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BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE,
CHIKKODI – 591201 District – Belagavi (Karnataka state, India)
(ACCREDITED AT 'A' GRADE BY NAAC WITH CGPA OF 3.26 IN THE THIRD CYCLE)

Department of Zoology (2019 – 20)

PROJECT WORK COMPLETION CERTIFICATE

This is to certify that following six B.Sc Final year students have undertaken the project entitled **Adulteration of Milk** in-partial fulfillment of the syllabus of Rani Channamma University, Belagavi during the year 2019-20. Following six students have together successfully completed the said project under the guidance of Dr Sridevi I Puranik.

Sl. No	Gender	Name of the student	Fathers name	Roll Number	Exam Seat Number
1	Miss.	Sonali Bandagar	Sanjay	187	S1715798
2	Miss.	Pooja Khot	Sanjay	241	S1715686
3	Miss.	Jayashree Mali	Appasaheb	150	S1715645
4	Miss.	Prajakta Latawade	Arun	155	S1715694
5	Miss.	Tanuja Shindhe	Appasaheb	161	S1715613
6	Miss.	Samreen Jamadar	Jahangeer	157	S1715743

Dr Sridevi I Puranik
PROJECT GUIDE

Dr N R Birasal
HEAD
DEPARTMENT OF ZOOLOGY

Prof U R Rajput
PRINCIPAL
KLES'S Basavaprabhu Kore
Arts, Science and Commerce College
CHIKODI - 591 201

Project Team Members

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INTRODUCTION

Adulteration of milk reduces the quality of milk and can even make it hazardous. Adulterants like soap, acid, starch, table sugar and chemicals like formalin may be added to the milk. Most of the chemicals used as adulterants are poisonous and cause health hazards. Adulterant means any material which is or could be employed for making the food unsafe or substandard or misbranded or containing extraneous matter; Food is adulterated if its quality is lowered or affected by the addition of substances which are injuries to health or by the removal of substances which are nutritious (Bania *et al.,* 2001). It is defined as the act of intentionally debasing the quality of food offered for sale either by the admixture or substitution of inferior substances or by the removal of valuable ingredient.

Food Adulteration first discovered in 1820 by the German chemist Friedrich Accumulated. He identified many toxic metals in food and drinks. Frederick Accum was the first to raise the alarm about food Adulteration. By that time Accum had become aware of the problem through his analytical work and this led him to publish "A treatise on adulterations of food Adulteration (Chen *et al.*, 2017).

Food Adulteration is an act of intentionally debasing the quality of food offered for sale either by the admixture or substitution of inferior substances or by removal of some valuable ingredient, food Adulteration takes into account not only the intentional addition or substitution or abstraction of substances which adversely affect nature, substances and quality the period of growth, harvesting, storage, processing, transport and distribution (Deng *et al.*, 2020).

Milk is very valuable food, readily digested and absorbed. It contains of nutrients, which needed for proper growth and maintenance of body. Milk and milk products form a significant part of the diet a sustainable amount of our food expenditures goes to milk and other dairy products. Milk is an important component of diets for all humans as it is high in essential amino acids that are most likely to be deficient in diets based on vegetable protein (DeVries *et al.,* 2017). Milk is considered to be the ideal food because of its abundant nutrients required by both infants and adults. Milk contains 87% water, 3.3% protein, 3.9% fats, 5% lactose and0.7% ash. In addition, it is a raw component to different food products (Reddy *et al.,* 2017). For example, casein protein can be separated and then Brocken down to provide a nitrogen source for infant formula and special diets for critically ill people. In addition, it is one of the best sources for protein, fat, carbohydrates, vitamin and minerals. Hence, milk is a highly nutritional product that can be used for a wide range of different products (Moncayo *et al.,* 2017).

Although milk is a high cost source of protein and fat relative to vegetable sources, it is readily saleable particularly in the more effluent urban areas of developing countries. Improving milk production is therefore an important tool for improving the quality of life particularly for rural people in developing countries. However, the production level of dairy animal is not satisfying the consumer demand worldwide. This became one of the driving forces for milk Adulteration by the producer. Possible reasons behind it may not only include demand and supply gap, but also perishable nature of milk, low purchasing capability of customer and lack of suitable detection methods also aggravated the problem. The motivation for food fraud is economic, but the impact is the real public health concern (Nurseitova *et al.*, 2019).

