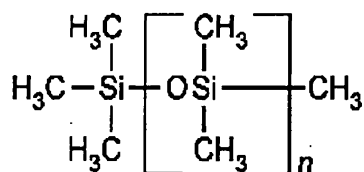


Figure 2.4 Dimethicone

2.6.5 2-Phenoxyethanol

2-Phenoxyethanol (Figure 2.5) is a preservative used for skin creams, which is also known as phenoxyethyl alcohol, arosol, ethylene glycol phenyl ether, cellosolve, and rose ether.

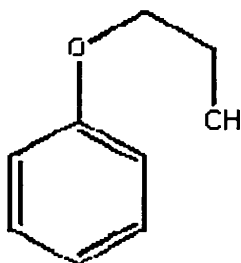


Figure 2.5 2-Phenoxyethanol

2.6.6 DMDM Hydantoin

DMDM (dimethyldimethyl) hydantoin is a crystalline weakly acidic compound used in organic synthesis, and also as a preservative. The basic molecular formula is C₇H₁₂N₂O₄, but this substance is a mixture of many individual substances and so cannot be adequately represented by a single molecular structure. As with cocamide MIPA, some sources suggest that it is a suspected carcinogen, and that it has been identified by researchers and physicians 'around the world' as a cosmetic ingredient that has caused adverse or toxic effects.

2.6.7 Ethyl paraben

Ethyl paraben (Figure 2.6) is more correctly Ethyl 4-hydroxybenzoate synonyms include 4-hydroxybenzoic acid ethyl ester, nipagin A, ethyl parasept; solbrol A.

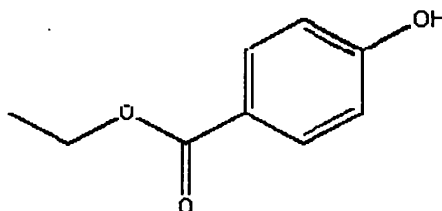


Figure 2.6 Ethyl paraben

2.6.8 Methyl Paraben

Methyl paraben is also known as: methyl 4-hydroxybenzoate, methyl chemosept; methyl parasept, 4-hydroxybenzoic acid methyl ester, and 4-hydroxy methyl benzoate (Figure 2.7).

Methyl paraben is derived from benzoic acid. A common source is the gum benzoin tree. However, it is also found to be one of five components of the American Queen Bee pheromone. The compound is formed as white needles which have a melting point of 128° C.

It is non-toxic and so is approved for use in foods. The common uses include the use of a preservative in foods, pharmaceutical preparations, beverages and cosmetic products. It is found to be effective against a wide range of bacteria and fungi.

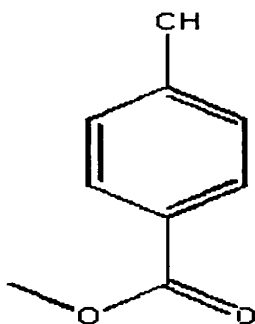


Figure 2.7 Methyl paraben

2.6.9 Butyl Paraben

Butyl paraben is also known as: n-butyl paraben; n-butyl p-hydroxybenzoate; butyl 4-hydroxybenzoate, butoben, butyl chemosept, butyl parasept, nipabutyl, and solbrol (Figure 2.8). In cosmetic products it is used as an anti-bacterial agent.

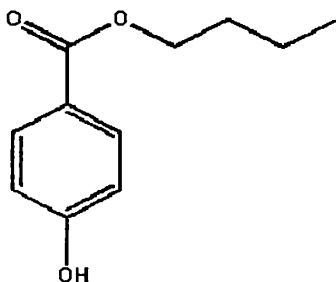


Figure 2.8 Butyl paraben

2.6.10 Propylene Glycol

Propylene glycol is also known as 1,2-dihydroxypropane, methylethylene glycol, and trimethyl glycol (Figure 2.9). Due to its low toxicity when ingested, propylene glycol is suitable for use in cosmetic products. It is also biodegradable which makes it environmentally friendly.

Propylene glycol has many uses. It is a stabilising agent for ethereal oils and a humecant for emulsions. As it binds moisture to itself and repels grease it is used in moisturising products such as skin creams.

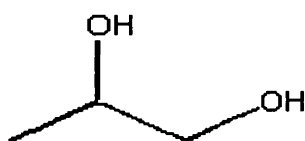


Figure 2.9 Propylene glycol

2.6.11 Carbomer

Carbomer (Figure 2.10) is also known as: polyacrylic acid; acrylic acid polymer; 2-propenoic acid, homopolymer, propenoic acid polymer and propenoic acid. After neutralization with amines or other alkalis carbomer has a thickening, gelling action. As a consequence of this it is used as a consistency regulator in cosmetic products. Alternatively, it can be used as a detergent polymer.

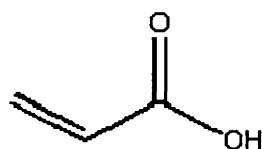


Figure 2.10 Carbomer

2.6.12 Glycerin

The simplest trihydric alcohol (Figure 2.11), with the formula $\text{CH}_2\text{OHCHOHCH}_2\text{OH}$. The name glycerol is preferred for the pure chemical, but the commercial product is usually called glycerin. It is widely distributed in nature in the form of its esters, called glycerides. The glycerides are the principal constituents of the class of natural products known as fats and oils.

Glycerin is a colorless, odorless, viscous liquid with a sweet taste. It is completely soluble in water and alcohol but is only slightly soluble in many common solvents, such as ether, ethyl acetate, and dioxane. Glycerin is insoluble in hydrocarbons. It has a very low mammalian toxicity.

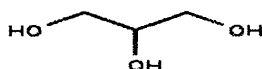


Figure 2.11 Glycerin

2.7 Peroxide value

In organic chemistry, peroxide is a specific functional group or a molecule containing an oxygen-oxygen single bond ($\text{R-O-O-R}'$). When the other oxygen bears hydrogen, it is called a hydroperoxide (R-O-O-H). The radical $\text{HOO}\cdot$ is known as hydroperoxide radical, and is thought to be involved in combustion of hydrocarbons in air. Organic peroxides tend to decompose easily to free radicals of the form: $\text{RO}\cdot$ (John and Steren, 1993)

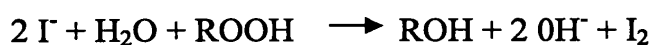
The Peroxide value of an oil or fat is used as a measurement of the extent to which rancidity reactions have occurred during storage. Other methods are available but peroxide value is the most widely used. The double bonds found in fats and oils play a role in autoxidation. Oils with a high degree of unsaturation are most susceptible to autoxidation. The best test for autoxidation (oxidative rancidity) is determination of the peroxide value. Peroxides are intermediates in the autoxidation reaction.

Autoxidation is a free radical reaction involving oxygen that leads to deterioration of fats and oils which form off-flavours and off-odours. Peroxide value, concentration of peroxide in an oil or fat, is useful for assessing the extent to which spoilage has advanced.

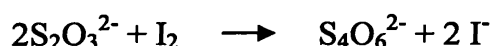
The peroxide value is the quantity of those substances in the sample, expressed in milliequivalent of active oxygen per kilogram of fat or oil, which oxidize potassium iodide under the conditions described. (SLSI, 611:1983) Traditionally this was expressed in units of milliequivalents, although if we are using SI units then the appropriate option would be in millimoles per kilogram (N.B. 1 millimole = 2 milliequivalents; for divalent ions). Note also that the unit of milliequivalent has been commonly abbreviated as mequiv or even as meq.

2.7.1 Method

The peroxide value is determined by measuring the amount of iodine which is formed by the reaction of peroxides (formed in fat or oil) with iodide ion.



Note that the base produced in this reaction is taken up by the excess of acetic acid present. The iodine liberated is titrated with sodium thiosulphate.



The acidic conditions (excess acetic acid) prevent formation of hypoiodite (analogous to hypochlorite), which would interfere with the reaction. The indicator used in this reaction is a starch solution where amylose forms a blue to black solution with iodine and is colourless where iodine is titrated.

A precaution that should be observed is to add the starch indicator solution only near the end point (the end point is near when fading of the yellowish iodine colour occurs) because at high iodine concentration starch is decomposed to products whose indicator properties are not entirely reversible.

Correlation of rancid taste and peroxide value depends on the type of oil and is best tested with taste panels. The odours and flavours associated with typical oxidative rancidity are mostly due to carbonyl-type compounds. The shorter-chain aldehydes and ketones isolated from rancid fats are due to oxidative fission and are associated with advanced stages of oxidation. The carbonyl-type compounds develop in low concentrations early in the oxidative process.

Peroxide values of fresh oils are less than 10 milliequivalents /kg, when the peroxide value is between 30 and 40 milliequivalents/kg, a rancid taste is noticeable. (SLSI, 611:1983)

2.7.2 Autoxidation

Autoxidation is any oxidation that occurs in open air or in presence of oxygen and/or UV radiation and forms peroxides and hydroperoxides. A classic example of autoxidation is that of simple ethers like diethyl ether, whose peroxides can be dangerously explosive. It can be considered to be a slow, flameless combustion of materials by reaction with oxygen. Autoxidation is important because it is a useful reaction for converting compounds to oxygenated derivatives, and also because it occurs in situations where it is not desired (as in the destructive cracking of the rubber in automobile tires).

Although virtually all types of organic materials can undergo air oxidation, certain types are particularly prone to autoxidation, including unsaturated compounds that have allylic hydrogens or benzylic hydrogens; these materials are converted to hydroperoxides by autoxidation.

Autoxidation is a free radical chain process. Such reactions can be divided into three stages: chain initiation, propagation, and termination. In the initiation process, some event causes free radicals to be formed. For example, free radicals can be produced

purposefully by the decomposition of a radical initiator, such as benzoyl peroxide. In some cases, initiation occurs by a process that is not well understood but is thought to be the spontaneous reaction of oxygen with a material with readily abstractable hydrogen. Destructive autoxidation processes also are initiated by pollutants such as those in smog.

Once free radicals are formed, they react in a chain to convert the material to a hydroperoxide. The chain is ended by termination reactions in which free radicals collide and combine their odd electrons to form a new bond.

Autoxidation is a process of enormous economic impact, since all foods, plastics, gasolines, oils, rubber, and other materials that must be exposed to air undergo continuous destructive reactions of this type. All plastics and rubber and most processed foods contain antioxidants to protect them against the attack of oxygen.

2.7.3 Molarity and Normality

Molarity: The molar unit is probably the most commonly used chemical unit of measurement. Molarity is the number of moles of a solute dissolved in a liter of solution. (Alexeyer, 1985)

Normality: There is a relationship between normality and molarity. Normality can only be calculated when we deal with reactions, because normality is a function of equivalents. The example below uses potassium hydroxide (KOH) to neutralize arsenic acid. By studying the reaction it is possible to determine the proton exchange number to determine the normality of the arsenic acid. (Alexeyer, 1985)

The example below uses potassium hydroxide (KOH) to neutralize arsenic acid. By studying the reaction it is possible to determine the proton exchange number to determine the normality of the arsenic acid.

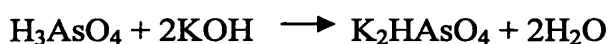
Look at the equation $\text{H}_3\text{AsO}_4 + 2\text{KOH} \rightarrow \text{K}_2\text{HAsO}_4 + 2\text{H}_2\text{O}$

Equivalent weight = molar mass / (H^+ per mole)

Equivalent = mass of compound / Equivalent weight

And Normality = (equivalents of X)/Liter

And the part that is of interest to you is that Normality = molarity x n (where n = the number of protons exchanged in a reaction). You probably remember that when a hydrogen atom is ionized and loses its electron, you are left with only a proton. So a hydrogen ion is basically a proton. Let's assume that we have a 0.25 M solution of H_3AsO_4 and want to determine the normality of it if it participates in the reaction.



When H_3AsO_4 is neutralized by KOH, H_3AsO_4 provides two protons to form $2\text{H}_2\text{O}$. Note that H_3AsO_4 has three hydrogens, but K_2HAsO_4 only has one hydrogen. That means that 2 protons were exchanged,

Again normality = molarity * n

Remember that normality of the solution is 0.25 mol H_3AsO_4 and there were two protons exchanged (2 equivalents/mole)

$$(0.25 \text{ moles } \text{H}_3\text{AsO}_4 / 1 \text{ L } \text{H}_3\text{AsO}_4 * (2 \text{ equivalents } \text{H}_3\text{AsO}_4 / 1 \text{ L } \text{H}_3\text{AsO}_4)) = (0.50 \text{ equivalents } \text{H}_3\text{AsO}_4 / 1 \text{ L } \text{H}_3\text{AsO}_4) = 0.5 \text{ Normal } \text{H}_3\text{AsO}_4$$

So, in short, while there is a relationship between the normality of a solution and the molarity of a solution, the normality can only be determined by examining reaction, determining the proton exchange and multiplying molarity by that number. Normality is particularly useful in titrations calculations.

2.7.3.1 Specific cases

As ions in solution can react through different pathways, there are three common definitions for normality as a measure of reactive species in solution: In acid-base chemistry, normality is used to express the concentration of protons or hydroxide ions in the solution. Here, the normality differs from the molarity by an integer value - each solute can produce n equivalents of reactive species when dissolved. For example: 1 M aqueous $\text{Ca}(\text{OH})_2$ is 2 N (normal) in hydroxide. (Alexeyer, 1985)

In redox reactions, normality measures the quantity of oxidizing or reducing agent that can accept or furnish one mole of electrons. Here, the normality scales from the molarity, most commonly, by a fractional value. Calculating the normality of redox species in solution can be challenging. (Alexeyer, 1985)

In precipitation reactions, normality measures the concentration of ions which will precipitate in a given reaction. Here, the normality scales from the molarity again by an integer value. (Alexeyer, 1985)

2.8 Market and Survey researchers

Market and survey researchers gather information about what people think. Market, or marketing, research analysts help companies understand what types of products people want and at what price. They also help companies market their products to the people most likely to buy them. Gathering statistical data on competitors and examining prices, sales, and methods of marketing and distribution, they analyze data on past sales to predict future sales. (Beri, 2002)

Market research analysts devise methods and procedures for obtaining the data they need. Often, they design surveys to assess consumer preferences through Internet, telephone, or mail responses. They conduct some surveys as personal interviews, going door-to-door, leading focus group discussions, or setting up booths in public places such as shopping malls. Trained interviewers usually conduct the surveys under the market research analyst's direction. (Beri, 2002)

After compiling and evaluating the data, market research analysts make recommendations to their client or employer. They provide a company's management with information needed to make decisions on the promotion, distribution, design, and pricing of products or services. The information also may be used to determine the advisability of adding new lines of merchandise, opening branches of the company in a new location, or otherwise diversifying the company's operations. Market research analysts also might develop advertising brochures and commercials, sales plans, and product promotions such as rebates and giveaways.

Survey researchers also gather information about people and their opinions, but these workers focus exclusively on designing and conducting surveys. They work for a variety of clients, such as corporations, government agencies, political candidates, and providers of various services. The surveys collect information that is used in performing research, making fiscal or policy decisions, measuring the effectiveness of those decisions, or improving customer satisfaction. Analysts may conduct opinion research to determine public attitudes on various issues; the research results may help political or business leaders to measure public support for their electoral prospects or social policies. Like market research analysts, survey researchers may use a variety of mediums to conduct surveys, such as the Internet, personal or telephone interviews, or questionnaires sent through the mail. They also may supervise interviewers who conduct surveys in person or over the telephone.

Survey researchers design surveys in many different formats, depending upon the scope of their research and the method of collection. Interview surveys, for example, are common because they can increase participation rates. Survey researchers may consult with economists, statisticians, market research analysts, or other data users in order to design surveys. They also may present survey results to clients.

Work environment. Market and survey researchers generally have structured work schedules. They often work alone, writing reports, preparing statistical charts, and using computers, but they also may be an integral part of a research team. Market researchers who conduct personal interviews have frequent contact with the public. Most work under pressure of deadlines and tight schedules, which may require overtime. Travel may be necessary. (Beri, 2002)

CHAPTER 03

MATERIALS AND METHODOLOGY

The research study has focused on two separate parts, for chemical analysis and Consumer Oriented Research and Development (CORD). Chapter 3, 4, and 5 comprised of chemical analysis while the two parts 6 and 7 comprised of CORD.

