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Effect of preservation on milk: A qualitative (gunatmak) analysis

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ABSTRACT:

Milk is secretion of mammary gland. It consists of all the proximal principles needed by our body and considered as perfect food. In ancient time man used to consume fresh milk of milch animals, eight milch animals are grouped together and their qualities are mentioned in samhitas.with passing time preservation of milk is done to increase the life and avalibility of milk. Pasteurization is the process which is widely used for preservation of milk. Preservation has a positive as well as negative effect. Today in market many type of preserved milk is available and as milk being essential part of our diet, it is absoutly necessary to thought on the changes that preserved milk undergoes.For this study a experiment was designed to digest the milk protein in lab and observe the digestibility of milk protein and analysis the gunatmak changes occurring due to preservation. As the guna (gurutva/ laghutva) of milk of milch animals is mentioned in samhitas taking that as a standard the analysis of marketed preserved milk samples are examined. The details of experiment, observation and results are discussed in the paper. Results show that the milk of the milch animals is laghu than the preserved milk samples.

Key Words: Pasteurization, Milch animals, Gunatmak changes

INTRODUCTION:

Food is considered as pran of every person. In the samhitas food is divided into different group which include the sheer verga also. Milk is the secretion of mammary gland and in sheer verga eight milch animals are grouped together and their guna (qualities) are mentioned in details. milk carbohydrates consist of lactose, glucose and galactose. Milk fat is compost of cholesterol, fatty acids& unsaturated fats.The milk proteins is consist of casinogen, lactalbumin and lactglobulin. The milk mineral is consists of sodium, potassium, chlorine, phosphorus, sulphur, calcium & magnesium. The only absence of iodine makes milk nearly perfect food than the perfect food. The vitamin present in milk are A,C,D,E,B1,B2&B6.As milk is essential part of our diet and to make it available to every individual man started preserving it. Preservation is done by bringing together the milk available, processing it and marketing it to deficiet areas. As milk consist of lot of nutrition it serves as a best raw material for the growth of lot of micro organism, similarly lot of chemical changes takes are brought about by contact with heat,

air and moisture. In order to keep milk free from micro organism and make it available for everyone preservation is necessary and pasteurization is the process universally used. In pasteurization milk is first collected from different sources, certain tests are done before accepting the milk. Then this milk is first given heat treatment and then suddenly cooled to a specific temperature and distributed to peoples. As there is always other side of the picture, pasteurization is having lot of advantages it has certain disadvantages too. Due to processing certain nutrients gets destroyed and there is change in colour, smell and digestibility of milk.

AIM & OBJECTIVES:

To study the gunatmak (qualitative) changes occurring in milk due to preservation.

MATERIALS & METHODS:

a) Three samples of milk of milch animals, three samples of preserved marketed milk, three samples of condensed marketed milk.

b) Chemicals:-citric acid, ninhydrine, methyl calosolve, papine, lucine, formaline,dimethyl salphoxy ether,ethanol,stannous chloride.

To examine the fresh milk of milch animals milk of goat (g) ,milk of cow(c),milk of buffalo(b)is taken which is self collected and stored at 10 degree C .The temperature of milk is maintained so that there is no scope of bacterial growth and other physical and chemical changes in the milk. At the time of performing the experiment the milk is first brought at room temperature and then used.

The preserved milk samples include pasteurized milk samples X,Y ,Z. The condensed milk samples are A,B,C which are prepared at the time of experiment according to the procedure given on the pack of the samples.

Method-1)Dilution of milk:-dilution of milk is prepared by mixing 0.1ml of milk to4.9 ml of distilled water. It is prepared instantlyat the time of experiment.

2) Enzyme solution:-25 mg enzyme (Papain) is taken and dissolved in 250 ml of distilled water. This enzyme solution is stored at 4 degree C and at the time of experiment it is brought to room temperature and then used.

3) Ether ethanol solution:-this is prepared by adding equal amount of ether to ethanol .It is stored in cool place. At the time of experiment, it should be brought to room temperature.

4) Citrate buffer (1.2M):-The PH of citrate buffer is maintained at 5.

a) 1.0505gm citric acid is dissolved in 25ml distilled water.

b) Sodium citrate 1.4705gm is dissolved in 25ml distilled water.

