ESTIMATION OF UNWANTED CHEMICALS IN MILK

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Abstract— **Today's world has become faster and faster. The dairy farming is important business of Indian farmer. Nowadays, the milk is adulterated by so many chemicals for the preservation. These adulterations reduce the quality of milk and can even make it hazardous. Some adulterants like soap, acid, starch, table sugar and chemicals like formalin may be added to the milk. Most of its chemicals used as adulterants are poisonous and cause health hazards. This paper describes the measurement of detergent and formalin present in the milk.**

Keywords— **Milk, adulteration, detergent, formalin, Hydrogen Peroxide**

I. INTRODUCTION

India is the second top milk producing country in the world. The milk adulteration is very common in India. The survey by Food Safety and Standards Authority of India (FSSAI) found that about 70 per cent of the milk in the country does not conform to the standards set by it. The milk samples were found to have glucose, urea, hydrogen peroxide, vegetable fat, neutralisers, skim milk powder and even detergent in the samples tested. In Today's world so many people can't use the fresh milk for their drink. They use the packet milk or milk powder for their daily usage. There is starch, soap, table sugar and chemicals are added in the milk for the storing purpose. These adulterants are reducing the milk quality and it leads to many health issues. There are no testing methods are available to measure the chemical contents present in the milk. In the fast-growing world, testing of milk is necessary due to two reasons. The primary reason is to protect our health from hazardous chemicals present in the milk. The secondary reason is to find the amount of chemicals present in milk. The two-process are needed to determine the colour change and to estimate the amount from that colour.

II. DETECTION PROCESS

Initially, some chemicals are added to milk. These chemicals change the colour of the milk. From these colour change, amount of chemical is present in milk will be determined manually. But it not gives the amount of chemicals in the milk. It will be determined by using measurement process.

A. Formalin in Milk

Measure out 2ml milk into a test tube. Gently add 2ml of 90% Sulphuric acid and ferric chloride mixture into the test tube. Formation of purple colour ring at the interface of two layers indicates that the milk is adulterated with formalin.

B. Detergent in Milk

Measure out 10ml milk into a test tube. Add 10ml of hot water into the test tube containing milk. Now add 1-2 drops of phenolphthalein indicator solution into the test tube. Gently mix the contents of the test tube. Development of pink colour on addition of phenolphthalein indicator confirms the presence of detergent in milk.

C. Hydrogen Peroxide

Take 1 ml of milk sample in a test tube. Add 1 ml of the potassium reagent and mix well. Observe the colour of the solution in the tube. Blue colour will be developed in the presence of H_2O_2, whereas pure milk sample remain white in colour.

III. MEASUREMENT PROCESS

Image processing is the measurement process, which involves analysing of image intensity. The characterization of image depends on the colour occurred in the process. The colour is detected and the intensity level is measured.

A. Block Diagram

In this Block Diagram, the confirmatory test was performed for the detection process. The confirmatory test preferred for the detection of Hydrogen Peroxide, Formalin and Detergent present in the milk. The detection process techniques are used for the confirmatory test. In this confirmatory test the colour of the milk will be changed. The image acquisition is used for get the image of the milk by using the camera. After getting the image, the colour of the image is detected. Then, the detected colour part only cropped from that image. Then, the cropped image intensity is to be finding. From that intensity, the amount of chemical present in the milk is to be estimated.
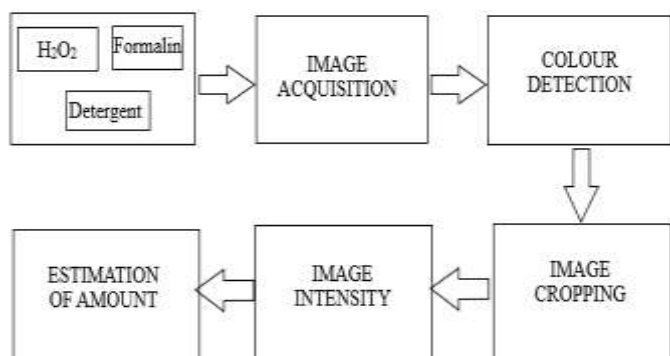
B. Image Acquisition

