IJournals: International Journal of Software & Hardware Research in Engineering
ISSN-2347-4890
Volume 3 Issue 9 September, 2015

Dairy Purpose System for Measurement of Milk Parameters in low Cost with Billing

Prof.A.S.Mali[1] , Aruna A.Chougale[2]

[1]*Department of Electronics Engg.,T.K.I.E.T., Shivaji University, Kolhapur, India.*
asmali@tkietwarana.org
[2]*Department of Electronics Engg.,T.K.I.E.T., Shivaji University, Kolhapur, India.*
chougale.aruna04@gmail.com

Abstract*— India is world's largest milk product country as farmers took more interest in dairy industry more number of co-operative dairies are formed in villages. Dairies are formed in villages. Dairies collect, test and rate milk. This paper describes system which provides milk testing and billing. The milk collection parameters such as weight, FAT and CLR are measured by this system as well as use of RFID curd to enter the daily billing for a farmer makes it convenient for dairy management and former to keep account of the entries made for a month The main aim behind this system is to provide measurement of milk parameters in low cost.

***Keywords* – CLR -Corrected lactometer reading, FAT, SNF-Solid but not fat**

I. Introduction

In Today's World all daily requirements goods are become more luxurious. According to time, need to change milk collection and dairy system. There are some reasons to change existing system. Firstly the process testing of milk by measuring FAT, density and quantity is time consuming. Hence, a farmer has to stay in line. Secondly, some milk collections in small villages do not have costly milk analyzing equipments. In this situation milk sample can be tested after milk collection process which can take two or more hours. During this time collected milk stored in plastic bags or bottles which can lead to unhygienic conditions. Another reason is all measurement done noted and calculated manually which can lead to error or mistake during calculation To reduce manual work and for faster milk collection need to replace existing system [1].This system provides low cost and automatic billing. By using this system milk collection parameters. Can be measured in low cost and using RFID card daily billing of farmer updated which is convenient for both dairy management and farmer. The main motivation behind designing this system is Time required for processing milk is more as after procuring the milk from farmers at village cooperative societies, it is tested for the quality. This quality decided by measuring the FAT content, density of milk and solid content of milk. According to quality payment is done to farmer. As this process is time consuming hence farmers has to stay in a line for an hour or more. Fig 1 shows Queue at milk collection centre.

Fig 1

Secondly all the measurement is done manually and the values are also noted manually in farmers membership card hence chances of errors in manual calculation of equality and quantity by cooperative staff. Hence a request from the cooperative staff to reduce above manual work and to speed up the operation of milk collection, need to develop the automatic milk analyzing and billing. Another reason is some milk collection centers do not have the costly milk analyzing equipments so the sample of milk for testing was stored in plastic bottles and tested only after milk collection process was over, this means that a sample was examine after a one or two hours.This led to unhygienic conditions and fear of contamination at the center[2].Milk is an ideal medium for micro-organisms and as it is a liquid, it is very easily contaminated and invaded by bacteria[3].fig 2 shows milk for testing stored in plastic bag and bottles.To avoid this need of low cost milk parameter measurement system which small village dairies can afford which leads to need of low cost automatic milk analyzing and billing.

