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Adulteration of Milk in Jabalpur

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***Abstract:** Aim-Milk adulteration is a serious threat posed in front of a country like Indiawhere milkis a major source of protein and consumed by all generations.There is need to ensure the extent and type of substances which are used for adulteration in a particular area.Present study was conducted to detect the adulteration in milk supplied to various dairies of Jabalpur.*
***Material and Method-**Sixty random raw milk samples were collected from dairy owners from different regions of Jabalpur. Samples were analyzed for determination and extent of adulteration. A standard milk adulteration kit manufactured by Himedia laboratories, Mumbai, India was usedto detect the adulterants.*
***Results-**Adulterants found were urea (63%), skim milk powder (23%), salt (28%), sucrose (90%) and detergent (20%) .*
***Conclusion-**This analysis which has unfolded proved that the milk wasadulterated with toxic chemicals which are injurious to health. The adulterants decrease the nutritive value of milk and may also cause serious human health related problems.*
***Key words:** milk Adulteration, milk quality, urea*

I. INTRODUCTION

We cannot be certain when man started utilizing milk of other animals for his benefit, but the milk has been in existence since Vedic times. More than 100 substances that are either in solution, suspension or emulsion in water, the important being casein - the major protein of milk, lactose - milk sugar, whey and mineral salts are found in milk [1-4] and it is considered very important to young and old people as it is an attractive source of energy , proteins and calcium . In Jabalpur, milk purchasing is a process which continues whole day and milk is a product which can be easily contaminated and spoiled under the influence of unhygienic environment. Considering its nutritional value and demand, some unethical activities are usually adapted to prevent the financial losses due to the spoilage of milk during its transportation and sale [5]. To attain a maximum profit out of this business, dairy owners adulterate the milk and also add some dangerous chemicals like starch, urea ammonium sulphate, salt, formalin, cane sugar, detergent etc to increase the shelf life of milk. These chemical decrease the nutritive value of milk and can cause serious health problems [6]. Finding of this study will make the society aware about the harmful chemicals which are used to contaminate the milk and will help to take the precautions against these malpractices. Milk is an indispensible part of people's life and its adulteration not only causes major financial losses for the processing industry, but it is also responsible for health hazards of the consumers. Water borne diseases can caused from the milk adulterated with water which is a serious health hazard. Other adulterants which are harmful chemical may cause severe health issues in consumers. Thus present study was conducted to evaluate the adulterations of milk sold at different dairies of Jabalpur.

II. MATERIAL & METHOD

A. Ethical approval

Ethical approval was not necessary as all milk samples were procured from the open market.

B. Raw Material

Raw milk samples were collected from five different community areas of Jabalpur that are Sadar, Wright town, Ganjipura , Gadha and Napier town and from each area, we have selected twelve dairies at random . Single sample in triplicate was taken from each dairy , that made sixty sample total . Each sample was procured in sterilized bottle and kept in an ice-box and transported to the laboratory for the detection of adulteration.

C. Milk Adulteration Testing (MAT) Kit

A standard milk adulteration kit manufactured by HIMEDIA

D. Procedure

A total of sixty dairy milk samples were tested infor various adulterants. A standard milk adulteration kit manufactured by HIMEDIA laboratories, Mumbai, India was used. The milk samples were tested in triplicates for the following adulterants–

formalin, urea, starch, neutralizers ($NaHCO_3$, Na_2CO_3, NaOH, $Ca(OH)_2$ etc.), detergents, sodium chloride, skim milk powder, sucrose, glucose/dextrose, hydrogen peroxide .

E. Results

Presence and absence of adulterants in dairy milk has been presented in table one.

As evident from the table all the samples tested negative for neutralizers , hydrogen peroxide, formalin, starch and glucose . Adulterants which showed their presence in the sample were , detergent, urea , sucrose , sodium chloride and skim milk powder .In these samples the extent of adulteration with sodium chloride urea , detergent and sucrose was found to be , 28.3% 63%, 20% ,90 %, 23.3 % respectively.

