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Quality Attributes of Rabri Marketed in Agra City

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Abstract

Current investigation was envisaged to acquaint with quality attributes of rabri manufactured and marketed in Agra city. For the purpose rabri samples were collected from local traders after dividing city in to four different zones during the periods of July 2013 to March 2014. To compare market samples a control sample was also prepared in laboratory using standardized milk (6% fat, 9.5% SNF, 1/3rd milk concentration and 6% sugar). Results indicate that market rabri samples possess significantly (P<0.05) higher acidity, acid value and sucrose content, while total solids, fat, free fat, protein and lactose were significantly (P<0.05) lower as compared to control rabri samples. Microbial make up enunciate that market rabri samples were inferior to that of control samples. Average TVC, coliform and yeast and moulds count ware 17.71, 7.86 and 10.56 in market samples resulted in significantly (P<0.05) higher than 9.89, 3.48 and 6.95 in control samples.

Key words: rabri, physico-cemical, microbial and quality attributes

Introduction

The traditional Indian dairy products have great commercial significance as they account for over 90% of all dairy products consumed in the country. Traditional dairy products not only offer great employment opportunity to our large unskilled and semiskilled workforce, but also preserve milk solids at room temperature for longer time and provide value addition to milk. The principal objective involves in the manufacturing of some of the traditional milk products, such as heat desiccated (Kheer, Rabri and Basundi), heat and acid coagulated (Channa and Paneer) and fermented (Dahi, Chakka and Shrikhand) are to store milk solids in time of plenty against the periods of scarcity.

Amongst various concentrated/heat desiccated milk products rabri is quite popular in northern India. Rabri is a partially desiccated sweetened milk product. Traditionally, it prepared by milk confectioners on a very small scale by simmering whole milk for a long period and adding sugar after achieving the desired concentration. The production of rabri is still rest in the hands of local confectioners (halwais) in each locality and is invariably manufactured and stored in open and shallow type of containers which may leads to enormous contamination from surrounding. This leads products having poor hygienic and shelf life quality. Since no legal quality standards exist for rabri till date, its quality attributes varies widely from place to place and even from batch to batch. Keeping above outstanding facts in mind the present investigations was aimed to become familiar with manufacturing processes and handling techniques of rabri adopted by local traders (halwais) in Agra city.

Materials and Methods

The current experiment was carried out in Agra city during the periods of July 2013 to March 2014 to unearth the various quality profiles of market rabri. Rabri samples were collected from various market zones of Agra city and compared with control samples prepared in departmental laboratory just to acquaint with manufacturing, handling and storage techniques of this product followed by the local traders (halwais). At the outset of the experiment a general survey of market was done and before collection of samples, the city was divided into four zones in order to avoid samples heterogeneity. To compare market rabri a control sample of rabri was also prepared under laboratory from milk standardized to 6.0/9.5 fat/SNF, 1/3rd milk concentration and 6.0% sugar as per standard

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described by Gayen and Pal (1991b). In total 80 market samples, 20 from each zone were collected and 20 control samples were prepared. At a time 100g sample was derived from each shop in a polyethylene bag and immediately brought to laboratory for further processing. The rabri samples obtained as well as prepared under controlled condition were subjected for analysis of various physic-chemical attributes viz., titratable acidity (TA), protein and ash (AOAC,1980); pH (ISI,1981), fat (ISI,1977), acid vale (Koniecko, 1979), free fat (Pruthi et al.,1973) and lactose as per ISI, 1973. Microbial characteristics were ascertained as per methods evinced by Chalmer (1955). The data thus obtained were statistically analyzed as per Snedecor and Cochran (1994).

Results and Discussion

Acidity content in market rabri samples varied from 0.18 to 0.45 percent with a mean value of 0.29% as compared to 0.17% acidity encountered in control samples. Statistical analysis of data revealed that acidity content in market samples of rabri is significantly ($P<0.05$) higher than that of control one. Since the control samples were made from fresh, good quality milk, hence, it is expected that these samples would contain lower acidity as compared to market samples. Singh and Gupta (2001) also reported that the market rabri samples had higher acidity value than control samples prepared in laboratory.

Acid value in market rabri was estimated significantly higher ($P<0.01$) with a mean value of 1.80% as compared to 0.60% in control rabri samples. Acid value of the product is considered as an important quality attribute as it reflect about lipolytical activity take place in the samples and higher the acid value in a product, is the result of prolong storage of the product. So this parameter is considered to check the freshness of the product. During current investigation the appearance of relatively higher acid value in market rabri samples might reflect that the products were stored one and not in fresh condition.

Total solids in market rabri samples was estimated to the extent of 66.80%, significantly ($P<0.01$) lower than determined in control rabri samples. Further, insight into data revealed that total solids content in market rabri was comparatively and significantly ($P<0.01$) lower than control samples. Total solids content in resultant product invariably depends upon its concentration in fresh milk of which the product is made and degree of concentration vis-a-vis loss of moisture. The lower total solids content in market samples might be attributed to use of partially skimmed milk and a lower degree of concentration by local traders to manufacture this product. The results of present finding are fully corroborated with the views earlier held by Debye and Gupta (1986) and Singh and Gupta (2001) who observed lower total solids content in market rabri. Endorsing the contentions of present finding Gayen and Pal (1991a) had reported a much lower total solids value in rabri samples collected from Delhi (55.29%) and Karnal (49.84) markets.