The Image Acquisition is the hardware dependent process, in which the reflected light energy from the object is converted into electrons and it spread over the internal sensor chip. Which creates the 2D array of the object. This Analog form of image is converting into the digital form by using Analog to Digital converter. The sensor inside a camera measures the reflected energy from the object. In a most Digital Cameras, the Charge Coupled Device is used as the image sensor.
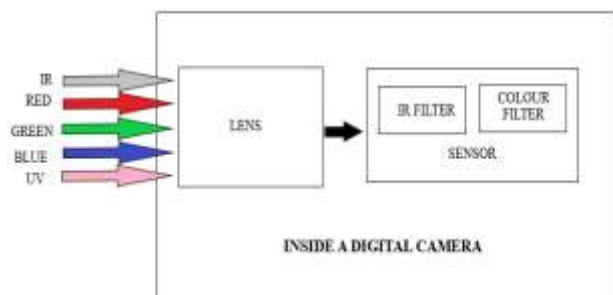
The Image Acquisition process consists of three steps: -

1. Optical system which focuses the energy.
2. Energy reflected from the object.

3. A sensor which measure the amount of energy.

Image Acquisition is achieved by suitable camera. We use different cameras for different application.

C. Colour Detection

There are many steps used for the colour detection process. They are,

Step 1: Read the input image.

Step 2: Creating Red, Blue colour band in the image.

Step 3: Plot the Red and Blue band Histogram.

Step 4: Conversion of input image into gray-scale image.

Step 5: To get the Red entity, subtract the red segment from the gray-scale to remove the blue segments in the picture.

Step 6: Remove the noise using Median Filter.

Step 7: Transform gray-scale picture into Black and White picture
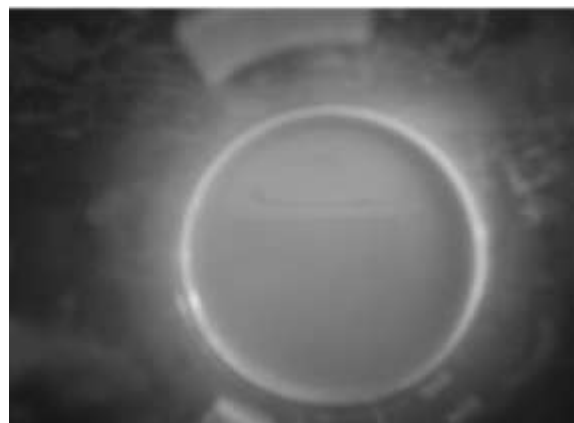