III. DISCUSSION

A survey has been conducted by food safety and standard authority of India [7]to determine the quality of milk and to detect chemicals present in milk throughout the country. Total 1791 samples were tested from 28 states and five union territories. Worst performer were, Bihar Orissa, Westbengal, Chhattisgarh, Jharkhand, Mizoram and Daman and Diu. This survey disclosed that that 250 samples (20.4%) procured from the Non Confirming Eastern States were found to be contaminated with urea.

Surprisingly in present study20 % samples were tested positive for detergent. A study conducted by Singuluri*et al* .[9] also revealed that 44% samples were positive for detergent .According to him presence of detergent can be due to low maintenance of milk tanks or it can be used to conceal fat value of milk. Same FSSAI survey[7] observed that due to malpractices such as insufficient hygiene and sanitation in handling and transportation of milk , detergent which is used to clean the utensil are not completely washed off. Some times to resemble the viscosity and thickness of natural milk detergents are deliberately added in milk. Report of the survey (FSSAI)[7] concluded that use of detergent is hazardous to health. One of the reports of Indian medical council of research[8] shows that detergents are the cause of food poisoning and gastrointestinal implication. A study conducted by the Kandpal*etal*.[3] showed that all of its samples (100%) were adulterated with urea and 82% and 35% samples were tested positive in the analysis of Singuluri*et al*.[9] and Nirwal*et al*.[1]respectively. In present study 90 % samples were adulterated with urea. According to Kandpal*etal*.[3] that presence of urea in milk is due to the consumption of fodder which contains pesticide/herbicides and fertilizers residues by the cattle which are now commonly used to increase the productivity of crop. In the same study it is stated that urea is mixed with milk to give whiteness and increase the consistency of milk and presence of urea increases the risk of renal failure as kidneys have to do more work to remove the urea from blood.

A survey conducted by FSSAI[7] revealed that 44.69 % samples contained skim milk powder. Present study also showed that 23.3 % samples were contaminated with skim milk powder. 10 % and 80% samples were adulterated with skim milk powder in studies by Singh *et al*. [10]and Singuluri*et al*.[9]respectively. According to Singh *et al*.[10] , skim milk powder is added to increase the SNF value of diluted milk and it can be used to increase the weight and relative mass of the milk .

Two studies by Singuluri*et al*.[9]and Singh *et al*.[10]showed the presence of sucrose in 22% and 100 % of all its samples respectively. Shockingly ,In our study 90% samples were tested positive for sucrose. The presence of cane sugar in milk has been reported from many regions of India as well as Pakistan (9; 15; 16). According to Singh*et al*.[10]Usually, sugars other than lactose are mixed to give poor quality milk its characteristic sweetness and also increase the consistency of milk to interfere the lactometer reading.

This study reported sodium chloride in 28.3% milk samples . 80 %,19 % , and 46 % samples were adulterated with sodium chloride in studies conducted bySinguluri*et al*. [9]Barham*etal*.[11],and Makadiya*etal*.[11]respectively. Similar adulterant was detected in Assam state of India and Brazil to mask the high water content, sodium chloride was added in milk [13]. It has also been stated that high level of sodium chloride in milk could alter the acid base balance in body and may contribute to regression loss of acquired immunity, and sensory disturbances kidney problems and speech [14].

IV. AUTHORS' CONTRIBUTIONS

This study is the part of training project of the first author Shweta tripathi, who carried out the research and Sudha Tiwari helped during the study. All authors have read and approved the final version of the manuscript.

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VI. CONCLUSION

It can be concluded from the analyses that a large number of samples procured were found to be adulterated. The extent of adulteration varied significantly with least percentage for skim milk powder (23%) and highest for sucrose (90%). This portrays that most of the milk samples were adulterated with various substances during their production and processing or added intentionally to increase the profit. India is a country where milk and milk products play very important role .This study should bring about more awareness to the general public about theadulteration in milk.