3.1 Sample collection

Samples to be analyzed were collected from the market.

3.2 Materials

3.2.1 Equipment

- (a) Stoppard conical flasks (250ml)
- (b) Reflux condenser
- (c) Thermometer
- (d) Hot plate
- (e) Water bath
- (f) Glass ware (Beakers, Round bottom flasks, Measuring cylinders, Pipettes, Separating funnel Titration flask, Burettes)

3.2.2 Instruments

- (a) Rotary evaporator (Buchi Rota vapor R - 200)
- (b) Magnetic stirrer (Hotplate Stirrer)
- (c) pH meter (Thermo electronic)
- (d) Centrifuge (PLC Series, Speed: 8000 rpm)
- (e) Viscosity meter (RVT model, Speed: 5rpm , Spindle:15, T = 25 °C)
- (f) Moisture analyzer (Accuracy: mid, T = 105 °C)
- (g) Analytical balance (Precisa XT 220A)
- (h) Microwave Oven (Defrost)
- (i) Oven (Intellowave LG)

3.3 Reagents

- (a) Ethyl Acetate (GR, 99%)
- (b) Diethyl Ether (LR)
- (c) Acetic Acid – Glacial (AR, 99.8%)
- (d) Chloroform (GR)
- (e) Potassium Iodide solution
- (f) Starch solution (AR)
- (g) Sodium Thiosulphate (99%)

3.4 Methodology

As separation of oil layer is difficult to standard methods were tried and finally the new method was developed.

3.4.1 Determination of pH

A 5.00g of baby cream sample was weighted into a 100ml beaker and 45ml of distilled water was added and cream was dispersed in water. The pH of the suspension at 27⁰C was directly read using Thermo electronic pH meter. (Sri Lanka Standard 611:1983)

3.4.2 Determination of Viscosity

A 3.30g of baby cream sample was weighted into adaptor and apparatus was connected and measurement was directly read by the using Viscosity meter at 25 ⁰C (RVT model, Speed: 5rpm, Spindle: 15). (Current standard procedure followed by Hemas)

3.4.3 Détermination of Non volatile content

A 5.00g of baby cream sample was weighted into a moisture analyzer plate and measurement was directly read by the using Moisture Analyzer. (Accuracy = mid, T=105 ⁰C. (Current standard procedure followed by Hemas)

3.4.4 Check for Solution Separation

10.00g of baby cream sample was weighted into centrifuge tube and Centrifuged at 8000rpm for 30 minutes and checked for separation of oil layer from cream.(PLC series Speed: 8000 rpm) (Current standard procedure followed by Hemas)

3.4.5 Determination of Peroxide value

3.4.5.1 Extraction of oil layer

3.4.5.1.1 Sri Lanka Standard method (611:1983)

A 200g of baby cream sample was weighted in a 500ml clean, dry beaker and warmed in water bath at 80 °C till an aqueous layer separated out at the bottom of the beaker. After content was poured into a centrifuge tube and was centrifuged till the separation of a clear upper oil layer occurs. But oil layer was not separated. Therefore bottom aqueous layer was discarded and extract the top layer with petroleum ether in a separating funnel. Ether was evaporated in a water bath from the top layer to obtain the oil. Ether was form an emulsion because sample was transferred into a centrifuge tube and was centrifuged till a clear upper oil layer was obtained.

3.4.5.1.2 Oven method

A 20g of baby cream sample was dispersed in a 50ml beaker and the beaker was kept in an Oven at 80 °C for 20 minutes to check the separation of oil from the cream.

3.4.5.1.3 Microwave Oven method

A 200g of baby cream sample was dispersed in a 500ml beaker and the beaker was kept in the Microwave Oven at Defrost for 20 minutes. After content was poured into a centrifuge tube and was centrifuged to check the separation of oil from the cream.

3.4.5.1.4 Hot plate method

A 200g of baby cream sample was dispersed in a 500ml beaker and the beaker was kept in the hot plate at 80 °C for 20 minutes. After content was poured into a centrifuge tube and was centrifuged to check the separation of oil from the cream.

3.4.5.1.5 Water bath method

A 200g of baby cream sample was dispersed in a 500ml beaker and the beaker was kept in the Water bath at 80 °C for 20 minutes. When sample was boiling immediately, sample was cooled using refrigerator. After 10 minutes again sample was boiled using water bath and same procedure was repeated about 8 times. After content was poured in to a centrifuge tube and was centrifuged to check the separation of oil from the cream.

3.4.5.1.6 Extraction with Diethyl Ether (34.6 °C)

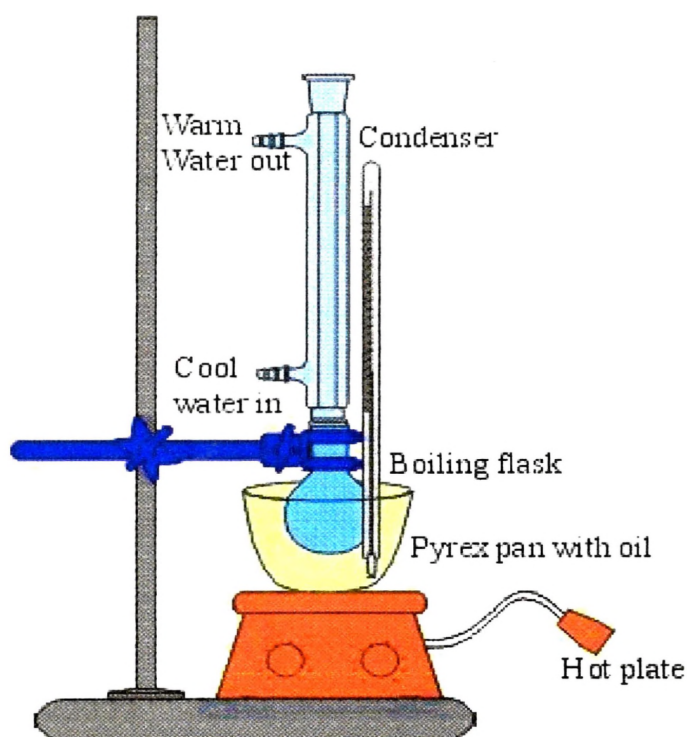


Figure 3.1 Flow chart for extraction using reflux condenser

A 300g sample of baby cream was dispersed in a 500 ml round bottom flask and 120ml of Diethyl ethyl was added and dissolved the cream completely. Sample was dipped in water bath and was put on magnetic stirrer with hot plate. Reflux condenser was connected to the round bottom flask. After 8 hours the solution was quantitatively transferred to a separator funnel and it was shaken. After 2 hours the Diethyl ether phase was collected in a 250ml round bottom flask and evaporated to dryness in a rotary evaporator (Buchi Rota vapor R - 200) at 35 °C under vacuum.

3.4.5.1.7 Extraction with Ethyl Acetate (77 °C)

A 300g sample of baby cream was dispersed in 500 ml of round bottom flask and 120ml of Ethyl acetate was added and dissolved the cream completely. Sample was dipped in water bath and was put on magnetic stirrer with hot plate. Reflux condenser was connected to the round bottom flask. After 8 hours the solution was quantitatively transferred to a separatory funnel and it was shaken. After 2 hours the Ethyl acetate phase was collected in a 250ml round bottom flask and evaporated to dryness in a rotary evaporator at 45°C under vacuum. (Standard procedure developed for Hemas)

3.4.5.2 Preparation of solutions

3.4.5.2.1 Starch solution

A 5.00g of soluble starch was weighted and 30ml of water was added to that beaker and 1000ml of boiling water was added to this mixture and was left for 3 minutes.

3.4.5.2.2 Saturated aqueous potassium iodide solution

A 5ml of potassium iodide was weighted into a beaker and was added suitable volume of water to that beaker, until solution was saturated.

3.4.5.2.3 Sodium thiosulphate solution

A 0.1241g of Sodium thiosulphate was weighted into a 500ml beaker and 250ml of water was added to prepare 0.002N Sodium thiosulphate solution.

3.4.5.3 Measuring of Peroxide value

A 5.00g of oil was measured in 250ml dry, stopper conical flask and 10ml of chloroform was added and was dissolved the oil by swirling. After 15ml of glacial acetic acid and 1ml of fresh saturated aqueous potassium iodide solution was added, immediately flask was stoppard and 1 minute was shaken and the flask was placed for exactly 5 minutes away from light, in a cool, dark place. After that 75ml of distilled water was added to it and vigorously was stirred. Finally sample was titrated with 0.002 N sodium thiosulphate solutions until yellow colour disappear. After 2ml of freshly prepared starch solution was added and again was titrated with 0.002 N

sodium thiosulphate solutions until purple colour disappear. (Sri Lanka Standard 611:1983)

3.5 Calculations

Calculating the Peroxide value of baby creams

$$\text{Peroxide value (Ip)} = \frac{(V - V_0) * N * 1000}{m} \text{ milliequivalents per kilograms}$$

V = Volume in ml, of Na₂S₂O₃ solution used for titration

V₀ = Volume in ml, of Na₂S₂O₃ solution used for blank

N = Normality of the Thiosulphate solution used

m = Mass in g, of oil used for the determination (Sri Lanka Standard 611:1983)

If N is expressed as, in redox reactions, normality measures the quantity of oxidizing or reducing agent that can accept or furnish one mole of electrons.

CHAPTER 04

Results and Discussion

4.1 Results

4.1.1 Baby creams

4.1.1.1 Different features of baby creams

Appearance, labeling, and packaging information of baby cream samples were evaluated by marketing survey. (Appendix I)

4.1.1.2 Baby cream ingredients

Ingredient comparisons were done using market samples of baby cream. (Appendix I)

4.1.1.3 Baby cream parameters

Peroxide value of brand name 1 baby cream was 0.80, brand name 2 baby cream was 0.54 and brand name 3 baby creams was 0.68. This data was summarized in table 4.1 and figure 4.1.

Table 4.1: Peroxide value of baby creams

Brand Name	Average Peroxide value(milliequivalent/kg)
Brand Name 1	0.80
Brand Name 2	0.54
Brand Name 3	0.68

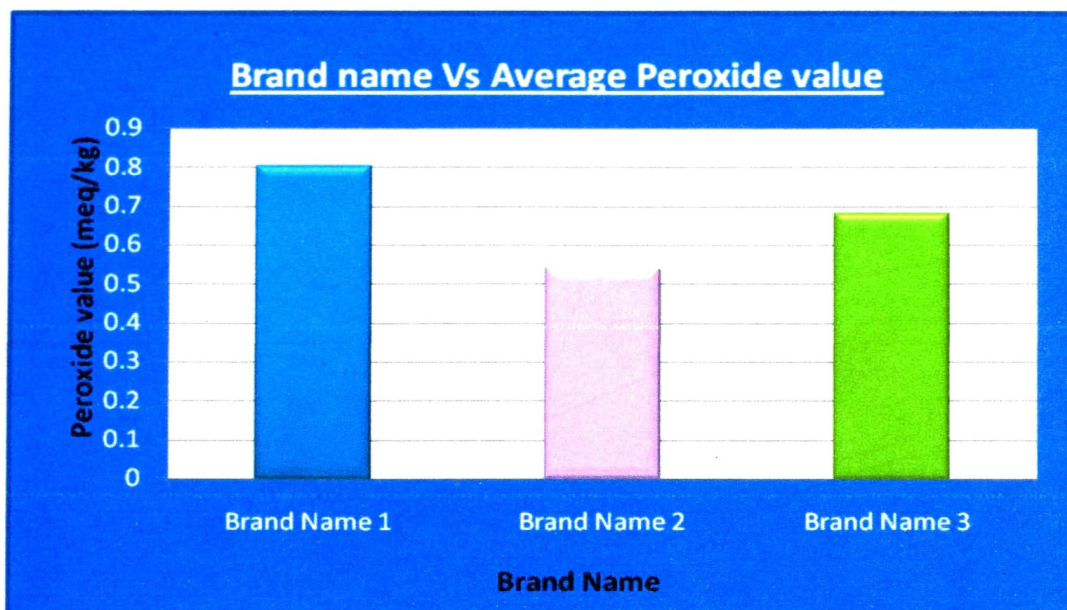


Figure 4.1: Peroxide value variation of baby creams around SLSI standard

pH of brand name 1 baby cream was 6.51, brand name 2 baby cream was 7.05 and brand name 3 baby cream was 7.2. This data was summarized in table 4.2 and figure 4.2. Viscosity of brand name 1 baby cream was 18 500, brand name 2 baby cream was 10 000 and brand name 3 baby cream was 12 000. This data was summarized in table 4.2 and figure 4.3. Non volatile matter percentage of brand name 1 baby cream was 22.36%, brand name 2 baby cream was 16.74% and brand name 3 baby creams was 16.23%. This data was summarized in table 4.2 and figure 4.4.

Table 4.2: pH, Viscosity, Non volatile matter and solution separation of baby creams

Brand Name	pH value	Viscosity/cps	Non volatile matter	Solution separations Centrifuge(Speed: 8000 rpm)
Brand Name 1	6.51	18 500	22.36%	No
Brand Name 2	7.05	10 000	16.74%	No
Brand Name 3	7.20	12 000	16.23%	No

