

## A Machine Learning-Based Approach for Predicting Milk Quality in Sri Lanka

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Quality of raw milk is necessary to assure food safety, human health and the survival of the dairy industry in Sri Lanka, though the existing approaches to quality assessment are mostly manual, time consuming, and are not viable in making immediate and accurate decisions by the dairy suppliers in the rural collection centers. The traditional tests like the Alcohol test, Resazurin test, Fat percentage, Solid Non Fat (SNF) percentage and pH value involve laboratory methods and experienced operators and result in a significant disparity in effective field-level quality monitoring. This paper suggests a method to identify the status of milk quality using periodically measured parameters of physicochemical tests on the milk samples at Sri Lankan milk collection centers. Following the consultation with domain experts, reading of industry guidelines, and referring to existing work major features such as Alcohol stability, Resazurin reduction time, pH, fat content, SNF value, temperature, etc. were chosen as predictive features. 1056 milk sample data were collected from milk collection centers in the Uva Province of Sri Lanka, and was preprocessed. Then the preprocessed dataset was trained and evaluated using various Machine Learning (ML) models. This research mainly focuses on six ML algorithms to predict the milk quality. Here, above 80% of accuracy has given by Deep Neural Network (DNN) and XGBoost models, above 75% accuracy from SVM and Random Forest models and Logistic Regression and KNN models give an accuracy of below 75%. The results of the experiment show that DNN had the best accuracy followed by Random Forest and SVM, which proves that machine learning has the potential to improve the quick and reliable quality of milk in Sri Lanka.

**Keywords:** Dairy Industry; Deep Neural Network; Machine Learning; Physicochemical Tests; Quality Assessment