Solution is taken 15.375 and solution b is taken at 22.5/25ml and mixed properly.

This solution is also stored in cool place.

5) Ninhydrine solution:-a)40 mg stannous chloride is dissolved in 25 ml citrate buffer.

b) 0.8gm ninhydrine is dissolved in 25 ml methyl salosolve(2methoxy ethanol).

Solution a and b are mixed in equal amount and stored in cool place.

6) Leucin solution:-25 mg leucin is taken and dissolved in 25 ml distilled water.10ml of this dilution to 100ml .This solution is used as standard solution .This solution is stored at cool place

Place of study:-Biochemical lab of Shri Ayurved Collage and rugnalaya Nagpur.

PROCEDURE:

0.5 ml of diluted milk is taken in testtube at room tempture and to this 0.5 ml of enzyme solution is mixed.This solution is incubated at 25deg Cfor 5 minutes and immediately to this solution 1ml ether ethenol mixture is mixed

0.5ml ninhydrine is mixed to the above mixture and kept at boiling water for 20 min.This solution is filtered in a tight cotten plug and washed repeatedly by ether ethanol mixture till the volumne becomes to 4ml.

Any turbidity appears was cleared by adding diethylethenoi mixture and the volumne is made to 5ml(double layer appeared in some casesis clearsd by adding little ethanol keeping volumeconstant to 5ml)

The intensity of colour is read against the reagent blank and standard leucin solution at 570nm in spectrometer.

The reagent blank is prepared by above method usingdistilled waqter in place of milk where as standard solution is prepared by taking 0.2 ml leucin or 0.4 ml leucin in place of milk.

The milk of the goat ,cow and buffalo is examined .similarly the preserved milk samples A,B,Care examined.leucin is prepared separately with every set of samples.for each samplestwo sets are prepare d one with enzyme and other with without enzyme.after the colour is formed the intensity of colour is read at 570nm on spectrometer.

RESULTS:

1) The result of the samples of goat, cow and buffalo are given below.

Samples	With enzyme	Without enzyme
Goat	1.284	0.955
Cow	0.397	0.248
Buffalo	0.641	0.556

The value of standard leucin solution which is prepared by adding 0.2 ml leucin is 0.790.

2) The result of samples of preserved marketed milk X,Y,Z is given below

Samples	With enzymes	Without enzymes
X	1.79	1.51
Y	1.67	1.63
Z	1.55	1.48

The value of standard leucin solution which is prepared by adding 0.2ml leucin solution is 1.92

3) The result of samples of condensed preserved milk samples A,B,C are given below

samples	With enzyme	Without enzyme
A	0.0121	0.0174
B	0.0197	0.0193
C	0.0176	0.0147

CALCULATIONS:

Mg .free amino acids =OD of standard x0.02

1.284/0.790x0.02=0.0325(with enzyme)

0.955/0.790x0.02=0.0241(without enzyme)

Difference of two is 0.0084.

This is the rate of digestion of milk for 5 minutes.

