

UNIVERSITY B.D.T COLLEGE OF ENGINEERING
DAVANAGERE – 577004

(A Constituent College of Visvesvaraya Technological University, Belagavi, Karnataka)



A PROJECT SYNOPSIS

ON

**“MILK QUALITY DETECTION USING ELECTRONIC
MILK QUALITY ANALYZER”**

REFERENCE NUMBER:46S_BE_3785

Submitted in partial fulfilment of the requirement for the award of

BACHELOR OF ENGINEERING
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INTRODUCTION TO MILK QUALITY DETECTION USING ELECTRONIC MILK QUALITY ANALYZER

Milk is a pale liquid produced by the mammary glands of mammals. It is the primary source of nutrition for infant mammals before they are able to digest other types of food. Early lactation milk contains colostrum, which carries the mother's antibodies to its young and can reduce the risk of many diseases. The principal constituents of milk constitute of carbohydrate, fat, protein, vitamins and minerals, enzymes etc. The composition of milk varies considerably with the breed of cow, stage of lactation, feed, season of the year, and many other factors. However, some relationships between constituents are very stable and can be used to indicate whether any tampering with the milk composition has occurred.

Milk is most commonly diluted with water, it not only reduces its nutritional value, but contaminated water can also cause additional health problems. The other adulterants used are mainly detergents, foreign fat, starch, sodium hydroxide, sugar, urea, pond water, salt, malt dextrin, sodium carbonate, formalin, hydrogen peroxide, and ammonium sulphate. For detection of adulterants sophisticated instrument is required. With the advancement of technology, newer techniques have been invented to detect different kinds of milk adulterants, but in the same pace the complex methods of milk adulteration and varieties of milk adulterants have been evolved.

This project mainly has three different parameters to be measured such as pH, impedance, temperature, by the use of electronic method. Here different samples of milk are taken, which will include fresh milk that is processed as per the standards and the samples which are contaminated due to adulteration. In general, the test will be performed with reference to standard parameter values according to which any abnormalities found in sample will be determining its quality. Depending on the pH, impedance and temperature values of the adulterated milk, deciding whether the given milk is good for consumption and also deciding whether the adulteration is acidic or alkaline by number of experimentations and the finally analyzing the experimented values, it is done by electronic methods.

OBJECTIVES

This project analyzes the quality of milk by checking four parameters. Adultration reduces the quality of milk and can even make it hazardous. The presence of adultrants is determined by the use of electronic sensors such as pH sensor, temperature sensor, conductivity sensor.

- Understanding the composition of milk ,sensors, Arduino Uno etc.
- Quality of milk is analyzed by using various parameters such impedance, pH. Temperature etc.
- Design and development of milk quality analyzer using electronic sensors.
- Testing and analysis of milk samples and documentation.

METHODOLOGY OF PROPOSED MILK QUALITY ANALYZER

Power is turned ON after placing all the sensors in the Beaker. It's starts reading from the various sensors interfaced with this Arduino Controller. The pH sensor detects the pH of milk sample. The normal milk pH is 6.2 to 6.8. Temperature sensor measure the temperature of milk. Conductivity sensor detects the conductivity of milk converts it into impedance value. Thus, can be measured using conductivity sensor. For different milk samples the three parameters are detected and displayed on LCD screen. If all the detected parameters are within range, it is considered that the milk is edible.

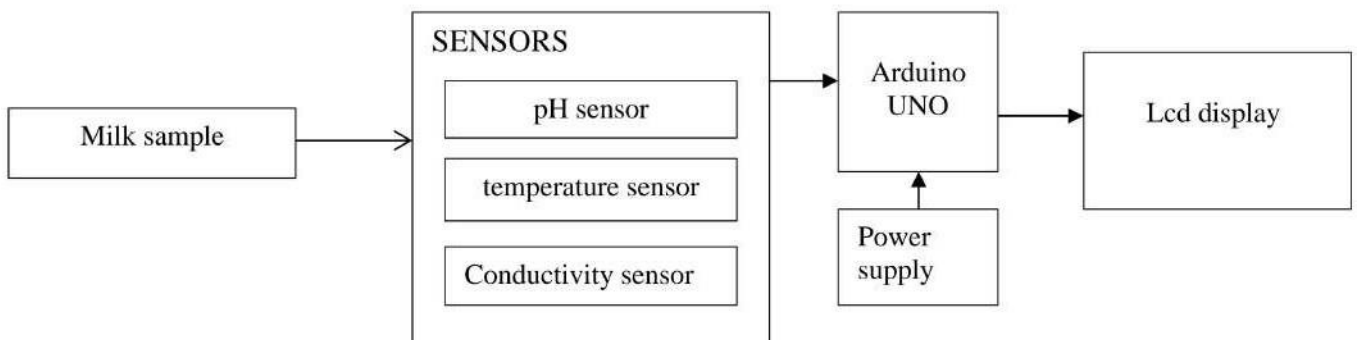


Figure1. Block diagram of proposed milk quality analyzer

EXPERIMENTAL PROCEDURE

Adultrant : Water

- Sample 1- Fresh milk (250ml) + 10% of water
- Sample 2- Fresh milk (250ml) + 20% of water
- Sample 3- Fresh milk (250ml) + 30% of water
- Sample 4- Fresh milk (250ml) + 40% of water
- Sample 5- Fresh milk (250ml) + 50% of water