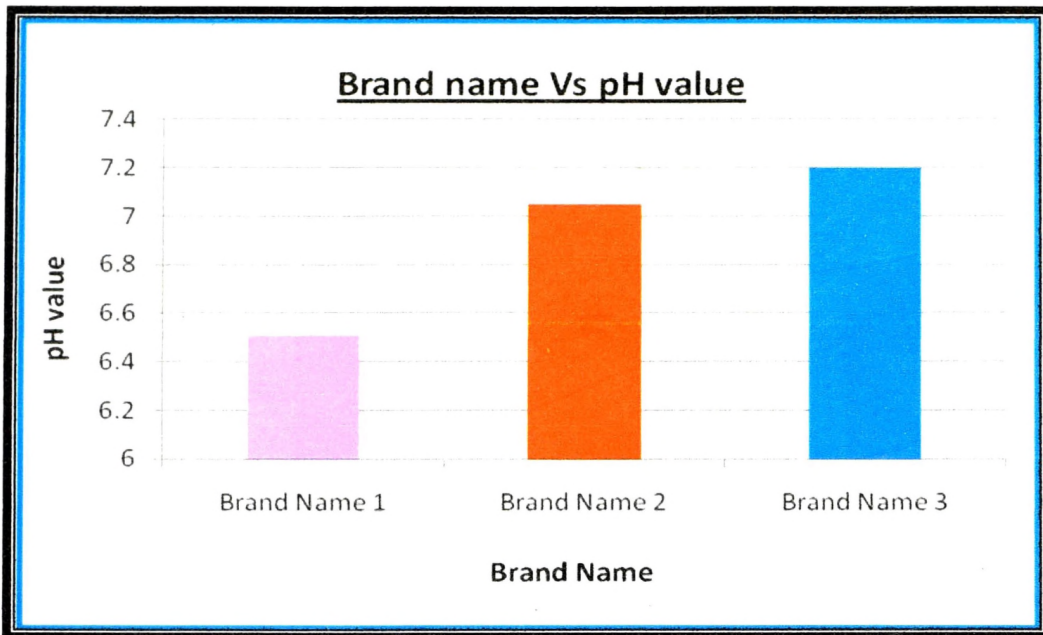


Figure 4.2: pH value variation of baby creams around SLSI standard

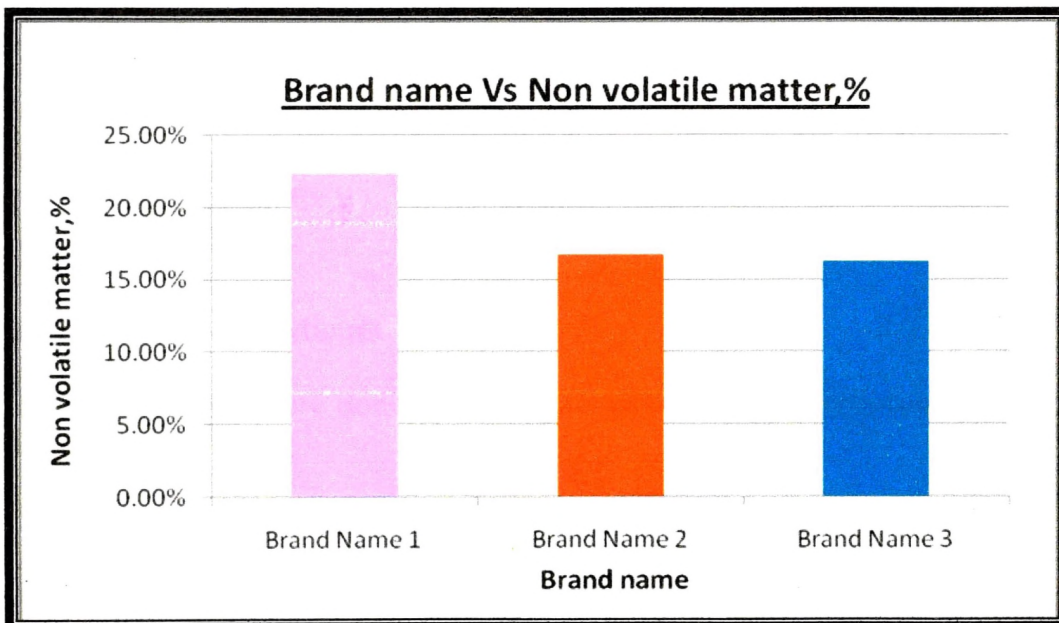


Figure 4.3: Viscosity variation of baby creams around SLSI standard

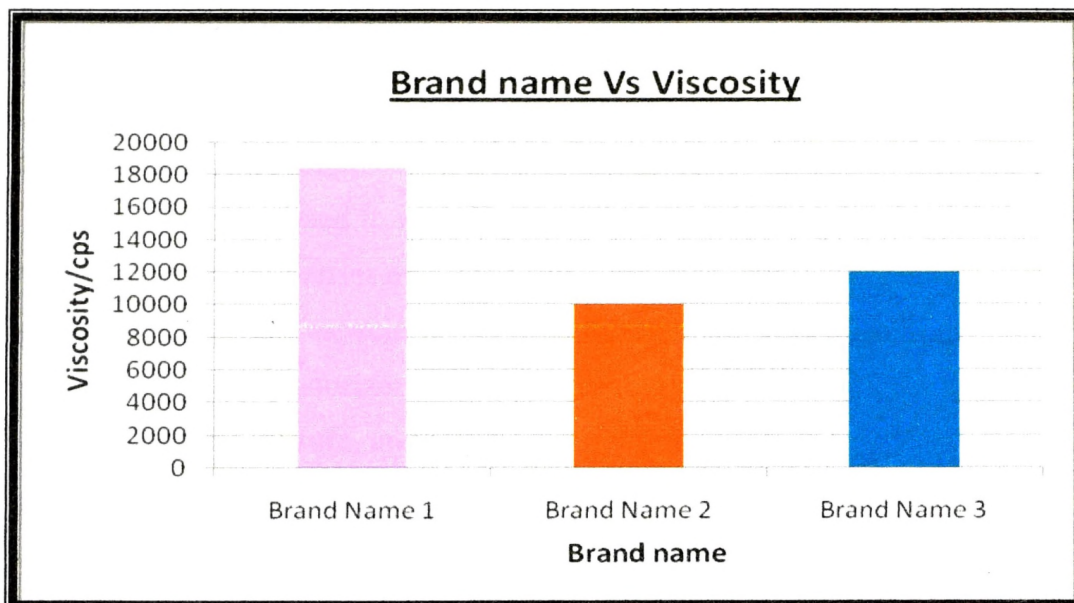


Figure 4.4: Non volatile matter variation of baby creams around SLSI standard

4.1.2 Body Lotions

4.1.2.1 Different features of body lotions

Labeling and packaging information of body lotions samples were evaluated by marketing survey. (Appendix II)

4.1.2.2 Body lotions ingredients

Ingredient comparisons were done using market samples of body lotions. (Appendix II)

4.2 Discussion

4.2.1. Baby creams and Body lotions

Creams and Lotions are used to mainly as a provision of a barrier to protect the skin (This may be a physical barrier or a chemical barrier as with sunscreens), as an aid in the retention of moisture (especially water-in-oil creams), as a cleansing agent and as an emollient effects. Moisturizers prevent and treat dry skin, protect sensitive skin, improve skin tone and texture, and mask imperfections.

4.2.1.1 Specialized baby creams

Some specialized baby creams were Milk, Aloe Vera, Nourishing and Herbal.

4.2.1.2 Specialized body lotions

Some specialized body lotions were Moisturizing lotion, Dry skin lotion, Body lotion with vitamin E, Aloe Vera lotion, Herbal lotion and Sun protection sun lotion.

4.2.1.3 Main Ingredients of baby creams and lotions

Some main ingredients were Moisturiser, Cleansing product, Emollient, Preservative, pH stabilizer, Viscosity stabilizer, Fragrance and UV filter.

4.2.1.4 Sri Lanka Standard requirements

Table 4.3: Sri Lanka Standard 742:1986 (baby cream) & 743:1986 (body lotion)

No	Characteristics	Requirements
1	Thermal stability	To pass the test
2	pH (10 % aqueous solution) @ 27 °C	5.0 to 9.0
3	Total non – aqueous content, percent by mass (min)	15
4	Water content, percent by mass (max)	85
5	Peroxide value, milliequivalents/kg (max)	10

The Peroxide value of an oil or fat is used as a measurement of the extent to which rancidity reactions have occurred during storage. The double bonds found in fats and

oils play a role in autoxidation. Oils with a high degree of unsaturation are most susceptible to autoxidation. The best test for autoxidation (oxidative rancidity) is determination of the peroxide value. Peroxides are intermediates in the autoxidation reaction.

4.2.2 Baby creams

In the project the main objective is to compute the peroxide value of baby cream products to verify the rancidity. The experiments were done only for the determination of pH, Viscosity, Non-volatile matter and Peroxide value of baby creams. Although there are no SLS for the Viscosity it is still an important factor in personal care products. But all of others were done according to SLSI methods.

pH value of skin care product should be around 5.5. Hemas product saw the nearest appropriate pH value for skin than other baby cream products. According to results there was no solution separation in any baby cream. Therefore they can give long self life for their creams. When considering the viscosity of baby creams, all the baby creams had viscosity higher than 10 000cps and Hemas baby creams have comparatively higher viscosity value. Viscosity results were relative according to consumer minds. Non-volatile matter content gave idea about water content, which means about moisturizing effect. Hemas product gave the higher viscosity value and higher non volatile matter percentage.

The one major objective of this project was to develop a method to extraction oil content in baby creams. Normally ingredients which are containing in oil phase are Cetyl alcohol, Gecyl stearate and Sorbital stearate. Water is held together by hydrogen bonds and can interact efficiently with anything that has well developed permanent charges; that's why it can dissolve electrolytes so well.

Oils on the other hand are non polar, simply because the difference between the electro negativities of H and C are so small. These molecules interact by London (of van der Waals) dispersion forces and are induced dipole - induced dipole interactions. These interactions become stronger as more molecules are bound together, at least up to some critical size. These interactions are also strongest between molecules with similar polarizabilities. The interactions between the oil and water molecules are not

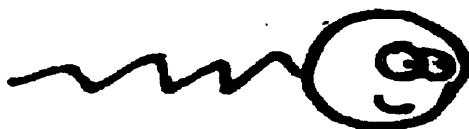
strong, the oil can't hydrogen bond as it is non -polar and water can't form strong London forces to the oil; it has a different polarizability.

Now, a second part to this is that water molecules are much smaller than most other molecules, so to accommodate oil molecules, many water molecules have to have their hydrogen bonds broken. To prepare a cream should have mix oil and water together for that should be supply mechanical energy to the system like Agitation or Heat by stirring. But need Surfactants or Emulsifiers to stabilize the cream.

Emulsifier (the Stabilizer)

Lipophilic tails

Hydrophilic heads



It has Lipophilic tails and Hydrophilic heads therefore it help to disperse oil in water by reducing interfacial surface tension and forming micelles in solution. After that to break that emulsion to separate oil part in creams should supply again higher energy. Due to energy is not enough the first five methods (method 3.4.5.1.1 to 3.4.5.1.6) were not successful. The 3.4.5.1.7 method was the developed one. According to that oil content in baby cream were extracted in to ethyl acetate after several steps. Due to the strength of baby cream emulsion it was essential to be careful during the extraction. Finally titrate that extracted oil portion with Sodium thiosulfate solution according to SLSI method to calculate Peroxide value. Blank test was done, which did not have oil and the same procedure for the samples was carried out.

Almost tested baby cream samples were in the range of SLSI requirements. Hemas baby creams also maintain SLSI requirements.

According to the information gathered by Market Survey, there are few companies' market baby creams in Sri Lanka. Those are Unilever Ltd, Hemas Ltd, Swadeshi Industrial Ltd and CIC (cosmetics) Ltd. Both imported & local baby creams are

shearing the baby creams market. The packaging systems of almost all the baby creams were in same position expect J&J. It has invert tube type packaging, while Unilever baby creams have very attractive container appearance. Hemas has three varieties of baby creams. Readily available volumes are the 50ml, 100ml, 200ml and 300 ml. From those analysed baby creams, J&J has the highest unit price (5.41- Appendix I). However; all the other baby creams are in reasonable prices (Appendix I).

There are about 31 ingredients (Appendix I) present in J&J products. Hemas, Unilever and Swadeshi baby creams did not state the ingredients on their containers. Though this violates the consumer's rights, Sri Lanka's regulations do not state that the ingredients must be printed on the container.

4.2.3 Body lotions

According to the market survey on body lotions, many main companies market body lotions in Sri Lanka. Some are Unilever Ltd, Hemas Ltd, Oriflame cosmetics Ltd, St-Ives cosmetics Ltd, Janet Cosmetics Ltd, ReeBonn Cosmetics Ltd, Multichemi International Ltd and etc (Appendix II).

Both imported & local body lotions are shearing the body lotions market. The packaging systems of almost all the body lotions are in different position. Readily available volumes are the 100 ml, 200 and 500 ml. From those analysed body lotions, Nivea Sun maximum protection sun lotion (13.53- Appendix II) and Garnier sun control daily moisture lotion (7.20- Appendix II) body lotions had the highest unit price. In price wise Hemas body lotion was in the cheapest range. However, all the other fast moving body lotions were in reasonable prices (Appendix II).

Almost all the products share the same ingredients (Appendix II) and St-Ives products contain more botanical extracts than the others. Hemas, Unilever, Revlon body lotions did not state the ingredients on their containers. Nature Secrets, St-Ives, Nives, Garnier, Enchanteur, Janet, Shello, Personal care, Himalaya, Voodoo, Nyle, Pond's, Cream 21 and Fa body lotions were available with different varieties (Appendix II).

CHAPTER 05

CONCLUSION AND RECOMMENDATION

Peroxide values, pH and Non volatile matter of different tested baby cream brands, all the baby creams including Hemas brands are compel the limits of SLSI (Table 4.1,4.2 and Figure 4.1,4.2,4.3,4.4). By considering Peroxide value which is tested baby cream samples we can conclude Hemas baby cream formulation has the appropriate ingredients than others.

New developed method to take apart oil part in baby cream products gives positive results for all baby creams.

Almost all the baby cream brands have same packaging system except for J&J. But Unilever brand has introduce their products in very eye-catching containers. Although Hemas baby creams have a high nutritional value, the packaging should be improved to give a better competition to Unilever products and fragrance should be improved to give a better competition to J & J products.

Most of body lotions have very attractive fragrance and containers. Hemas should be improved body lotion packaging and fragrance to give a better competition to others.

CHAPTER 06

CONSUMER ORIENTED RESEARCH & DEVELOPMENT (CORD) ON BABY CREAMS USAGE

CORD Report

[November 2008]

6.1 Introduction

The Consumer Oriented Research Development (CORD) was carried out in mainly Colombo & Ratnapura districts and the results from these have been put together in this report.

6.1.1 Objectives

The objectives were Consumer Oriented Research Development to evaluate the market products, to determine the market position, to identify the improvements of existing products and to generate new product ideas from the consumers and find out what are the popular brands which are available in Sri Lanka.

6.2 Method

A questionnaire was developed with the assistance of persons knowledgeable in Hemas. A pilot test was done for ten participants to improve the questioner. Data of the pilot test were analyzed and questioner was rearranged using data gathered.

6.2.1 Factors use to select panel of participants (baby creams)

Panel

Age : 18 – 40 Mothers

User ship : Current Cream user / Non-user

Category : Babies

Sample size : 50

Panel of participants from: Colombo / Ratnapura / Dankotuwa / Kandy

6.2.2 Panel of participants from (baby creams):

General Hospital (Ratnapura)
General Hospital (Dankotuwa)
Sabaragamuwa University
Open University (Ratnapura)
Hemas Manufacturing
Other (Relatives & friends)

The participants were selected by these groups due to their understanding of products and services. Nearly all the participants were come across between in places where work or study. The selected size of the group is comparatively less (100) as each questionnaire completed personally. All the questionnaires were collected and reviewed for content and completeness.

6.3 The Questionnaire (baby cream: Appendix III)

6.4 Survey Results and Findings

Sample size = 75

Q1, Q2, Q3, Q4, Q5: Description about the target group

Objective : To make a group of participants for further surveys

For CORD participated people percentage was in Ratnapura (26%), Colombo (32%), Dankotuwa (40%) and 2% in Kandy. That data was summarized in table 6.1 and figure 6.1. Selected age group people percentage was in less than 1 year (26%), less than 5 year (48%) and more than 5 year (26%). That data was summarized in table 6.2 and figure 6.2.

Table 6.1: Percentage of sample size by Area

Area Live	Number of people	Percentage, %
Ratnapura	13	26.00
Colombo	16	32.00
Dankotuwa	20	40.00
Kandy	1	2.00
	50	

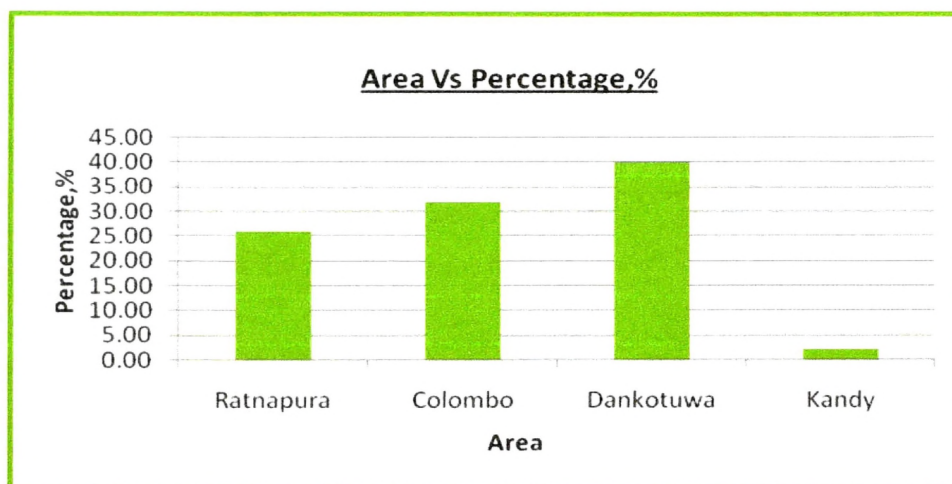


Figure 6.1: Flow chart for Area Vs Percentage

Table 6.2: Percentage of people from selected age groups

Age group	Number of People	Percentage, %
Less than 1 year	13	26.00
Less than 5 year	24	48.00
More than 5 year	13	26.00
	50	

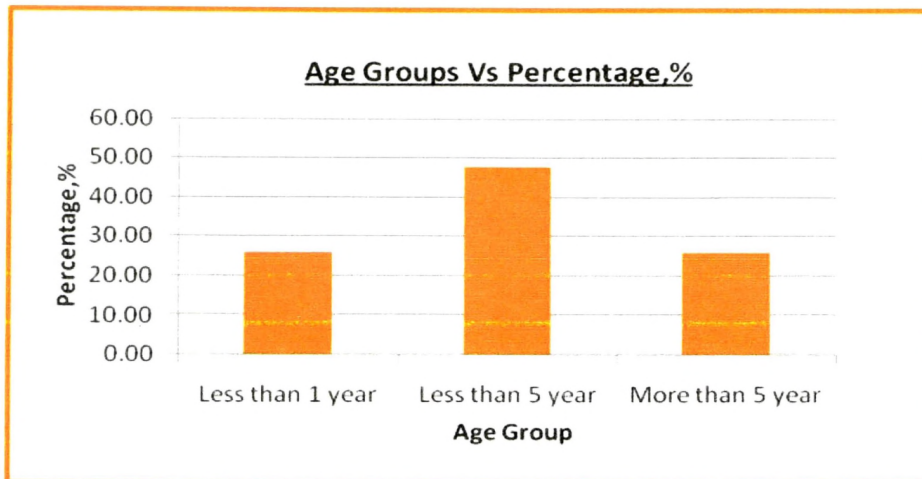


Figure 6.2: Flow chart for Age group Vs Percentage

Q6 : Preferred baby cream by the participants

Objective: To find out the most popular brands

Baby Cheramy users percentage was (53%), Pears (22%), J&J (20%), Baby Cheramy Nourishing (2%) and Curash baby care (2%). That data was summarized in table 6.3 and figure 6.3.