Milk and dairy product adulteration came into global concern after breakthrough of melamine contamination in Chinese infant milk products in 2008. However, history of milk Adulteration is very old. swill milk scandal has been reported in 1850 which killed 8000 infants in New York alone (Ruiz-Valdepeñas *et al.*, 2019). Milk Adulteration is significantly worse in developing and underdeveloped countries due to absence of adequate monitoring and lack of proper enforcement policies (Pandey *et al.*, 2019).

Material

- **Samples:** Buffalo milk, Goat milk and pasteurized packet milk
- **Chemicals**: iodine solution, Hydrochloric acid, Concentrated sulphuric acid, Citric acid, 5% barium chloride, Silver nitrate, Potassium sulphate, Vanadium Pentoxide, Resorcinol.
- Red litmus paper, Soybean/ arhar powder, Sugar.

Methods for Detection of common adulterants in Milk (Poonia *et al.*, 2017).

1. **Water:** The presence of water can be detected by putting a drop of milk on a polished slanting surface. The drop of pure milk flows slowly leaving a white trail behind it, whereas milk adulterated with water will flow immediately without leaving a mark.
2. **Starch:** Add a few drops of tincture of iodine or iodine solution. Formation of blue colour indicates the presence of starch.
3. **Urea:** Take a tea spoon of milk in a test tube. Add half teaspoon of soybean or archaeology powder, mix up the contents thoroughly by shaking the test tube. After 5

RESULTS

TEST: Test for Buffalo and Goat Samples.

Sl. No.	TEST	RESULT		
		Buffalo	Goat	Packet Milk
1	**Water:** The presence of water can be detected by putting a drop of mix on a polished slanting surface.	Absent	Absent	Present
2	**Starch:** Add few drops of tincture of iodine solution. Formation of blue colour indicates the presence of starch.	Absent	Absent	Absent
3	**Detergent:** shake 5-10 mL of sample with an equal amount of water. Lather indicates the presence of detergent.	Absent	Absent	Absent
4	**Vanaspati:** Take 3 ml of milk in test tube. Add 10drops of Hydrochloric acid. Mix one teaspoonful of Sugar. After 5 minutes, examine the mix. The red colouration indicates the presence of Vanaspati in milk.	Absent	Absent	Absent
5	**Formalin:** Take 10ml of milk in a test tube and add 5ml of conc. Sulphuric acid from the sides of the wall without shaking. If a violet or blue ring appears at the intersection of 2 layers then it shows presence of formalin.	Absent	Absent	Absent
6	**Ammonium sulphate:** Take 5ml of hot milk in a test tube add a suitable acid. Ex. Citric acid. The whey obtained is separated & filtered. Take the whey in another test tube & add 0.5ml of 5% barium chloride. Appearance of precipitate indicates the presence of ammonium sulphate.	Absent	Absent	Absent
7	**Salt:** Take 5ml of Silver nitrate reagent in a test tube. Add 2-3 drops of Potassium dichromate reagent. Add 1ml of milk in above test tube and mix thoroughly. If the contents of the test tube turn yellow, then milk contain salt.	Absent	Absent	Present
8	**Hydrogen peroxide:** To 10ml of milk sample in test tube. Add 10-15 drops of Vanadium pentoxide reagent & mix. Pink or red colour indicates presence of hydrogen peroxide.	Absent	Absent	Absent
9	**Sugar:** Take 3ml of milk in a test tube. Add 2ml of Hydrochloric acid. heat the test tube after adding 50mg of Resorcinol. The red colouration indicates the use of sugar in the milk.	Absent	Absent	Absent
10	**Urea:** Take a teaspoon of milk in a test tube. Add half teaspoon of Soybean/Arhar powder, mix up the contents thoroughly by shaking test tube. After 5minute, dip a Red litmus paper in it. Remove the paper after half a minute. A change in colour from red to blue indicates the presence of urea in the milk.	Absent	Absent	Present

CONCLUSION

By everyone support we successfully completed our project of Adulteration of milk in which we studied the collected milk adulterated with common salt, water and urea being the most common adulterant in packet milk. No adulterants were found in buffalo and goat milk. So we conclude that these are safe for children to drink. Thus, it was found that all the so collected milk had varied proportion of common adulterants which might be detrimental to human health, therefore a governing body should periodically check these products for presence of these harmful ingredients.

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