Adultrant : Salt

- Sample 1- Fresh milk (250ml) + 10g of salt
- Sample 2- Fresh milk (250ml) + 20g of salt
- Sample 3- Fresh milk (250ml) + 30g of salt
- Sample 4- Fresh milk (250ml) + 40g of salt
- Sample 5- Fresh milk (250ml) + 50g of salt

Adultrant : Urea

- Sample 1- Fresh milk (250ml) + 10g of urea
- Sample 2- Fresh milk (250ml) + 20g of urea
- Sample 3- Fresh milk (250ml) + 30g of urea
- Sample 4- Fresh milk (250ml) + 40g of urea
- Sample 5- Fresh milk (250ml) + 50g of urea

RESULT AND DISCUSSION

As the power is supplied to the kit LCD will turn ON and it displays as “MILK TESTER UBDT EEE” as shown in the figure below. The values obtained from various sensors in the model is analysed, calibrated, configured and displayed on LCD screen. These displayed values determine the quality of the milk based on the various parameters. The system indicates the presence of adulterants. If displayed values are within range then it is concluded that the milk sample is not adulterated and if they exceed the range then it is concluded the milk sample is adulterated.

FRESH MILK + WATER

Sample	Quantity of water added (%)	pH value	Impedance value(ohms)	Temperature (c)
1	0	6.205	430	25
2	10	6.062	478	25
3	20	5.802	466	25
4	30	5.28	463	25
5	40	5.16	492	25

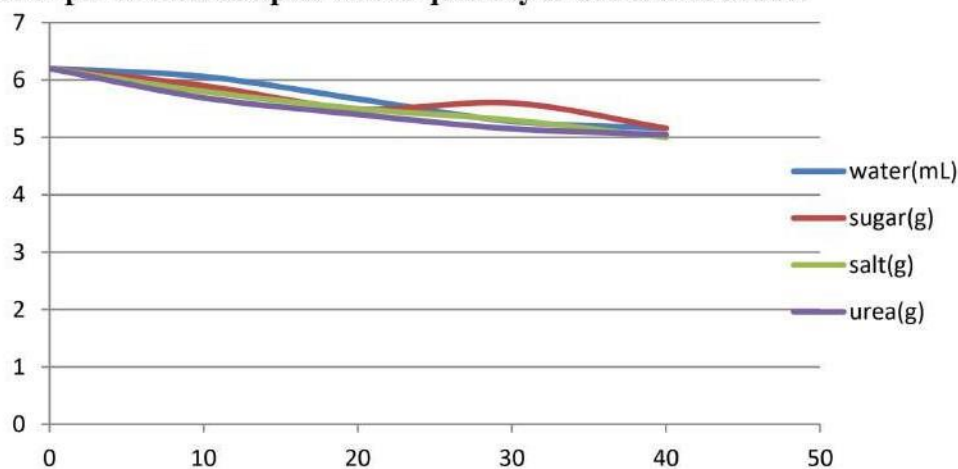
FRESH MILK + SALT

Sample	Quantity of Salt added(g)	pH value	Impedance value(Z)	Temperature (C)
1	0	6.205	430	25
2	10	5.8	455	25
3	20	5.5	338	25
4	30	5.3	355	25
5	40	5.0	456	25

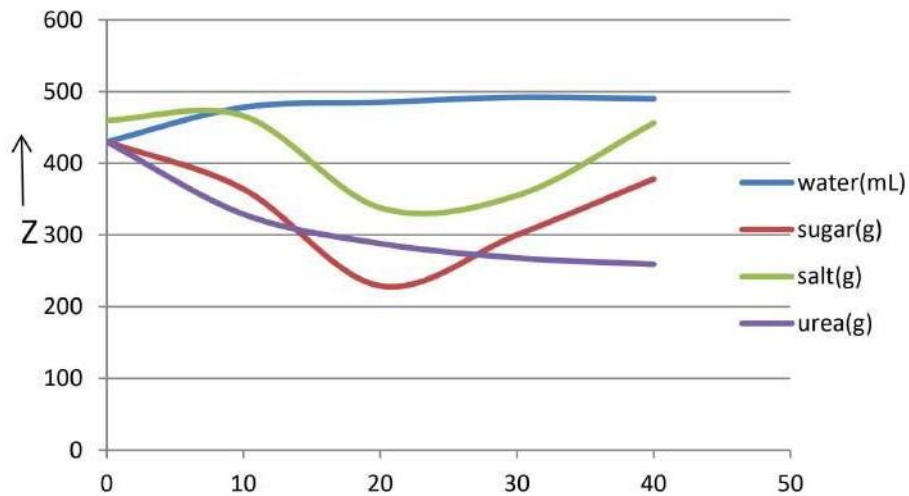
FRESH MILK + UREA

Sample	Quantity of urea added(g)	pH value	Impedance value	Temperature
1	0	6.2	430	25
2	10	5.621	329	25
3	20	5.4	288	25
4	30	5.15	268	25
5	40	5.049	259	25

Plot of pH of milk samples versus quantity of adultrants added



Plot of Impedance(Z) of milk samples versus quantity of adultrants added



CONCLUSION AND FUTURE WORK

This project is implemented using Arduino UNO. All the sensors are combined to form compact and flexible system which analyze the quality of milk and finally the output displayed on LCD screen. The problem faced in small dairies and by the individual can be prevented by detecting the quality of milk, and also prevent from causing the hazardous diseases by detecting the adulteration of milk. In future, this project can be implemented in small and large milk dairies. It can be interfaced with PC or printers so as to save the result and to give the analysis report for further references. If the display unit is of PC then the Graphical Representation of results can be plotted into Graphs.