Table 6.3: Percentage of people with different baby cream brands

Brand name of Baby Creams	Number of People	Percentage,%
Baby Cheramy	26	53.06
Baby Cheramy Nourishing	1	2.04
Pears	11	22.45
Jhonson & Jhonson	10	20.41
Curash baby care	1	2.04
	49	

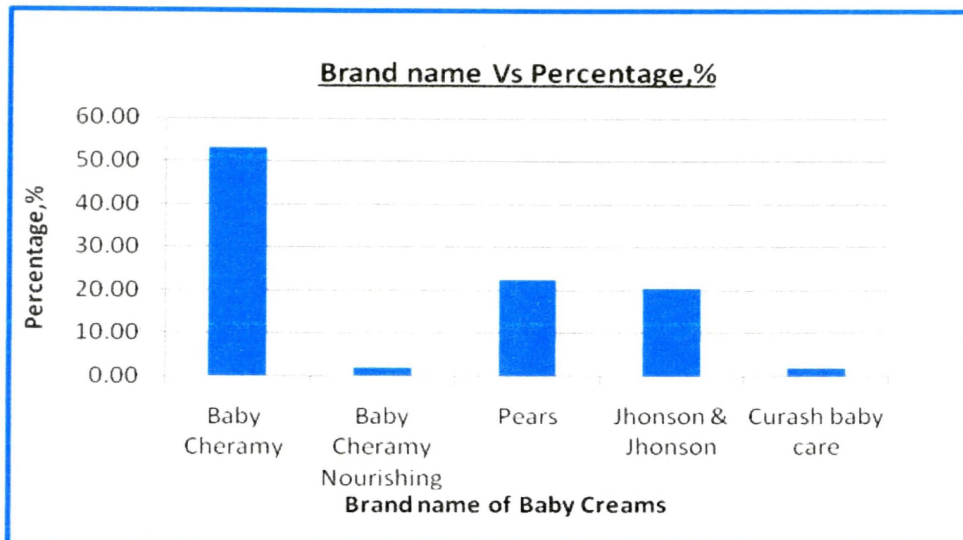


Figure 6.3: Flow chart Current brand Vs Percentage

Q7 : Brand loyalty of the participants

Objective: To find out the dependent time on current brand

Brand loyalty percentage of people were less than 1 year (28%), less than five year (41%) and more than 5 year (31%). That data was summarized in table 6.4 and figure 6.4.

Table 6.4: Percentage of people with brand loyalty

Brand Loyalty	Number of People	Percentage,%
Less than one year	14	28.57
Less than five year	20	40.82
More than five year	15	30.61
	49	



Figure: 6.4 Flow chart for Brand loyalty Vs Percentage

Q8 : Brand changing frequency of the participants

Objective: To find out the brand changing frequency on consumers

92% percentage of people never changes their current brand and 8% people may be changing their current brand baby cream. That data was summarized in table 6.5.

Table 6.5: Percentage of people with brand changing frequency

Brand changing Frequency	Number of People	Percentage,%
Never	45	91.84
May be	4	8.16
	49	

Q9 : Reason for selecting current brand

Objective: To find out the consumers mind when selecting a brand

As brand selecting reasons 30% percentage of people was considered moisturizing effect, 25% considered fragrance, according to brand name 6%, for softness 10%, for oiliness 1%, for prevent nappy rash 15% and 11% no special reasons. That data was summarized in table 6.6 and figure 6.5.

Table 6.6: Percentage of people with brand selecting reason

Brand selecting reason	Number of People	Percentage, %
Moisturizing effect	19	30.16
Fragrance	16	25.40
Mind good/Brand name	4	6.35
Softness	6	9.52
Oiliness	1	1.59
No special reason	7	11.11
For nappy rash	10	15.87
	63	

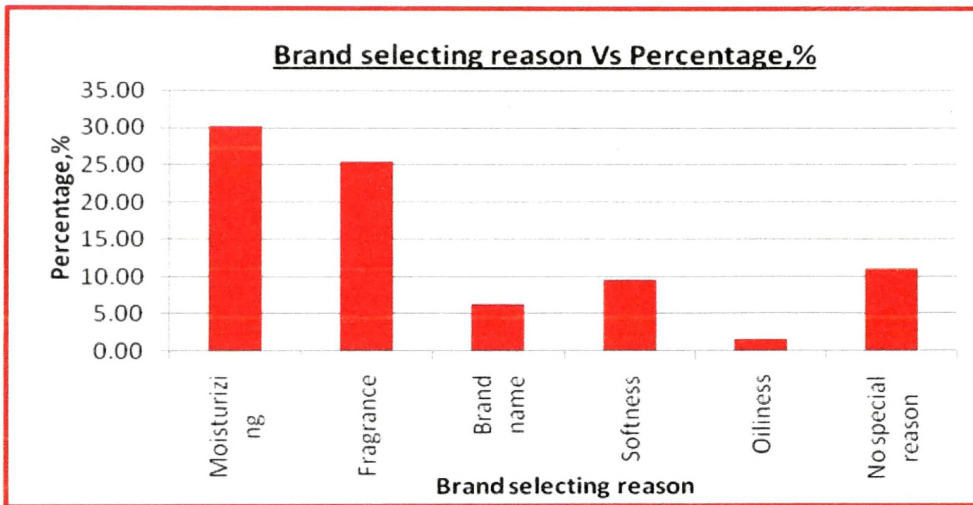


Figure 6.5: Flow chart for Brand selecting reason Vs Percentage

Q11 : Skin type

Objective: To find out skin type

Skin type percentage of participated people were oil 4%, Dry 22% and normal 73%.

That data was summarized in table 6.7 and figure 6.6

Table 6.7: Percentage of people with different skin type

Skin type	Number of People	Percentage, %
Oil	2	4.08
Dry	11	22.45
Normal	36	73.47
	49	

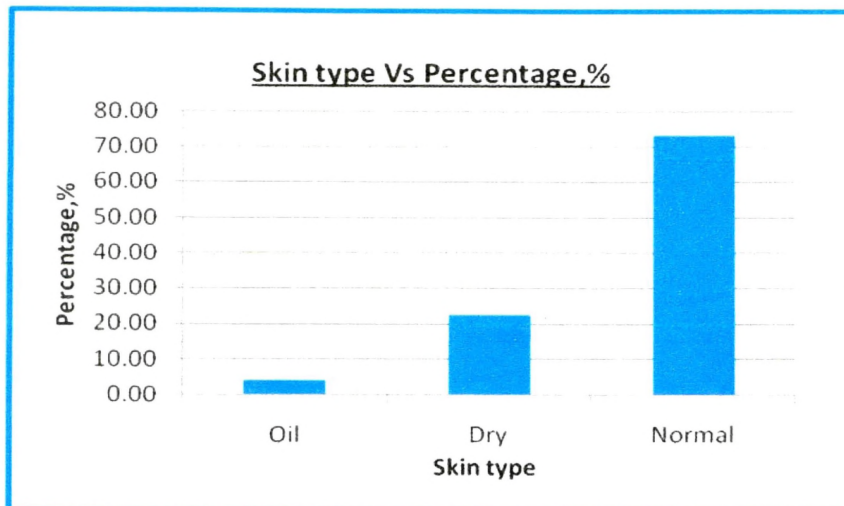


Figure 6.6: Flow chart for Skin type Vs Percentage

Q12 : To whom purchase

Objective: To find out whether the baby cream only use the target group or other people accepted

User type percentage of participated people was only babies 57%, for dual 25% and for family 18%. That data was summarized in table 6.8 and figure 6.7

Table 6.8: Percentage of people with user type

User Type	Number of People	Percentage,%
Baby	28	57.14
Dual	12	24.49
Family	9	18.37
	49	

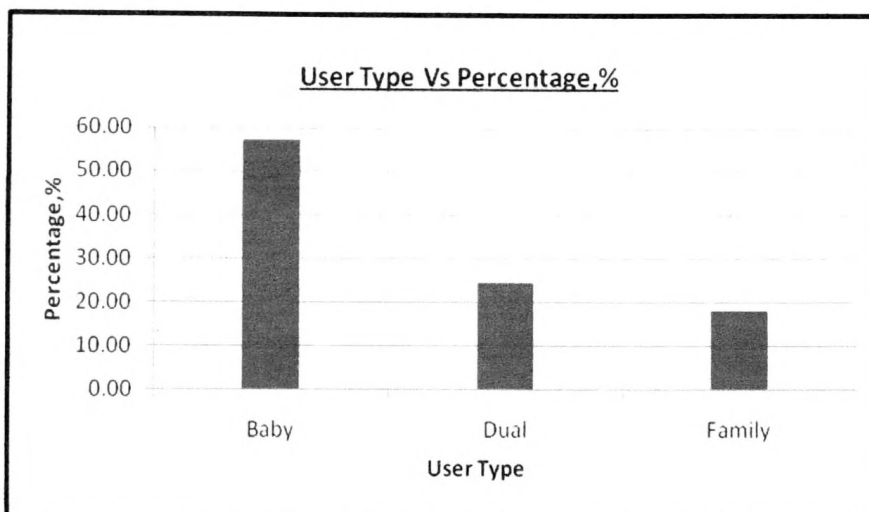


Figure 6.7: Flow chart for User type Vs Percentage

Q13 : Reason for using a cream

Objective: To find out the major reasons of using the cream

As reasons of use baby cream 42% percentage of people was considered moisturizing effect, 3% considered fragrance, for nourishing 11%, for softness 38%, for fairness 3% and for growth 1%. That data was summarized in table 6.9 and figure 6.8.

Table 6.9: Percentage of people with reason for using

Reason for using	Number of People	Percentage,%
Moisturizing effect	40	42.55
Softness	36	38.30
Nourishing	11	11.70
Fairness	3	3.19
Fragrance	3	3.19
Growth	1	1.06
	94	

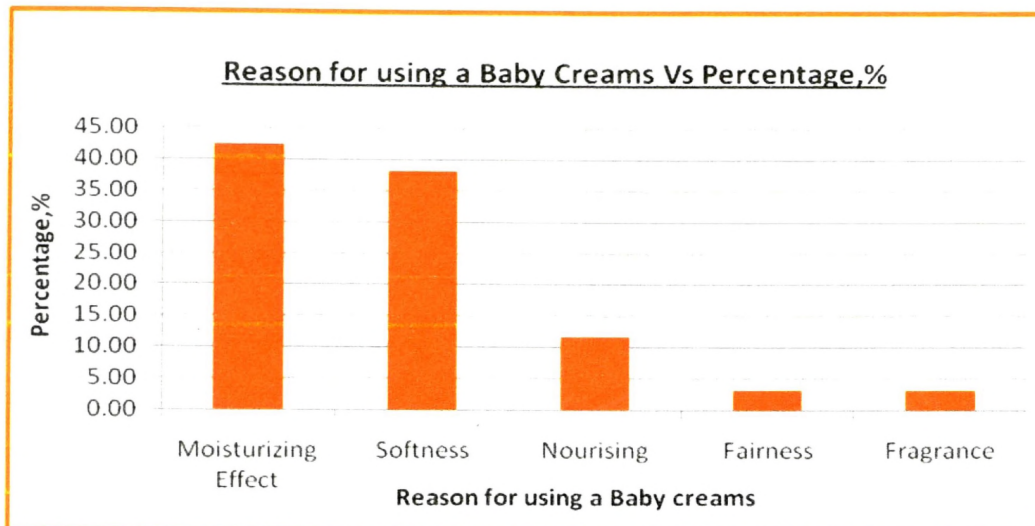


Figure 6.8: Flow chart for Brand using reason Vs Percentage

Q14 : Preferred pack size

Objective: To find out the preferred pack size

73% of people preferred to use 100ml pack size, 16% use more than 100ml and 10% use 50ml pack size bottles. That data was summarized in table 6.10 and figure 6.9

Table 6.10: Percentage of people with preferred pack size

Preferred pack size	Number of People	Percentage,%
50 ml	5	10.20
100 ml	36	73.47
More than 100 ml	8	16.33
	49	

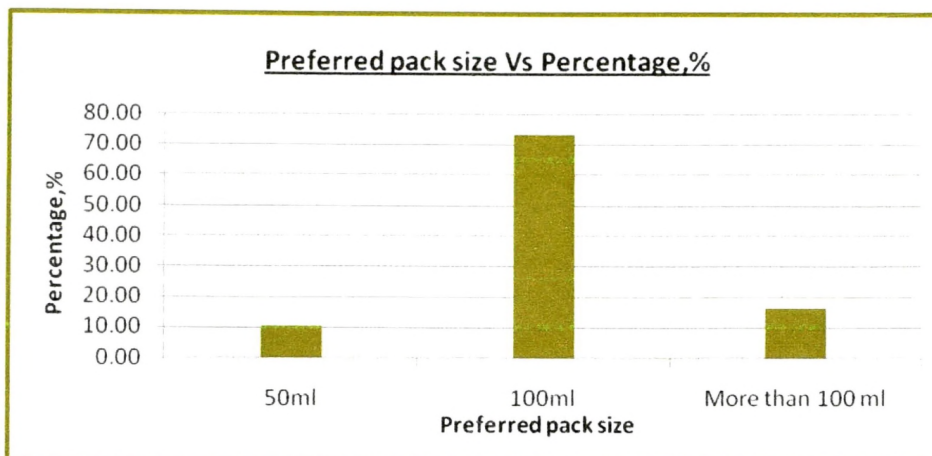


Figure 6.9: Flow chart for preferred pack size Vs Percentage

Q15 : Brand choosing method

Objective: To find out the impact media on consumers to choose a brand

67% of people selected brand according to their experience, 14% by friends and family, by advertizing 16% and according to Doctor's advice 2%. That data was summarized in table 6.11 and figure 6.10

Table 6.11: Percentage of people with brand choosing method

Brand choosing method	Number of People	Percentage,%
By Experience	33	67.35
By friends & family	7	14.29
By Advertisements, Magazines	8	16.33
By Doctor's advice	1	2.04
	49	