Fig 2

II. Block diagram

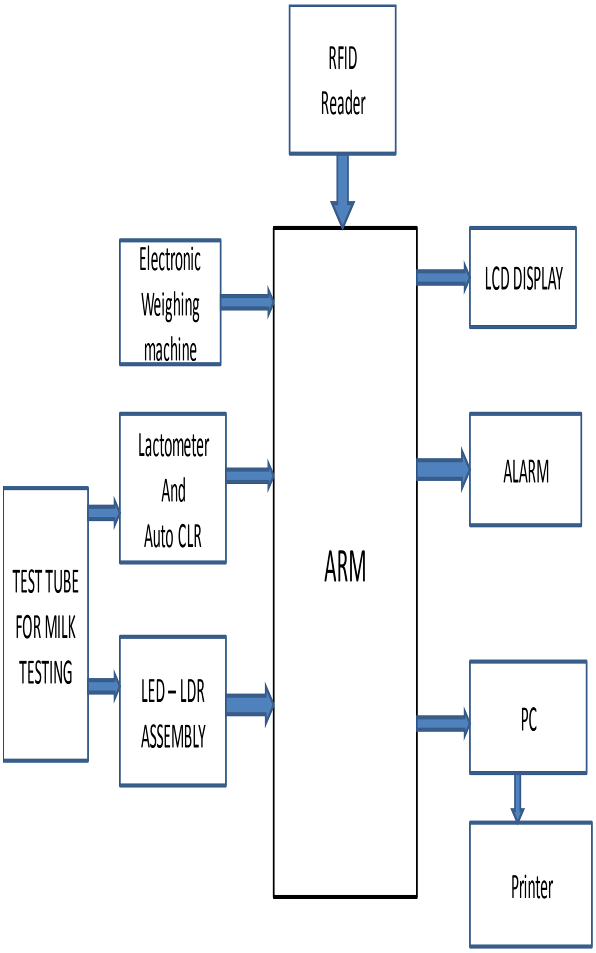


Fig.3

and CLR assembly, LED-LDR assembly, electronic weighing machine, RFID card and reader.The term RFID refers to Radio Frequency Identification, a technology which uses radio waves to automatically identify items or people. Most commonly this involves the use of an RFID tag and a reader device. An RFID system consists of four elements.The RFID tag element consists of an antenna integrated with a microchip. The RFID reader and antenna transmit an electromagnetic RF signal. This signal is received by the RFID tag via the tag's antenna. The energy in the received signal provides the power to the tag that allows the microchip to operate. This is referred to as a "passive" tag. This rfid card and reader used to identify farmer with its id name and open his account[4].

Sensor is a device that detects the quantities required and provides a corresponding output generally as electrical or optical signal. Sensor is used to measure fat in milk using the opto-electronic principle. A light dependent resistor works on the principle of photo conductivity. Photo conductivity is an optical phenomenon in which the materials conductivity (Hence resistivity) reduces when light is absorbed by the material. When light falls i.e. when the photons fall on the device, the electrons in the valence band of the semiconductor material are excited to the conduction band. When light having enough energy is incident on the device more & more electrons are excited to the conduction band which results in large number of charge carriers. The result of this process is more and more current starts flowing and hence it is said that the resistance of the device has decreased. The scattering of a beam of light by the fat globules present in the homogenized milk is the principle used in fat sensor. The amount of light scattered by the milk sample is a measure of the fat content in the milk. A high intensity LED is used as a light source. The light beam is made to pass through the sample solution contained in the test tube. A LDR is placed exactly on the opposite side of the test tube to detect the amount of light passing through the test tube un-scattered. Hardware used in this circuit is very less, so the cost gets reduced as compared to the other control systems designs. Sensors used in the systems are having wide range for inputs so the system can be used for large scale applications. In this system, we can use LCD[5].

CLR(corrected lactometer reading) reading calculated using lactometer and temperature sensor. when the lactometer reads a value closer to 1.0, probably water has been added to the milk. If possible the lactometer reading can be combined with the fat test. The density of fat is lower than that of milk. So in case the results of the fat test are low and the found density is still high (e.g. 1.035), then the milk might have been skimmed. If the results of the fat test are low and the density is low (e.g. 1.025), then water might have been added to the milk. Always read the temperature of the milk first; the lactometer reading varies according to temperature. Make sure you adjust readings as indicated below[6].Table no. 1 and table no. 2 shows temperature adjustments for lactometer readings to get corrected lactometer reading. The milk parameter CLR is important to calculate SNF.

Temp (°C)	17	18	19	20
Correction	-0.007	-0.005	-0.003	0.000

Table 1

Temp (°C)	21	22	23	24
Correction	+0.003	+0.005	+0.008	+0.011

. **Table 2**

III. Working

The task of system is divided into following steps

1.1. Actual measurement of milk parameters.
1.2. Calculation of SNF
1.3. Billing System.

1.1 Actual measurement of milk parameters

1.1.1 *Weight measurement of milk*

When farmers bring their milk to dairy, milk weighed on electronics weighing scale. As 1 liter = 1.03 kg Weight Can be displayed in liter or kilogram on LCD display.