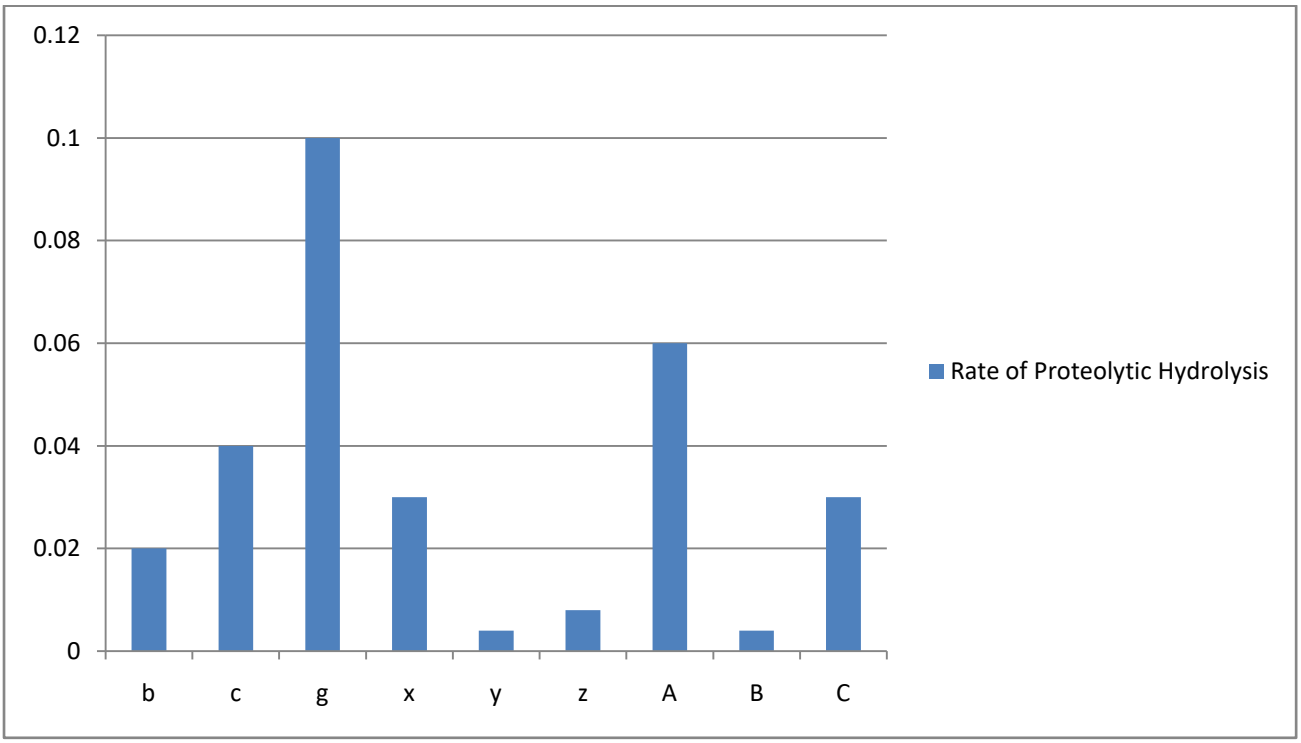
The rate of digestion of milk is 0.1008mg/hr.

Similar calculations are done for each samples and the results are given below.

Samples	With enzyme	With out enzyme	Dig/5 min	Rate of proteolytic hydrolysis
Goat	0.0325	0.0241	0.0084	0.1008mg/hr
Cow	0.0101	0.0062	0.0039	0.0468mg/hr
Buffalo	0.0162	0.0140	0.0022	0.0264mg/hr
X	0.0187	0.0186	0.0029	0.0348mg/hr
Y	0.0173	0.0169	0.0004	0.0048mg/hr
Z	0.0161	0.0154	0.0007	0.0084mg/hr
A	0.0174	0.0121	0.0053	0.0636mg/hr
B	0.0197	0.0193	0.0004	0.0048mg/hr
C	0.0147	0.0176	0.0029	0.0348mg/hr

The qualitative analysis of milk is done in the labortary. Durning the analysis the milk is mixed with enzyme papine which does the digestion of milk. After that ninhydrine is mixed with it which gives colour to the amino acids,after the colour is formed intensity of colour is read on spectrometer and readings are taken. Experimental observation shows that the milk of goat undergoes maximum hydrolysis and is laghu in digestion where as the cow undergoes little less hydrolysis than the milk of goat, and is guru than the milk of goat. The milk of buffalo is guru than the other two milk samples and is guru and takes lot of time for hydrolysis.

The milk samples A, B, C are guru than the fresh milk of milch animals. The sample A is used for infant feeding and is a substitute for mother's milk. It is laghu where as the other two condensed milk samples are guru and take lot of time for hydrolysis.



b : Milk of Buffalo

c : Milk of Cow

g : Milk of Goat

X,Y,Z : Preserved marketed milk samples

A,B,C : Preserved Condensed milk samples

CONCLUSION:

Thus the result prove that the preserved marketed samplesof milk are guru i.e takes lot of time for hydrolysis,due to the process of preservation where as milk of milch animals is laghu than the preserved samples(.Hydrolysis is the first stage of digestion of milk.).so if possible we should use milk of milch animals instead of using preserved marketed milk.

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