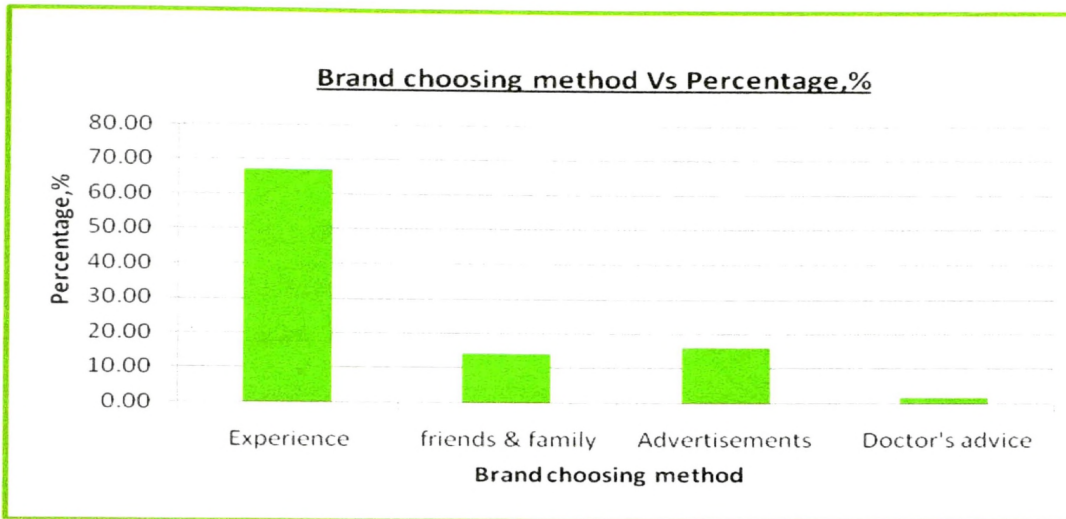


Figure 6.10: Flow chart for Brand choosing method Vs Percentage

Q16 : Important of appearance of the container

Objective: To find out the importance of appearance of the packing

61% of people did not consider appearance of packaging and 39% people considered. That data was summarized in table 6.12 and figure 6.11

Table 6.12: Percentage of people with importance of appearance of the packing

Importance of Appearance	Number of People	Percentage,%
Yes	19	38.78
No	30	61.22
	49	

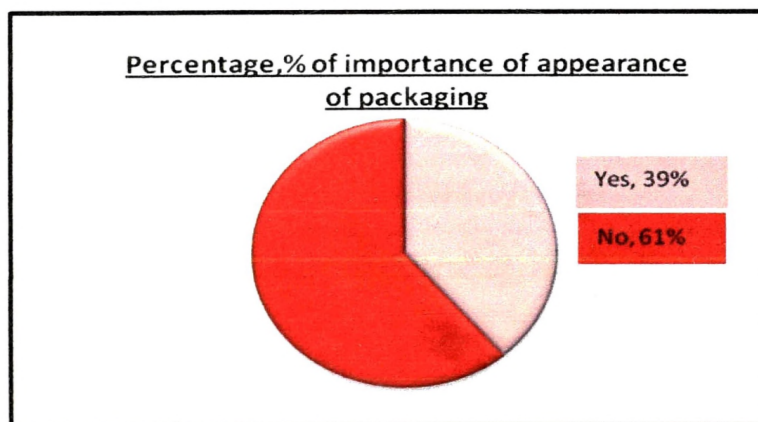


Figure 6.11: Flow chart for Importance of appearance Vs Percentage

Q17 : Characteristics are looking in a baby cream

Objective: To find out what are the major characteristics of baby creams preferred by participants

43% of people consider fragrance of baby cream, 44% of people consider thickness and 13% people considered about color of baby cream. That data was summarized in table 6.13 and figure 6.12. Fragrance type; 59% preferred to mild, 39% floral and 2% people like to low fragrance. That data was summarized in figure 6.13. 95% of people preferred to average thickness and 5% for low thickness. That data was summarized in figure 6.14.

Table 6.13: Percentage of people with different characteristics

Characteristics	Number of People	Percentage,%
Fragrance	44	43.14
Thickness	45	44.12
Colour	13	12.75
	102	

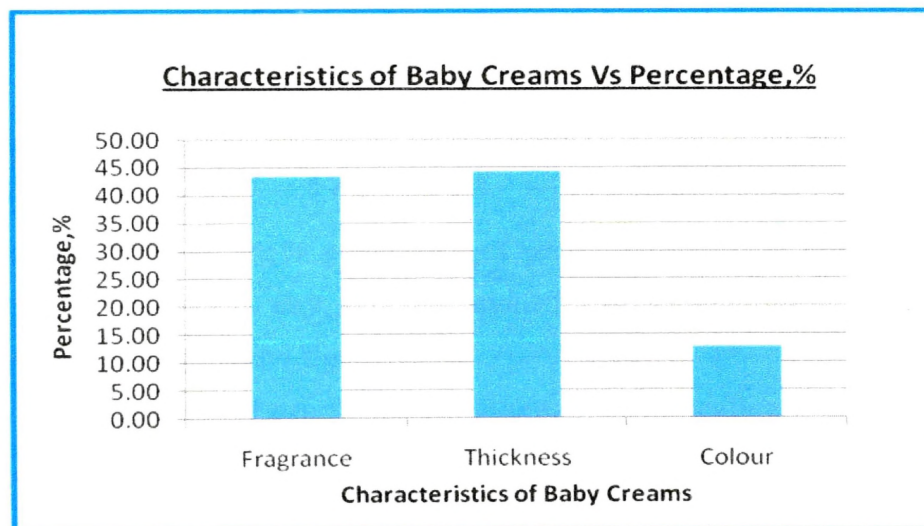


Figure 6.12: Flow chart for Characteristics Vs Percentage

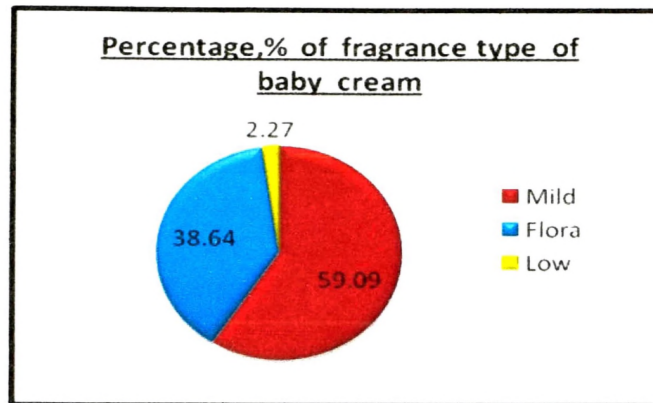


Figure 6.13: Flow chart for Fragrance type Vs Percentage

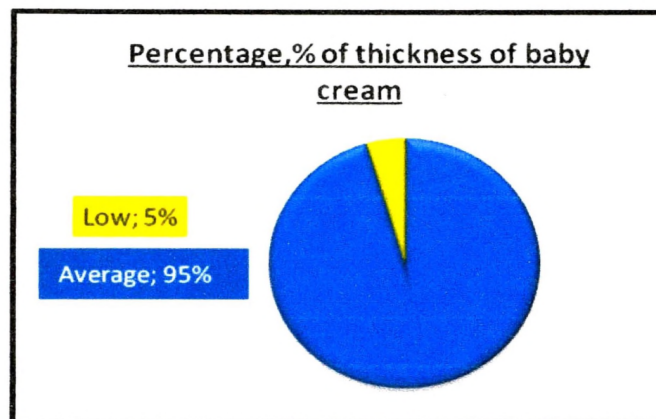


Figure 6.14: Flow chart for Thickness type Vs Percentage

Q21 : Frequency of using

Objective: To find out the frequency of application

Frequency of applying, 55% percentage of people was used in twice a day, 31% thrice a day, 8% once a day and 6% applied four times a day. That data was summarized in table 6.14 and figure 6.15.

Table 6.14: Percentage of people with frequency of application

Frequency of using	Number of People	Percentage,%
Once a day	4	8.16
Twice a day	27	55.10
Thrice a day	15	30.61
Four times a day	3	6.12
	49	

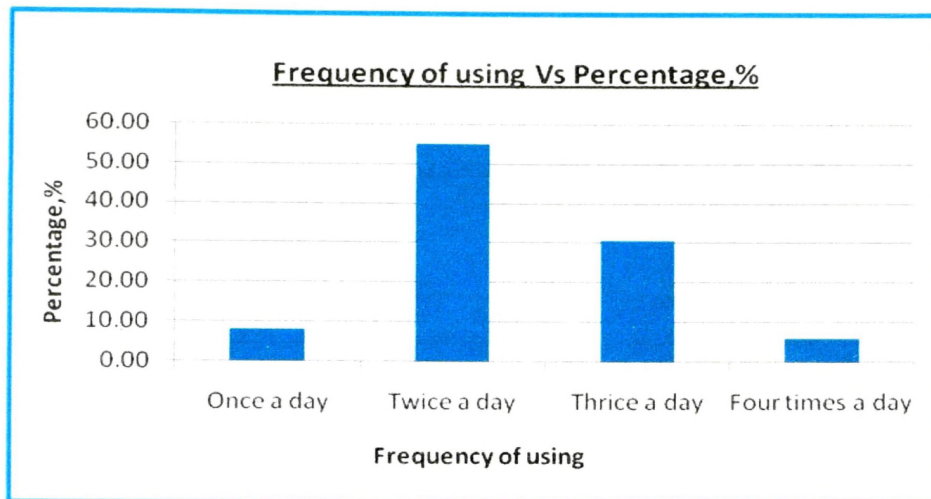


Figure 6.15: Flow chart for using frequency Vs Percentage

Q22 : Purchasing (Usage) Frequency

Objective: To find out the monthly consume volume of baby cream for Participants

2% of people 50ml amount of cream were used in per month, 20% used 100ml, 61% used 200ml and 16% used 300ml of cream per month. That data was summarized in table 6.15.

Table 6.15: Percentage of people with amount use per month

Baby Creams usage per month	Number of People	Percentage,%
50 ml	1	2.04
100 ml	10	20.41
200 ml	30	61.22
300 ml	8	16.33
	49	

Q22 : Satisfied with the current brand

Objective: To measure the satisfaction of consumer on current brand

100% of people were satisfied with their current brand. That data was summarized in table 6.16.

Table 6.16: Percentage of people with current brand satisfaction

Current brands Satisfaction	Number of People	Percentage, %
Yes	49	100.00
No	0	0.00
	49	

Q23 : Need any improvements in current brand

Objective : To find out the requirements of improvement in current brand

32% of people asked about improvement and 68% not considered improvements. That data was summarized in table 6.17 and figure 6.16.

Table 6.17: Percentage of people with current brand improvement

Improvement	Number of People	Percentage, %
Yes	16	32.65
No	33	67.35
	49	

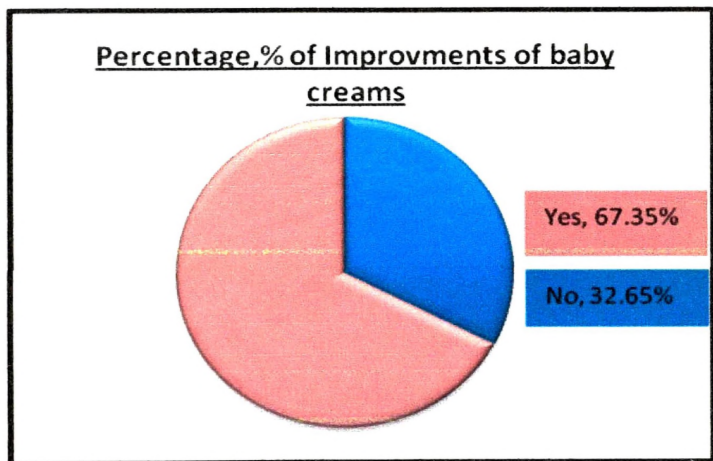


Figure 6.16: Flow chart for Improvement Vs Percentage

Fragrance and fairness increasing and thickness decreasing were the most important improvements. That data was summarized in table 6.18.

Table 6.18: Improvement of baby cream brands

Improvement	Baby Cheramy	Pears
Fragrance increases	√	√
Thickness decreases	√	√
Fairness increases	√	√
Reduce oiliness	√	
Increase oiliness		√

Q24 : Any bad experience by using any other cream

Objective : To find out the major reasons of using the baby cream

As their bad experience; they consider can not be prevent nappy rash, sweating and reduce fairness in day time. That data was summarized in table 6.19.

Table 6.19: Bad experience of baby cream brands

Bad experiences	Baby Cheramy	Pears	Jhonson & Jhonson	Khomba baby cream
Reduce fairness in day time	√			
Can not prevent nappy rash	√	√	√	√
Sweating		√		

6.5 Discussion

For the survey, self completion questionnaire was not given to the participants but also all the questioners were filled by doing a personal discussion with each and every participant, in order to understand what is on their mind. According to the figure 6.1, 40% participants are from Dankotuwa, 32% from Colombo, 26% from Ratnapura and 2% from the Kandy areas. By considering the age groups (Figure 7.2), most of baby cream users fall in to the category of age between 01- 05 (48%).

According to the figure 6.3, most of the participants prefer to use Baby cheramy (53%), out of 100 22% of participants prefer to use Pears, 20% of participants like to use J&J, and other (5%). Other category includes; Baby cheramy nourishing and Curash baby care.

According to the figure 6.4, the variation of the brand loyalty of the participants is, more than 70% of participants have been using their baby cream for more than a year. Only 8% of participants change their baby cream frequently.

The baby cream characteristics which are preferred by participants are mainly thickness (44%), fragrance (43%), and colour (13%) (Figure 6.12 and Table 6.13). Most preferred fragrances are mild (59%) and floral (39%) (Figure 6.13).

Moisturizing effect, softness and fragrance are the main factor which is considered by baby cream users when selecting a baby cream (Table 6.6 and figure 6.5). According to the table 6.16, 100% of participants are satisfied with their baby cream. Most of the participants have selected their baby cream with the influence of their experience (Table 6.11 and figure 6.10). Therefore, family background can make a major impact of selecting a baby cream of a particular baby cream user.

100% of participants read the label of baby cream bottle and therefore, the results have indicated that, consumers are very much concern about proper labeling of such products. According to the figure 6.11, 39% of the participants consider the appearance of the container as a factor when selecting a baby cream. That is, having an attractive packaging is not a somewhat important factor to select a baby cream.

Most of mothers think baby creams provide softness for babies. But some mothers (2%) did not like to use baby cream for their babies due to stickiness and sweating.

Baby cheramy is in most of participant's mind as the top baby cream. Then Pears and J&J can be taken as popular baby cream brands. Although most of participants think that Baby cheramy and Pears have similar percentage of participants. But Pears is fall in this category.

This CORD was repeated for girls also which is used baby cream. According to that results also, most popular brand is baby cheramy (57%).

6.6 Conclusion and Recommendation

Considering the age group of baby cream users all age group babies use baby creams. Baby cheramy baby cream has become more popular in last years since people thin that it is more beneficial and can have a reasonable price.

Most of babies suffer from nappy rash problems; for prevent those problem has nappy rash creams. Most of people consider moisturizing and softness as factors when they select baby creams. But when using they expect softness also. High level of moisturizing is important for people who live in dry areas.

Detailed labeling is also important for consumers since most of people read the label of the bottle to make sure that what are the benefits of the baby cream will supply. However, baby cheramy is preferred as better than others except J&J since most consumers use that baby cheramy for babies and their formulation has nutritional effect also. Most of mothers suggestion is baby product such as cologne, cream, oil and etc should be same fragrance.

CHAPTER 07

CONSUMER ORIENTED RESEARCH & DEVELOPMENT (CORD) ON BODY LOTIONS USAGE

CORD Report

[November 2008]

7.1 Introduction

7.1.1 Factors use to select panel of participants

Panel

Age	: 18 - 40
Gender	: Female / Male
User ship	: Current Cream user / Non-user
Category	: Employee / Students
Sample size	: 75

Panel of participants from: Colombo / Ratnapura / Dankotuwa / Kandy

7.1.2. Panel of participants from:

Sabaragamuwa University
Peradeniya University
Open University (Ratnapura)
Bank of Ceylon (Ratnapura)
Link Natural Products (Pvt) Ltd
Hemas Manufacturing
Other (Relatives & friends)

7.2 The Questionnaire (body lotions: Appendix IV)

7.3 Survey Results and Findings

Sample size = 75

Q1, Q2, Q3, Q4 : Description about the target group

Objective : To make a group of participants for further surveys

Table 7.1: Percentage of sample size by Area

For CORD participated people percentage was in Ratnapura (41%), Colombo (36%), Dankotuwa (16%) and 7% in Kandy. That data was summarized in table 7.1 and figure 7.1. Selected age group people percentage was in 18-25 (76%), 26-30 (17%), 31-35 (5%) and 6-41 (1%). That data was summarized in table 7.2 and figure 7.2.