1.1.2 *FAT measurement*

A milk sample taken into test tube. High intensity light beam is made to pass through milk sample into test tube. On exactly opposite site of test tube LDR is placed to detect the amount of light scattered by milk sample is equal to fat content in the milk[7].To ensure customer nutrition value government fixed range of fat content milk acceptable in market .For cow's milk fat must be 3.5 to 4.5 percent and for buffalo's it is 6-7 percent. If milk fat does not fall in acceptable ranges then milk sample will be rejected. For this feature alarm provided in system

1.1.3 *CLR measurement*

Another parameter CLR is measured using lactometer, we can find water content present in the milk. Pure milk has a specific gravity of 1.026 to 1.032 grams per ml [3]. The lactometer mainly contains glass tube containing mercury or lead shots at bottom side of it [8]. To observe the lactometer reading lactometer is kept in cylindrical flask.

1.2. Calculation of SNF

Once we got values of FAT and CLR, We can calculate SNF .ARM processor can calculate SNF by using equation (1),

SNF=(CLR reading/4)+(Fat x 0.21) + 0.36[9]. (1)

1.3. Billing System

According to the parameters the price of milk is calculated and added to database[10]. Each farmer is provided with RFID Card Farmer have to show this card whenever they want to deliver his milk. Farmer's account is opened from database is opened from database and after calculation bill payment receipt is also viewed on PC and print of payment receipt can provide to famer.

IV Result and conclusion

With the help of this system, we will able to judge quality of milk accurately. Quality of milk decided based on FAT, auto CLR and SNF. Measurement of parameters are displayed on LCD. As well as farmers gets daily updating of record and immediate payment status for the milk delivered. Also farmers get the proper benefit according to quality of milk and customer get the good quality milk.