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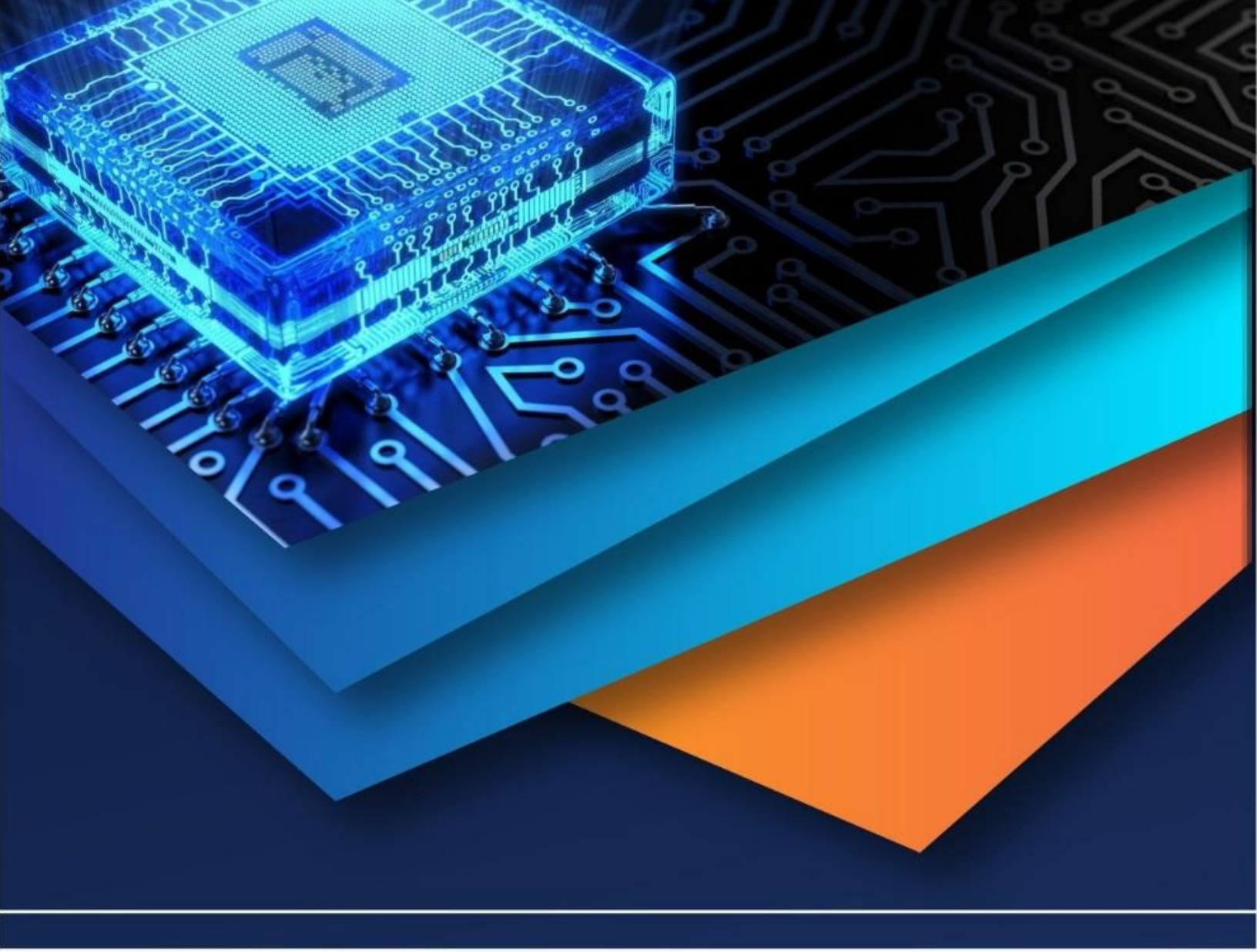
ADULTERANTS	Formalin	Hydrogen Peroxide	Detergents	Neutralizers	Sodium Chloride	Urea	Starch	Sucrose	Glucose	Skim Milk Powder
No. of Samples Positive	-	-	12	-	17	38	-	50	-	14
No. of Samples Negative	60	60	48	60	43	22	60	10	60	46
No. of Samples positive (%)	-	-	20	-	28.3	63.3	-	90	-	23.3
No. of Samples negative (%)	100	100	80	100	71.7	33.7	100	10	100	76.7

Cumulative Percent	100	100	100	100	100	100	100	100	100	100



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