Area Live	Number of people	Percentage,%
Ratnapura	31	41.33
Colombo	27	36.00
Dankotuwa	12	16.00
Kandy	5	6.67
	75	

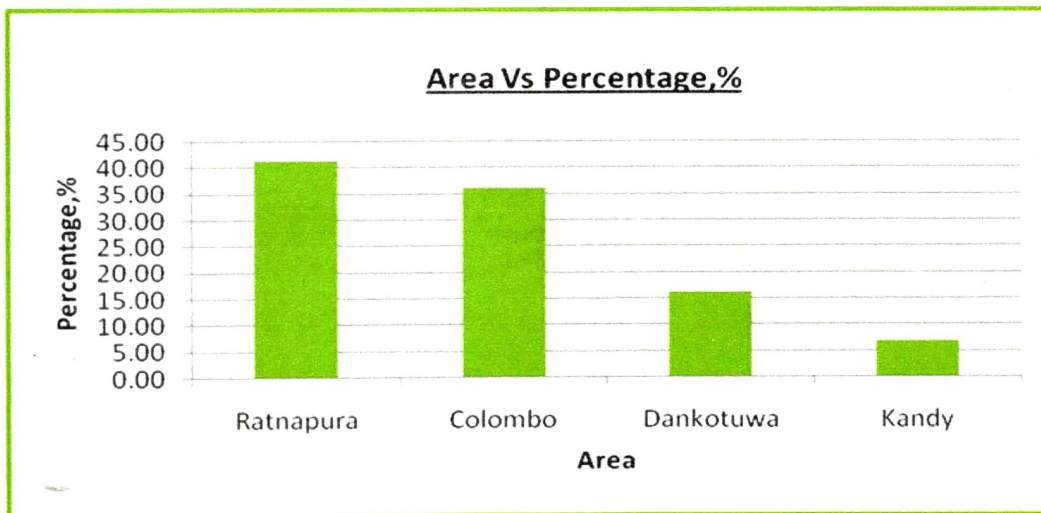


Figure 7.1: Flow chart for Area Vs Percentage

Table 7.2: Percentage of people from selected age groups

Age group	Number of People	Percentage, %
18 - 25	57	76.00
26 - 30	13	17.33
31 - 35	4	5.33
36 - 40	1	1.33
	75	

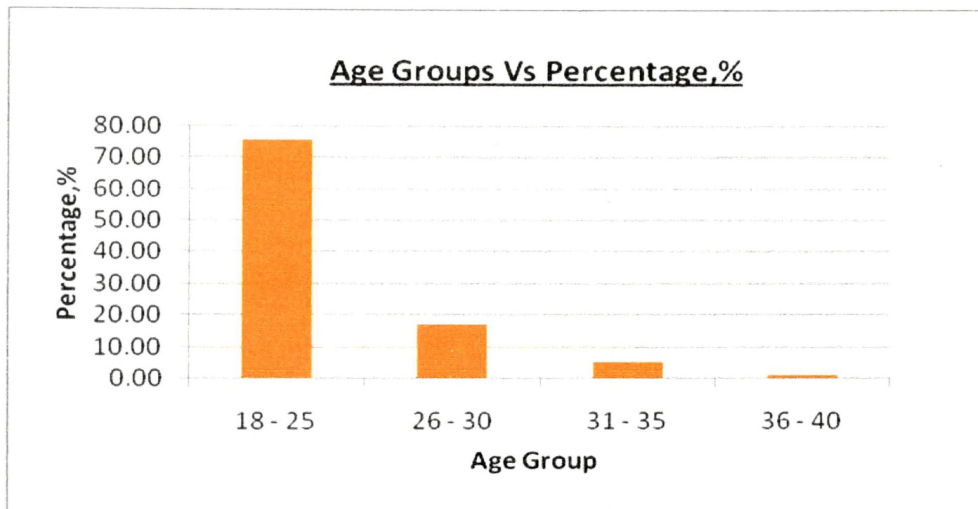


Figure 7.2: Flow chart for Age group Vs Percentage

Q5 : Preferred body lotion by the participants

Objective: To find out the most popular brands

Nature's Secret users percentage was (22%), Nyle (16%), Enchanteur (13%), Clean & Clear (9%), Dove (5%), St.Ives (4%), Jovees (4%), Voodoo (4%), Goya (3%) and Paris (3%). That data was summarized in table 6.3 and figure 6.3. That data was summarized in table 7.3 and figure 7.3.

Table 7.3: Percentage of people with different body lotions brands

Brand name of Lotions	Number of People	Percentage, %
Nature's Secret	15	22.06
Nyle	11	16.18
Enchanteur	9	13.24
Clean & Clear	6	8.82
Dove	4	5.88
St.Ives	3	4.41
Jovees	3	4.41

Voodoo	3	4.41
Goya	2	2.94
Constant clarone	2	2.94
Paris	2	2.94
Nivea	2	2.94
Reebonn	1	1.47
Pond's	1	1.47
Sujatha	1	1.47
Oriflame	1	1.47
Janet	1	1.47
Curel	1	1.47
	68	

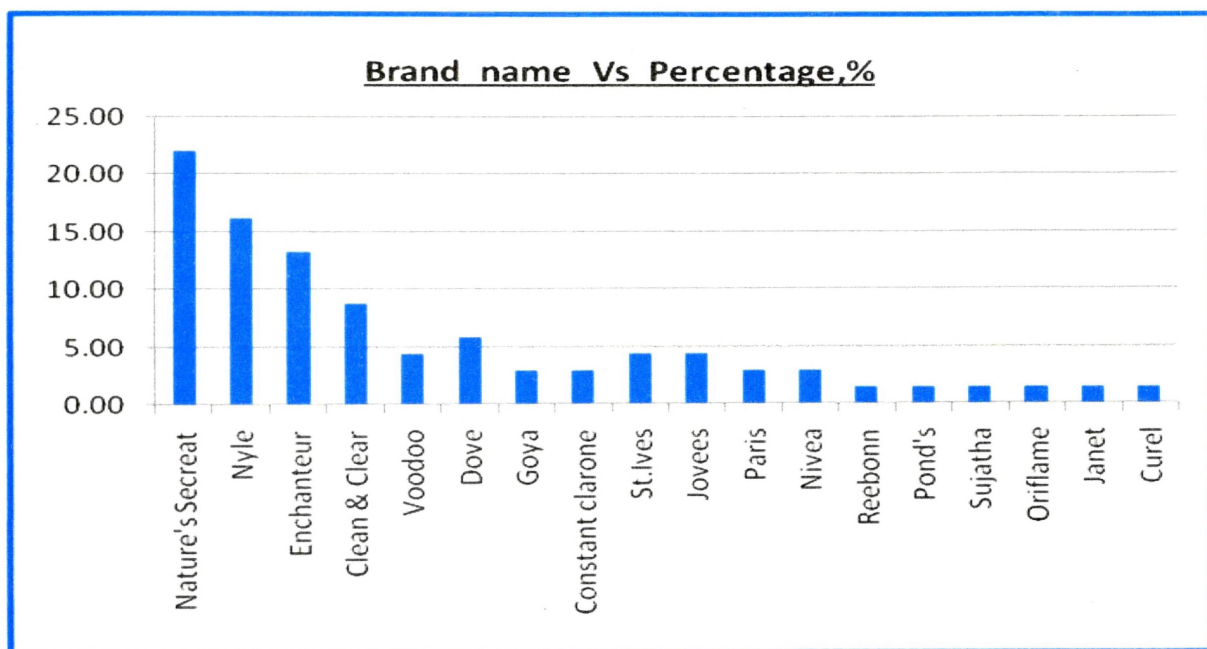


Figure 7.3: Flow chart Current brand Vs Percentage

Q8 : Reason for selecting current brand

Objective: To find out the consumers mind when selecting a brand

As brand selecting reasons 33% percentage of people was considered moisturizing effect, 19% considered fragrance, according to brand name 12%, for softness 7%, for oiliness 9%, for pimple removing 3% and 8% no special reasons. That data was summarized in table 7.4 and figure 7.4.

Table 7.4: Percentage of people with brand selecting reason

Brand selecting reason	Number of People	Percentage, %
Moisturizing effect	28	33.33
Fragrance	16	19.05
Mind good/Brand name	10	11.90
Softness	6	7.14
Oiliness	8	9.52
Prevent pimple	3	3.57
Nourishing	1	1.19
Cooling effect	1	1.19
Damage repair	1	1.19
Doctor's advice	1	1.19
No special reason	7	8.33
For AC good	2	2.38
	84	

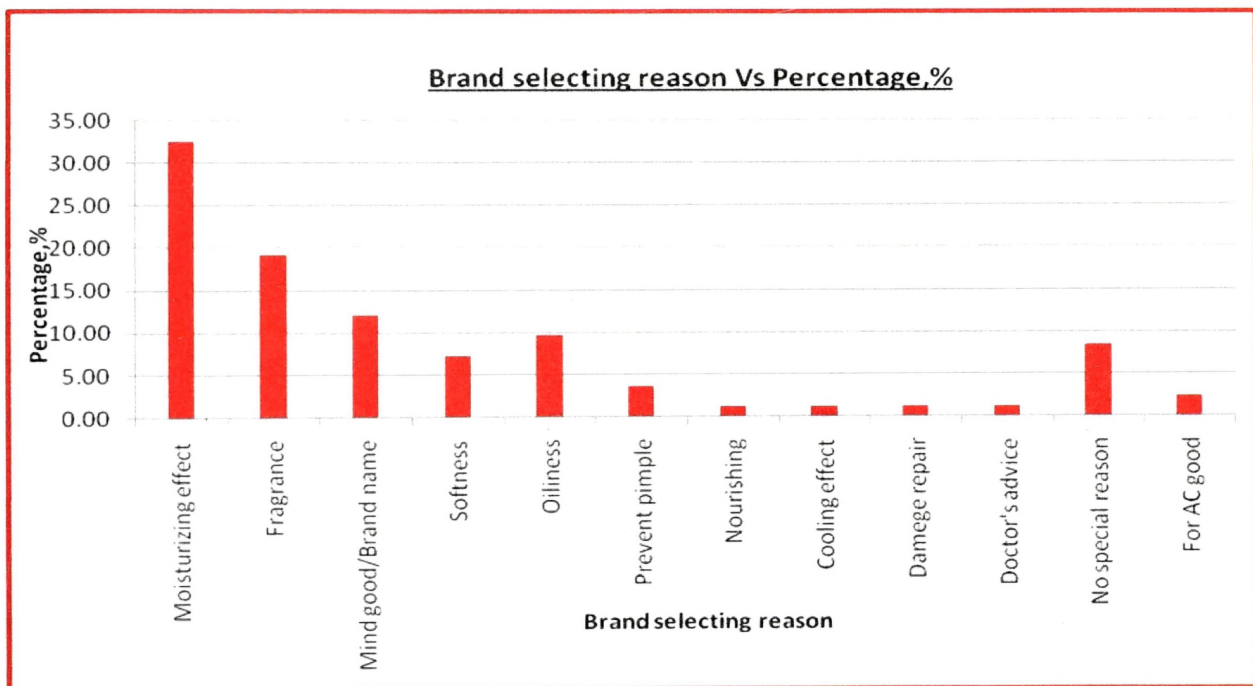


Figure 7.4: Flow chart for Brand selecting reason Vs Percentage

Q11 : To whom purchase

Objective: To find out whether the lotion only use the target group or other people
Accepted

User type percentage of participated people was only yourself 88%, and for family 12%. That data was summarized in table 7.5 and figure 7.5.

Table 7.5: Percentage of people with user type

User Type	Number of People	Percentage, %
Yourself	60	88.24
Family	8	11.76
	68	

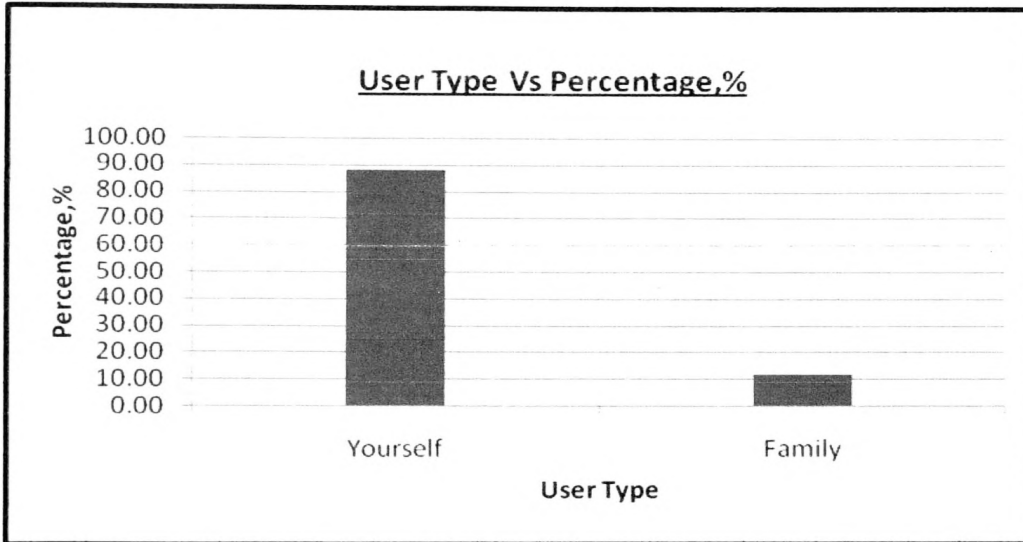


Figure 7.5: Flow chart for User type Vs Percentage

Q12 : Reason for using a lotion

Objective: To find out the major reasons of using the lotion

As reasons of use body lotions 43% percentage of people was considered moisturizing effect, 3% considered fragrance, for nourishing 15%, for softness 17%, for fairness 3% and for sun protection 14%. That data was summarized in table 6.9 and figure 6.8.

Table 7.6: Percentage of people with reason for using

Reason for using	Number of People	Percentage, %
Moisturizing effect	62	43.66
Softness	25	17.61
Nourishing	22	15.49
Sun Protection	20	14.08
Fairness	4	2.82
Fragrance	5	3.52
Feel Good	2	1.41
Reduce oiliness	2	1.41
	142	

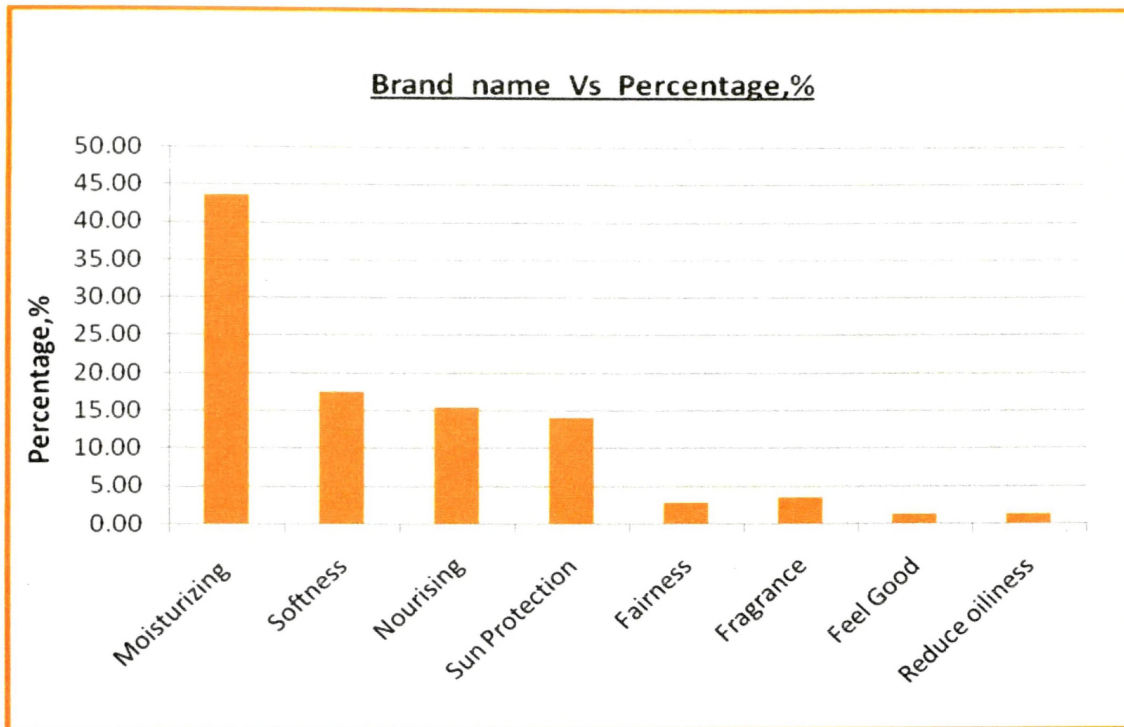


Figure 7.6: Flow chart for Brand using reason Vs Percentage

Q14 : Brand choosing method

Objective: To find out the impact media on consumers to choose a brand

47% of people selected brand according to their experience, 40% by friends and family, by advertizing 7%, by saloons 4% and according to Doctor's advice 1%. That data was summarized in table 7.7and figure 7.7