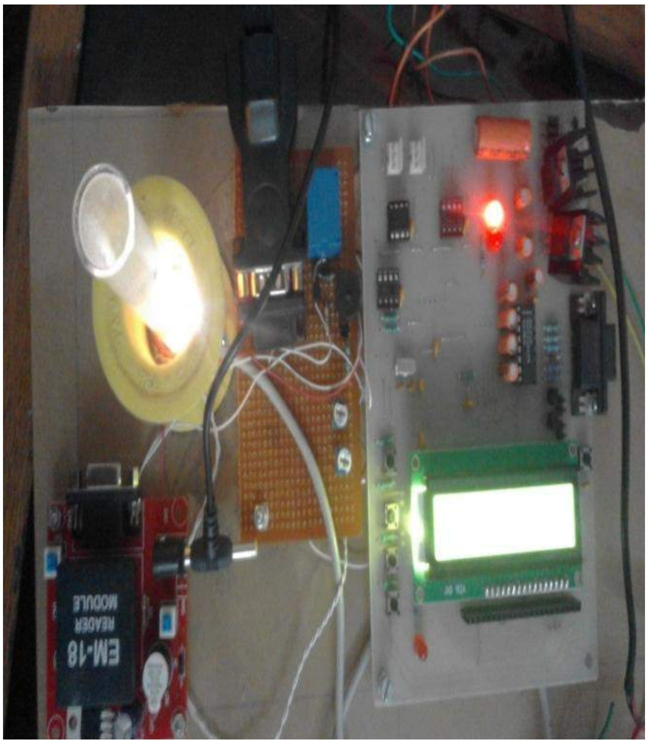


Fig. 4

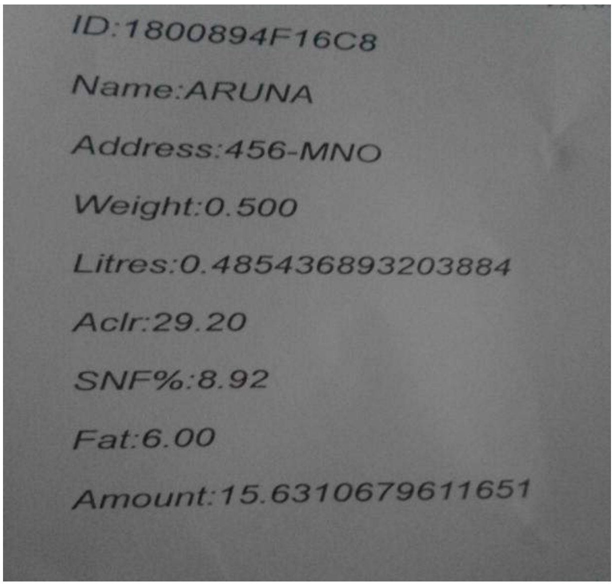
Fig. 4 shows implementation of system .The fig.5 shows lcd display when test tube and cylindrical flak is empty and fig. 6 shows lcd display when test tube and cylindrical flask filled with milk.

Fig. 5

Fig 6

Fig. 7

The output displayed in visual basics 6.0. In fig. 7 milk parameters fat , Auto CLR , SNF are shown in terms of percentage and amount shows bill dairy supposed to give farmer. The right side window shows the COM PORT selected for system and weighing machine both. The left side window shows ID no., name and address of farmer. Print button provided to get printed bill. Figure 8 shows print of customer receipt.



ID:1800894F16C8

Name:ARUNA

Address:456-MNO

Weight:0.500

Litres:0.485436893203884

Aclr:29.20

SNF%:8.92

Fat:6.00

Amount:15.6310679611651

Fig. 8

V. Conclusion

This paper has presented a low cost milk analyzing and billing system. The proposed paper include the measurement of fat and CLR Parameters by low cost equipment. The main advantage of this system is low cost system for measurement of milk parameters with automatic billing system using RFID Card.

References

[1]Prof.S.V.Arote, Prof.S.B. Lavhate, Prof.V.S.Phatangare, Prof.Taware Sachin S. Prof.Kadu Rahul N., Prof.Sachin D. “Low cost milk analyzing and billing system using electronic cards” *ISSN 2249-6343 International Journal of Computer Technology and Electronics Engineering (IJCTEE) Volume 2, Issue 2*, 2013, pp.9-13.

[2] Srinivas Vadlamudi”*Propelling growth in the dairy- A perspective*” tata consultancy services,pp5-7

[3]Abebe Tessema, Markos Tibbo “Milk quality control” *International Cente for Agricultural Research in the Dry Areas, Technical Bulletin No.2,* May 2009, pp.9-11.

[4]User manual rfid card and reader , mikroelectronika ,pp.2-4.

[5]Kejal Shah, Rajeshri Kelkar, Amruta Sarda, M.S.Chavan “*Photometric Based Sensor for Fat Detection in Fresh Milk*” International Journal of Innovative Research in Computer and Communication Engineering,Vol. 3, Issue 4, April 2015,pp.2861-2869

[6]G. S. Pandey, G.C.J. Voskuil ”*Manual on milk safety ,quality and hygiene*”,May 2011,pp.38-39.

[[7] Yadav S. N. Kulkarni V.A. Gholap S.G. *“Design of Milk embedded system for dairy farmers “* International Journal electronics and communication engineering and technology , Volume 3, Issue 2, July September (2012),pp 497-500.

[8]H.K.Rama Murthy, “Need for a Lactometer with New Design and proper calibration for determination of SNF in Milk” *Indian Dairyman* 32,1980, pp 525-527.

[9]T.U.Ahmed, A.B.M.Khaleduzzaman, M.A.Akbar and M.Shamsuddin” Effect of Feeding Intervention on Milk Production Performance of Crossbred Cows in Different Seasons of Bangladesh” *International Journal of Agriculature and Biosciences,* 2013, pp 45-52.

[10]Ankit V.Shingala, R.R.Sedamkar,” Raw milk collection using POS Point of Sale) and GPRS Technology”, *International Journal of Applied Information Systems (IJAIS) – ISSN : 2249-0868,* 2014, pp.31-36.