Perusal of data evinced that both mean total fat and free fat levels in rabri samples either collected from market or prepared in controlled conditions differed significantly ($P<0.01$) to each other. And these two utmost important parameters were higher in control rabri samples when compared to their counterparts (market samples). While total fat level in finished product is positively associated to its initial level in raw

Table 1: Physico-chemical Attributes of Rabri Marketed in Agra city

Attributes (%)/ Markets	Acidity	Acid value	Total solids	Fat	Free Fat	Protein	Lactose	Sucrose
Nurigate Market	0.28	1.76	66.80	16.39	6.61	9.28	16.06	20.37
Lohamandi Market	0.32	1.85	66.67	15.34	5.58	9.08	14.50	22.35
Shahgang Market	0.27	1.79	66.65	17.87	6.55	8.99	15.74	20.48
Shethgali Market	0.28	1.78	67.19	16.01	6.70	9.19	15.79	21.22
Mean	0.29	1.80	66.80	16.40	6.36	9.14	15.52	21.11
Control	0.17	0.60	70.05	20.97	7.82	10.80	17.06	19.43
F - Value	3.081*	9.042**	15.709**	35.795**	9.787**	5.745**	29.987**	42.291**
CD at 5%	0.03	0.09	1.043	0.395	0.098	0.351	0.469	0.471
CV%	28.86	8.15	2.46	3.40	9.43	6.01	4.72	3.61

Table 2: Microbial Quality of Rabri Marketed in Agra city

Attributes (%)	Total Viable Count (X103/g)	ColiformCount (/g)	Yeast and Moulds Count (/g)
Nurigate Market	22.56	7.41	13.62
Lohamandi Market	18.19	8.47	11.16
Shahgang Market	14.97	7.73	9.18
Shethgali Market	15.13	6.82	8.26
Mean	17.71	7.86	10.56
Control	9.89	3.48	6.95
F - Value	28.427**	12.297**	7.554**
CD at 5%	2.454	1.654	2.667
CV%	24.22	37.77	43.24

milk of which the product was made, the free fat in the product is the result of release of globular fat, extent of which depends upon type and fat content, and the manufacturing process. The results of present study with regard to total and free fat in rabri samples are in agreement with the results earlier obtained by Dubey and Gupta (1986), Gayen and Pal (1991a) and Singh and Gupta (2001).

Results revealed that protein values in market rabri samples were comparatively and significantly ($P<0.01$) lower than control samples. Having gone through the trend of results with this regard, it elucidate that protein level in market rabri samples witnessed to possess lower figures as compared to control rabri samples. The findings of present study with regard to protein content in rabri samples got sanction of views held earlier by Singh and Gupta (2001) who reported more or less similar protein values for market and control rabri samples.

Observations with regard to mean lactose value in market rabri was estimated to the extent of 15.52 percent as against 17.06 percent in control samples vividly reflecting a significantly ($P<0.05$) lower values in market samples. Added sugar in terms of sucrose content in market rabri samples was markedly and significantly ($P<0.01$) higher as compared to control rabri samples prepared after addition of sugar @ 6.0% of milk valueme in finished product. Statistical analysis of data further evinced that sucrose content in market and control rabri samples exhibited a highly significant ($P<0.01$) variation to each other. And it was evident that added sugar level was significantly more in market rabri than control rabri. Bandopadhyay and Mathur (1987) reported 15% sucrose content in rabri samples while according to Gayen and Pal (1991a) rabri samples contained 11.83 and 12.29 percent sucrose in samples collected from Delhi and Karnal market. The sucrose content in rabri samples collected from Agra city was comparatively higher than the values as reported by the above cited authors. The discrepancies arrived in this regard may be due to excess use of sugar by the local traders with an aim to enhance the quantity of product and eventually fetch more income.

Microbial quality

Conversion of milk into milk products constitute a mode of preserving the nutritional constituents as well as providing a concentrated source of energy. Sanitary practices adopted by the halwais during preparation of such products are usually poor, resulting in microbiological contamination of product with various types of organisms. These organisms thrive on milk constituents causing different changes in physical, chemical and nutritional quality of the product. Besides, such contamination may lead to health hazards too.

The total viable counts were estimated to be 22.56, 18.19, 14.97 and 15.13X10^3/g in rabri samples procured from Nurigate, Lohamandi, Shahganj and Shethgali market zones of Agra city(Table -2). The overall average TVC was 17.71X10^3/g in market samples and 9.89X10^3/g in control samples reflecting a highly significant ($P<0.01$) differences. The significantly higher number of total viable count in market samples accentuate to perceive the fact that the product was contaminated during its preparation, handling and sale.

Mean coliform and yeast and mould counts in market rabri samples were significantly ($P<0.01$) higher than control samples. Perusal of data contained in Table 4.2 vividly indicate that coliform and yeast and mould counts in control samples were appeared

to be 3.48 and 6.95/g respectively, much lower than market samples which reflect the respective figures of 7.86 and 10.56/g counts.

Higher microbial counts in market rabri samples in present investigation might be the consequence of poor quality of materials particularly milk and sugar and adoption of unhygienic conditions during manufacturing of this product by the traders in city. The results of present investigation with this regard are in full conformity with the findings of Gayen and Pal (1991a), Singh and Gupta (2006) who were also reported more or less similar trend for these attributes in the market rabri samples.

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