Table 7.7: Percentage of people with brand choosing method

Brand choosing method	Number of People	Percentage,%
By Experience	32	47.06
By friends & family	27	39.71
By Advertisements, Magazines	5	7.35
By Saloons	3	4.41
By Doctor's advice	1	1.47
	68	

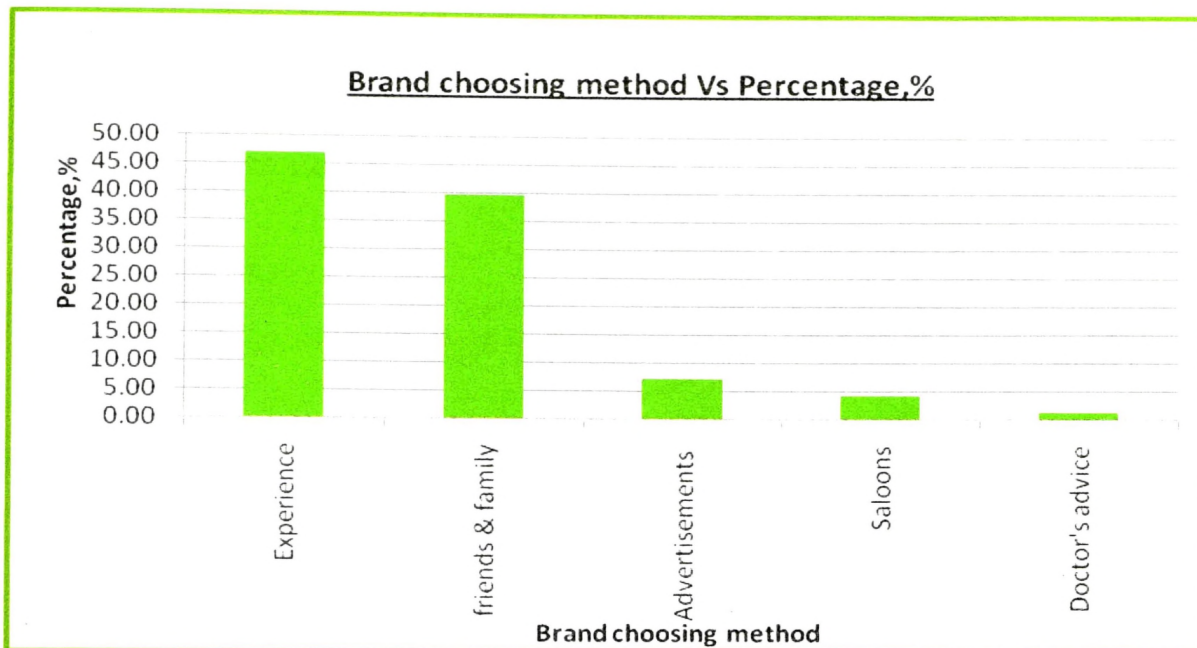


Figure 7.7: Flow chart for Brand choosing method Vs Percentage

Q15 : Important of appearance of the container lotion

Objective: To find out the importance of appearance of the packing

54% of people did not consider appearance of packaging and 46% people considered. That data was summarized in table 7.8 and figure 7.8.

Table 7.8: Percentage of people with importance of appearance of the packing

Importance of Appearance	Number of People	Percentage,%
Yes	31	45.59
No	37	54.41
	68	

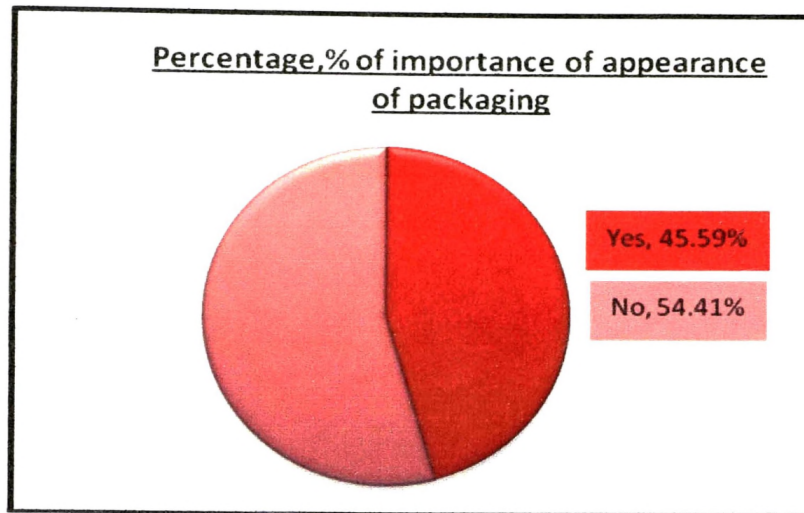


Figure 7.8: Flow chart for Importance of appearance Vs Percentage

Q16 : Characteristics are looking in a lotion

Objective: To find out what are the major characteristics of lotion preferred by participants

47% of people consider fragrance of body lotions, 45% of people consider thickness and 8% people considered about color of body lotions. That data was summarized in table 7.9 and figure 7.9. Fragrance type; 70% preferred to mild, 17% floral, 6% preferred to fruity and 6% people like to low fragrance. That data was summarized in figure 7.10. 95% of people preferred to average thickness and 5% for low thickness. That data was summarized in figure 7.11.

Table 7.9: Percentage of people with different characteristics

Characteristics	Number of People	Percentage,%
Fragrance	60	47.24
Thickness	57	44.88
Colour	10	7.87
	127	

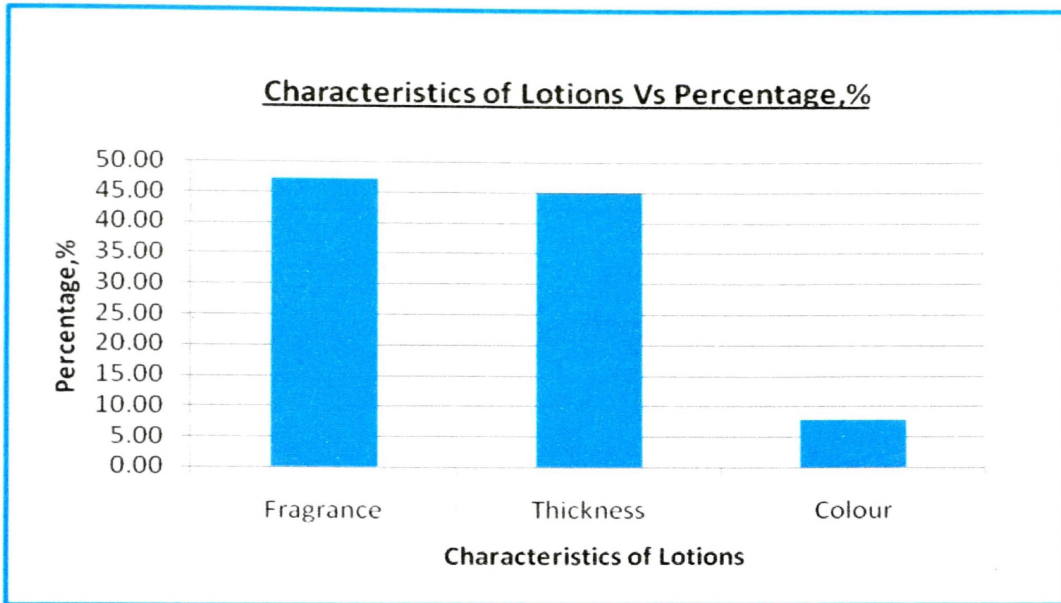


Figure 7.9: Flow chart for Characteristics Vs Percentage

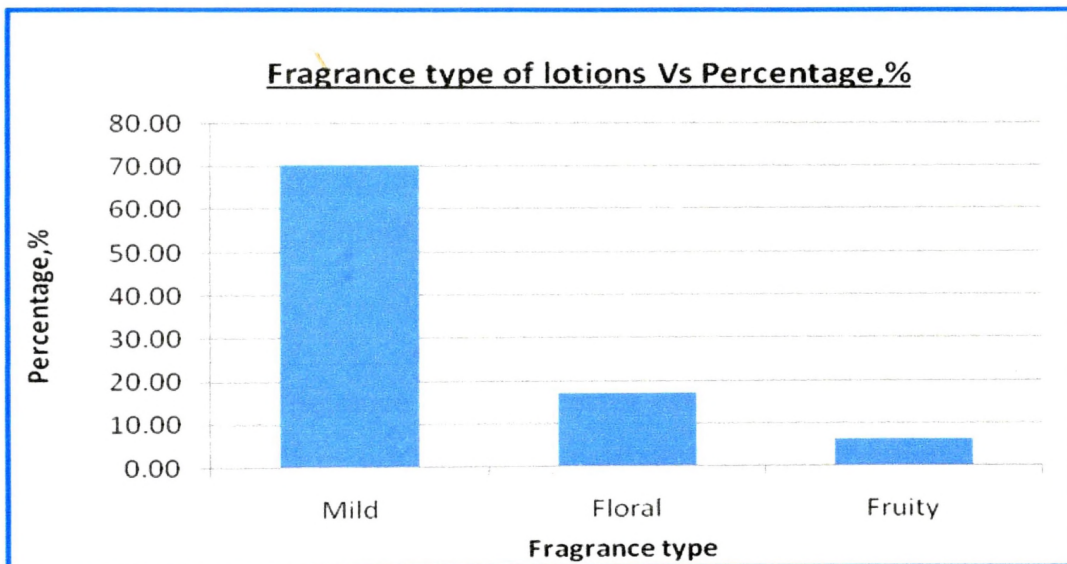


Figure 7.10: Flow chart for Fragrance type Vs Percentage

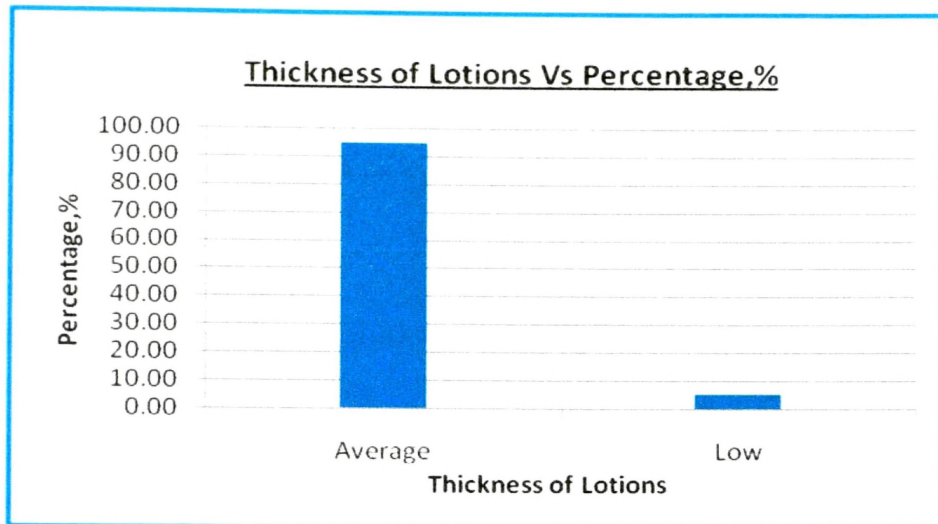


Figure 7.11: Flow chart for Thickness type Vs Percentage

7.4 Discussion

According to the results (Figure 7.3) fast moving body lotions are Nature's Secret (22%) and Nyle (16%). Goya and Paris lotions are in lower range. The lotion characteristics (Figure 7.9) which are preferred by participants are mainly thickness (45%), fragrance (47%), and colour (8%). Most preferred fragrance is mild (73%) (Figure 7.10).

Moisturizing effect and fragrance is a main factor which is considered by lotion users for selecting lotions. 96% of participants are satisfied with their lotions. Most of the participants have selected their lotions with the influence of their experience (Figure 7.7). Therefore, family background can make a major impact of selecting a lotion of a particular lotion user. 100% of participants read the label of lotion bottle also and therefore, the results have indicated that, consumers are very much concern about proper labeling of such products. 46% of the participants consider the appearance of the container as a factor when selecting a lotion (Figure 7.8). That is, having an eye-catching packaging is a somewhat important factor to select a lotion.

Most of people use body lotions (90%). But some peoples (10%) did not like to use lotions due to synthetic, stickiness and pimple developed. Nature's Secret is in most of participant's mind as the top lotion. Then Nyle and Enchanteur can be taken as

popular lotions. According to suggestions most of people expected Air condition protection (reduce dryness) and sun protection lotion with natural ingredients.

7.5 Conclusion

Considering the age group of lotion users 18-25 age group people use lotions. Nature's Secrete has become more popular brand in last years since people thin that it is more beneficial and can have a reasonable price. Most of people consider moisturizing and fragrance as factors when they select body lotions. But when using they expect softness also. High level of moisturizing is important for people who live in dry areas. Detailed labeling is also important for consumers since most of people read the label of the bottle to make sure that what are the benefits of the lotion will supply. However, all of people are waiting for lotion with natural ingredients.

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Appendix I

Different features of baby cream

No	Product Name	Price Rs.	Volume / ml	Rs / ml	Colour
1	Baby cheramy	90.00	100	0.90	Pink
2	Baby cheramy Alovera	90.00	100	0.90	Green
3	Baby cheramy Nourishing	90.00	100	0.90	White
4	Pears Baby cream	90.00	100	0.90	White
5	Pears herble Baby cream	84.00	100	0.84	Green
6	Khomba Baby cream	90.00	100	0.90	White
7	Khomba Baby cream floral	84.00	100	0.84	Pink
8	Rebecca Lee Baby cream	75.00	100	0.75	White
9	Jhonson & Jhonson Baby cream	460.00	85	5.41	Pink
10	Jhonson & Jhonson Baby cream	190.00	100	1.90	White
11	Jhonson & Jhonson Milk cream	205.00	100	2.05	White

Baby cream ingredients

Ingredients	Function	J & J bc pink	J & J bc white
Acetylated lanolin alcohol	Emulsifier / skin-conditioning agent	√	
Benzyl alcohol	Essential oils / preservative		√
BHT	Antioxidants		√
Butyl paraben	Moisturisers to sunscreens / Preservative		√
Carbomer	Emulsifier		√
Cetyl acetate	Emollient / Moisturiser	√	
Cetyl alcohol	Emulsifier / emollient / Moisturiser	√	√
Dimethicone	Skin-conditioning agent	√	√
Glycerin	Emollient / Denaturant / Humectant / Solvent		√
Glyceryl stearate	Emollient / Moisturiser / Emulsifier	√	
Isopropyl palmitate	Moisturiser/ Cleancing product/ Fragrance,Emollient		√
Methylparaben	Deodorants and moisturisers to sunscreens / Preservative	√	√
Oleyl acetate	Anti-lipases property	√	

Paraffinum liquidum glycerin (Mineral oil)	Emollient / Moisturiser	√	√
Fragrance	Fragrance	√	√
Petrolium	Lubricant / Moisturiser / Antistatic agent / Emollient		√
Phenoxyethanol	Preservative	√	
Polyoxyethylene-21	Emollient / Reduce stickiness		√
Polysorbate 60	Emulsifier / surfactant	√	
Propylparaben	Deodorants and moisturisers to sunscreens / Preservative	√	√
Sodium hydroxide	pH-value regulation		√
Sorbitan stearate lanolin alcohol	Surfactant-Emulsifine agent	√	
Stearyl acetate	Emollient / Reduce stickiness / Emulsifier	√	
Stearyl alcohol	Emollient / Emulsion stabilizing / Emulsifier / surfactant		√
Stearyl ether	Emollient / Skin-conditioning agent		√
Steareth-2	Emulsifier		√
Synthetic beeswax	Emulsifier		√
Tetrasodium EDTA	Chelating	√	
Tocoperol (Vitamin E)	Emollient / smooths / softens the skin texture / antioxidant		√
Water	Solvent / moisturizer	√	√