Fig 3. Input image of detergent adulteration

Fig 4. RGB to Gray conversion
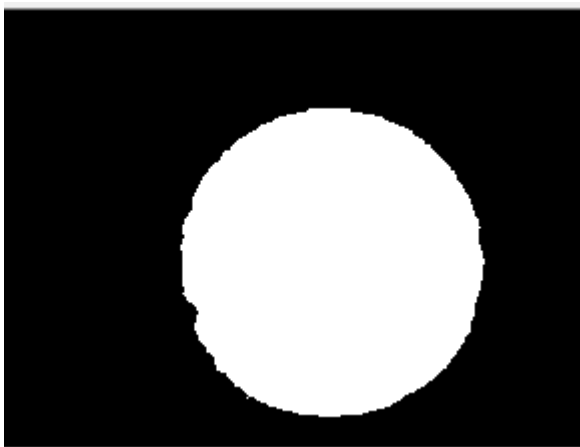

Fig 5. Subtraction of pink segment from grayscale

Fig 6. Pink colour detected image

D. *Image Cropping*

Image Cropping is used for extract the needed information from the original image. Cropping an image means, creating a new image from the original image. This cropped image is used for different application. There are many shapes are also used for crop the image. Some cropping shapes are Rectangular crop, circular crop, Square crop and Triangular crop. The image cropping removes the unwanted portion from the original image.
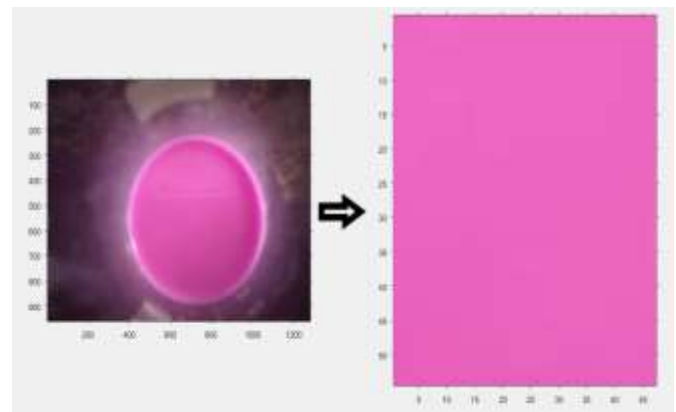

Fig 7. Image cropping

E. *Image Intensity*

Digital images consist of an array of picture elements (pixels) resulting from the regular sampling of an Analog image in x and y and averaged intensity per sampled area. Images may be digitized, or captured, from a video source using an Analog to Digital Converter (ADC). The image consists of array of pixels; each pixel has a different brightness. With the help of brightness in each pixel, the image colour intensity is captured.
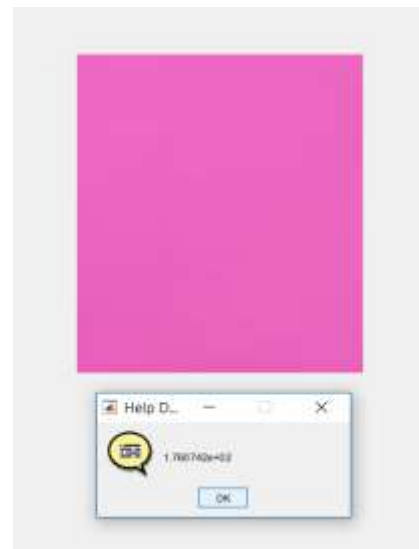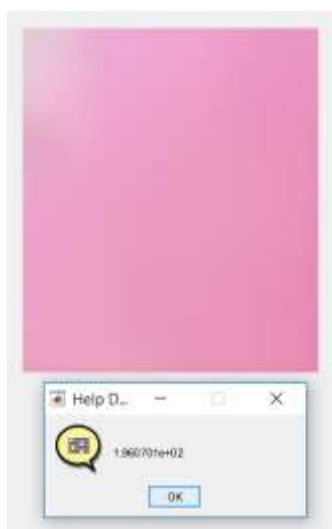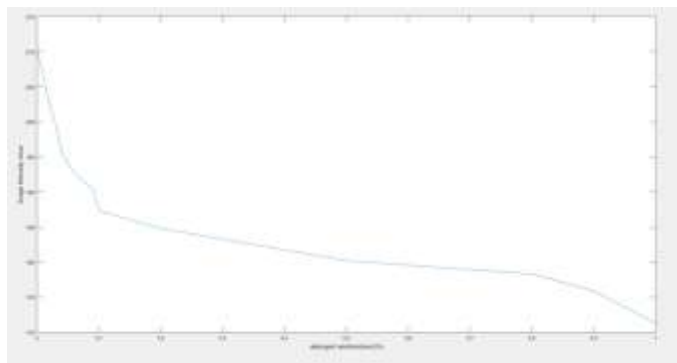

Fig 8. Image Intensity (1)

Fig 9. Image Intensity (2)

F. Estimation of amount

The amount of adulteration is determined from the intensity of image. The detergent adulteration is estimated from the image intensity process. Then the result is obtained.

IV. RESULT

The graph is plotted between the intensity of the image and amount of detergent adulterated in milk.

V. CONCLUSION

If the adulterations are added to milk, then it leads to many health issues. In India, the adulteration is becoming larger in amount for the preservation. To overcome, these issues this technology detects the presence of adulteration in milk.

VI. REFERENCE

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