Appendix II

Different features of body lotions

No	Product name	Price Rs.	Volume / ml	Rs / ml
1	Goya	83.00	100	0.83
2	Paris	60.00	100	0.60
3	Nyle Moisturizing lotion	95.00	100	0.95
4	Nyle Dry skin lotion	110.00	100	1.10
5	Clear & Clear	130.00	125	1.04
6	Pond's Triple vitamin moisturizing lotion	95.00	100	0.95
7	Pond's Silky smooth moisturizing lotion	95.00	100	0.95
8	Nivea body lotion vitamin E	426.00	150	2.84
9	Nivea Intensive milk dry skin	506.00	150	3.37
10	Nivea Sun protection sun lotion	895.00	125	7.16
11	Niveabody fresh cream lotion	301.00	75	4.01
12	Nivea Sun maximum protection sun lotion	1691.00	125	13.53
13	Nivea Sun Children sun lotion	800.00	125	6.40
14	Nivea Sun after sun lotion	409.00	125	3.27
15	Nivea sun lotion	798.00	125	6.38
16	Cream 21 for normal skin	615.00	250	2.46
17	Cream 21 for dry skin	615.00	250	2.46
18	St.Ives Vitamin A	250.00	88	2.84
19	St.Ives Collagen ilastin	795.00	532	1.49
20	St.Ives Cucumber melon	795.00	532	1.49
21	St.Ives Vitamin E	795.00	532	1.49
22	St.Ives Aloe chamomile	795.00	532	1.49
23	St.Ives Intensive healing	795.00	532	1.49
24	Dove Baby skin moisturizing	600.00	300	2.00
25	Nature's Secret moisture lotion Aloe vera	110.00	100	1.10
26	Nature's Secret moisture lotion Cucumber	110.00	100	1.10
27	Nature's Secret moisture lotion Carret	110.00	100	1.10
28	Nature's Secret moisture lotion Papaya	110.00	100	1.10
29	Nature's Secret Vitamin E	340.00	250	1.36
30	Nature's Secret with jojoba oil	210.00	100	2.10
31	Nature's Secret Sun & fun lotion	280.00	80	3.50
32	Voodoo Jesmin	52.00	50	1.04
33	Voodoo Gardenia	52.00	50	1.04
34	Voodoo Extra care with Vitamin E	90.00	100	0.90
35	Reebonn herbal Avacado oil	199.00	100	1.99
36	Reebonn harbal papaya	199.00	100	1.99
37	Janet Avacado	249.00	125	1.99
38	Janet pure skin day moisture	195.00	125	1.56
39	Janet sun shades	199.00	75	2.65
40	Enchanteur Romantic	430.00	250	1.72
41	Enchanteur Enticing	430.00	250	1.72
42	Enchanteur Alluring	430.00	250	1.72
43	Enchanteur Charming	430.00	250	1.72
44	Enspa herbal body lotion	215.00	120	1.79
45	Jhonson & Jhonson Baby lotion	135.00	100	1.35

46	Jhonson & Jhonson Baby lotion	660.00	500	1.32
47	Jhonson & Jhonson Milk lotion	200.00	100	2.00
48	Shello Vitamin E body lotion	360.00	500	0.72
49	Shello moisturizing lotion	360.00	500	0.72
50	Shello herbal beauty moisturizing lotion	330.00	500	0.66
51	Himalaya herbal body lotion Dry skin	456.00	200	2.28
52	Himalaya herbal body lotion Normal skin	456.00	200	2.28
53	Himalaya herbal face moisture lotion	438.00	200	2.19
54	Prevenze skin care moisturizing body lotion	625.00	200	3.13
55	Personal care Nourishing vitamin E lotion	460.00	592	0.78
56	Personal care Cooling aloe moisture lotion	460.00	592	0.78
57	Personal care Cocoa butter moisture lotion	460.00	592	0.78
58	Garnier Intensive moisture lotion	600.00	250	2.40
59	Garnier Essential care daily moisture lotion	390.00	75	5.20
60	Garnier sun control daily moisture lotion	360.00	50	7.20
61	Garnier body cocon moisture lotion	375.00	125	3.00
62	Garnier off lotion	375.00	125	3.00
63	Revlon fairness lotion	485.00	100	4.85
64	Dr. Green's	390.00	50	7.80
65	Vitamin E body cream	300.00	250	1.20
66	Yardley lavender spa	1599.00	200	8.00
67	Fa body milk	660.00	400	1.65
68	Fa firming body lotion	660.00	400	1.65

Body lotions ingredients and ingredients comparison

Ingredients	Function
Acetylated lanolin alcohol	Emulsifier/skin-conditioning agent
Acrylates/ C 10-30 alkyl Acrylate crosspolymer	Thickening efficiency
Acrylates 30 alkyl acrylate crosspolymer	Emulsion stabilizer / Viscosity controlling
Alanin	Non-essential amino acid
Almond oil	Emulsifier / skin-conditioning agent / Emollient / surfactant
Aloe barbadensis gel	Nourishes skin
Benzyl alcohol	Essential oils into the product or added as a preservative
Benzyl benzoate	Essential oils
Benzyl salicylate	Essential oils
BHT	Antioxidants
Butyl methoxybenzoylmethane	UV filter / UV absorber
Butyl paraben	Deodorants and moisturisers to sunscreens / Preservative
C12-15 parath-7 C13-14 isoparaffin	Emollient / Moisturiser
Caprylic	Emollient / skin conditioning / Solvent / Skin conditioning
Carbomer	Emulsifier
Castor oil	Thickening / Stabilizer
Cetanol	Stabilises emulsification / skin soft and smooth
Ceteareth-20	Emulsifier / surfactant / emollient
Ceteareth-30	Emulsifier / surfactant
Cetearyl alcohol	Emollient / Moisturiser / Emulsifier / Viscosity adjuster
Cetearyl isononanoate	Moisturiser
Cetyl acetate	Emollient / Moisturiser
Cetyl alcohol	Emulsifier / emollient / Moisturiser
Cetyl palmitate	Emollient
Chamamila recutita (Matricaria)	Masking / tonic
Chlophenesin	Anti microbial / preservative
Chlorhexidine digluconate	Anti microbial / preservative
Citronellol	Denaturant / Fragrance / essential oils
Citral	Essential oils
Coco glycerides	Emulsifier
Cocoa (theobroma cacao) buter	Moisturize and soften
Coumarin	Exfolient / buffering agent / skin conditioning
Cucumber (cucumis sativus) extract	Skin-conditioning agent
Cyclopentasiloxane	Lubricate / waterproof / provide shine
Diazolidinyl urea	Anti microbial preservative
Dimethicone	Skin-conditioning agent
Disodium EDTA	Stabilizer in cosmetic products and is a chelating compound
DMDM hydantion	Preservative
EDTA	Chelating agent
Ethyl paraben	Deodorants and moisturisers to sunscreens / Preservative
Ethylhexyl palmitate	Skin-conditioning agent / Emollient
Ethylhexyl triazone	UV filter / UV absorber
Eugenol	Absarive / skin conditioning
Flower extract	Refreshing / chelating / masking / smoothing / solvent
Fragrance	Fragrance
Geraniol	Essential oils
Glycerin	Emollient / Denaturant / Humectant / Solvent
Glyceryl mono stearate	Emulsifier / emollient / moisturizer / viscosity builder
Glyceryl stearate	Emollient / Moisturiser / Emulsifier

Glycol distearate	Humectant / skin conditioner / moisturizer
Glycol stearate	Emollient / Moisturiser / Emulsifier / Opacifier / Surfactant
Hexyl cinamal	Essential oils
Hydrogenated coco glycerides	Moisture / Emulsifier
Hydrolysate	Skin conditioning
Hydroxy citronellal	Perfuming, masking
Hydroxypropyl methylcellulose	Adhesive / Binder
Imidazolidinyl Urea	Preservative
Isobutyl paraben	Skin conditioning / preservative / anti-acne agent
Isopropyl Myristate	Moisturiser/ Cleansing product/ Fragrance,Emollient
Jojoba oil	Moisturiser
Lanolin	Soften and moisturize
Laureth-23	Softeners / Moisturiser
Limonene	Essential oils
Linalool	Essential oils
Magneesium aluminum silicate silica	Thicken / stabilizer / gel-forming agent / co-emulsifier component
Magneesium aspartate	Antimicrobial / Buffering / Skin protecting
Magnesium aluminum silicate	Absorbent - anti-caking agent
Maltodextrin (algea extract)	Deodorants / moisturisers to sunscreens
Methyl paraben	Deodorants and moisturisers to sunscreens / Preservative
Mineral oil	Emollient / Moisturiser
Mono propylene glycol	Stability
Octadecenedioic acid	Skin whitening agent
Olivate	Emulsifier / emulsion stabilizer / emollient
Palmitic acid	Emulsifies and improves consistency of product.
Papaya fruit extract	Cleanser / moisturizer / skin soft and smooth
PEG-4	Skin conditioning
Persea gratissima Prunus armeniaca	Penetrates skin easily and protective functions
Petrolatum	Lubricant / Moisturiser / Antistatic agent / Emollient
Phenoxy ethanol	Preservative
Polusorbate 60	Emulsifier / surfactant
Polyacrylamide	Skin conditioning / surfactance / Antistatic agent
Polyglyceryl-3 methylglucose distearate	Emulsifier
Polysorbate-20	Stabilize emulsions / suspensions
Polysorbate-61	Emulsifier,surfactant
Pottasium lactate	Buffering agent / Expolient / skin conditioning
Pottasium palmitate	Cleaning
Pottasium stearate	Cleaning agent / emulsifying agent
Propyl paraben	Deodorants and moisturisers to sunscreens / Preservative
Propylene glycol	Solvents / surfactants / wetting agents
Ricinus communs	Emollient / moisturizer / skin conditioning
Saccharide	Denaturant
Saccharide hydrolysate	Additive
Sambucus nigra flower extract	Refreshing / tonic / skin-conditioning agent / smoothing
Simmondsia chinesis helianthus annuus	Anti oxidents / skin conditioning
Sodium carbomer	Emulsion Stabilizer / viscosity controlling
Sodium hydroxide	pH-value regulation
Sorbitan stearate	Surfactant / Emulsifine agent
Sorbitan tristearate	Emulsifier / surfactant
Sorbitol	Emollient
Stearic acid	Thickener / Long-term energy storage
Sunflower (helianthus annuus) extract	Moisturiser

Tamarind seed extract	Preservative
Titanium dioxide	Sun block
Tocoperol (Vitamin E)	Emollient / smooths / softens the skin texture / antioxidant
Triclosan	Antibacterial agent
Triethanolamine	Fragrance / pH adjuster / surfactant / emulsifying agent
Triglyceride	Emollient / masking / skin conditioning / solvent
Trisodium EDTA	Emollient / Moisturiser
Urea	Preservative
Virgin cocunut oil	Moisture and smooths
Water	Solvent / moisturizer
Xanthan gum	Thickening agent / gel forming agent / supple skin texture
Zea mayslcom starch	Nourishes and softens

Body lotions ingredients

Ingredients	Nature's secret Aloe vera	Nature's secret papaya	Enchanteur Romantic	St.Ives Body moisture	J&J body lotion (pink)	J&J milk lotion	Enspa herbal body lotion	Garnier Daily Milk lotion
Acetylated lanolin alcohol				✓				
Acrylates/ C 10-30 alkyl Acrylate crosspolymer						✓		
Acrylates 30 alkyl acrylate crosspolymer	✓							
Alanin	✓							
Almond oil	✓	✓						
Aloe barbadensis gel	✓			✓				
Benzyl alcohol								
Benzyl benzoate								
Benzyl salicylate								
BHT			✓					
Butyl methoxybenzoyl/methane								
Butyl paraben	✓							
C12-15 pareth-7 C13-14 isoparaffin								✓
Caprylic	✓							
Carbomer			✓	✓	✓	✓	✓	
Castor oil		✓						
Cetanol			✓					
Ceteareth-20			✓				✓	
Ceteareth-30								
Cetearyl alcohol							✓	✓
Cetearyl isononanoate								
Cetyl acetate								
Cetyl alcohol	✓			✓		✓	✓	
Cetyl palmitate								

Appendix III

CONSUMER SURVEY ON BABY CREAM USAGE

Conducted By: Dinusha Peiris

[11-2008]

1. **Name:**
.....

2. **Address:**
.....

3. **Contact number:**
.....

4. **Baby's Age group:**

Less than 1 year	<input type="checkbox"/>
1 – 2 year	<input type="checkbox"/>
2 – 3 year	<input type="checkbox"/>
3 – 5 year	<input type="checkbox"/>
Above 5 year	<input type="checkbox"/>

5. **Age group (Mothers / Girls):**

18-25	<input type="checkbox"/>
26-30	<input type="checkbox"/>
31-35	<input type="checkbox"/>
36-40	<input type="checkbox"/>

6. **Current brand:**
.....

7. **Brand loyalty:**
.....

8. What is the brand changing frequency?

- Never
- Less than 3 months
- 3 - 6 months
- 6 - 12 months
- Other

9. What is the reason for selecting this brand?

.....

10. Why are you not using a cream? (Only for non-users)

.....

11. Skin type:

- Oil
- Dry
- Normal

12. To whom do you purchase?

- Yourself
- For baby
- Dual
- Family

13. Why are you using a cream?

- Moisturizing effect
- Softness
- Reduce oiliness

Nourishing

Other

14. What is the preferred pack size?

50 ml

100 ml

300 ml

15. How do you choose the brand?

By experience

By friends & family

By TV programs, Advertisements, Magazines

Other

16. Is the appearance of the container important for you to select a cream?

Yes

No

17. What are the characteristics you are looking in a cream?

Fragrance

Thickness

Colour

18. Do you read the label of the cream bottle before you buy?

Yes

No

19. What is your comment on label claim?

.....

20. Frequency of using?

Once a day

Twice a day

Thrice a day

Other

21. Frequency of purchasing? (Usage)

Volume

Time duration

.....

.....

22. Are you satisfied with the current brand?

Yes

No

23. Do you need any improvements in your current brand?

.....
.....

24. Do you have any bad experience by using any other cream?

Yes

No

25. Suggestions

.....
.....

Appendix IV

CONSUMER SURVEY ON LOTION USAGE

Conducted By: Dinusha Peiris

[11-2008]

1. Name:

.....

2. Address:

.....

3. Contact number:

.....

4. Age group:

18-25

26-30

31-35

36-40

5. Current brand:

.....

6. Brand loyalty:

.....

7. What is the brand changing frequency?

- Never
- Less than 3 months
- 3 - 6 months
- 6 - 12 months
- Other

8. What is the reason for selecting this brand?

.....

9. Why are you not using a lotion? (Only for non-users)

.....

10. Skin type:

- Oil
- Dry
- Normal

11. To whom do you purchase?

- Yourself
- Family

12. Why are you using a lotion?

- Moisturizing effect
- Softness
- Reduce oiliness
- Nourishing
- Sun protection
- Other

13. What is the preferred pack size?

100 ml

150 ml

200 ml

14. How do you choose the brand?

By experience

By friends & family

By TV programs, Advertisements, Magazines

Other

15. Is the appearance of the container important for you to select a lotion?

Yes

No

16. What are the characteristics you are looking in a lotion?

Fragrance

Thickness

Colour

17. Do you read the label of the lotion bottle before you buy?

Yes

No

18. What is your comment on label claim?
.....

19. Frequency of using?

- Once a day
- Twice a day
- Thrice a day
- Other

20. Frequency of purchasing?(Usage)

Volume
Time duration

21. Are you satisfied with the current brand?

- Yes
- No

22. Do you need any improvements in your current brand?

.....

23. Do you have any bad experience by using any other lotion?

- Yes
- No

24. Suggestions

.....
.....
.....

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