STANDARDIZATION AND SHELF LIFE STUDY OF KASHMIRI SAFFRON PHIRNI


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ABSTRACT

The study was aimed at optimizing the basic formulation and processing conditions for the preparation of Kashmiri saffron phirni, popular milk-semolina desert of Jammu and Kashmir. Three levels of semolina viz. 5%, 7.5% and 10% were evaluated for various physicochemical, sensory and microbiological properties. The product was packaged in low density polyethylene pouches (LDPE) and analyzed at a regular interval of 0, 4 and 7 days during refrigerated storage at 4±1°C. The level of sugar with respect to milk in the product was optimized as 10% w/w. All the proximate parameters of the product showed a non-significant (P>0.05) decreasing trend with increasing level of semolina. Overall acceptability was significantly (P<0.05) high for the product containing 7.5% semolina. The storage results indicated a significant (P<0.05) and gradual decrease in almost all the quality attributes, but were well within the limits of acceptability for the entire period of storage.

Key words: Phirni, Saffron, Formulation, Refrigerated storage.

INTRODUCTION

India’s market potential and current growth rate of traditional dairy products is unparalleled and all set to boom further with the help of mass production technology. This market is the largest in value after liquid milk and is estimated at US $3 billion in India and US $1 billion in North America alone (Aneja, 2002).

One of the traditional dairy products of the state of Jammu and Kashmir is Kashmiri saffron phirni. It is a milk based product which is very much similar to rice kheer. Kashmiri saffron phirni consists of semolina, sugar, saffron and dry fruits in milk in the form of paste with a thick consistency. It is served in restaurants and hotels or made at home, throughout the state but there seems to be no standard method of preparation and control over the quality. The present study was envisaged to standardize the basic formulation with a view to develop this dairy product with most suitable and desirable characteristics and to study its shelf life for one week at refrigeration temperature.

MATERIALS AND METHODS

Milk: Fresh buffalo milk from the local market of Jammu was used in all experiments after suitable standardization. The fat percentage of milk was standardized to 5.5% with 9% SNF for optimum product characteristics.

Semolina, Sugar and Saffron: Commercial brands were obtained from local market.

Preparation of Kashmiri saffron phirni: The different ingredients used for preparation of Kashmiri saffron phirni are given in Table 1. Milk was boiled in a thick bottomed pan maintained at a temperature of 90±5°C and semolina was added slowly and continuously while stirring the milk to prevent lump formation. After continuously stirring the mix for 10 minutes, sugar and saffron (presoaked in warm milk and reserving a few strands for garnish) was added and was again simmered for 5 minutes while continuously stirring the mix. The product made was cooled to ambient temperature after packing in flatten cup (100 ml) and stored under refrigerated condition (10°C) for further setting.

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The product was stored in LDPE pouches for further studies at refrigeration temperature (4±1°C) for one week.

**Analytical procedures:** The pH of the product was determined as per the method of O’Keeffe et al. (1976) by using a digital pH meter (Systronics Digital pH Meter 802, Serial No. 603).

The moisture, protein, fat and ash content of the product were determined by standard methods using hot air oven (Yorco sales Pvt. Ltd. India, Model YS1-431, S. No. 02B2843), Soxhlet extraction apparatus, Muffle furnace and Kjeldhal assembly respectively (AOAC, 1995). Method of Witte et al. (1970) was used for measuring 2-Thiobarbituric acid (TBA) values.

Psychrotrophic and total plate count of the samples were determined as per the methods described by APHA (1984). Preparation of samples and serial dilutions were done near the flame in a vertical laminar flow apparatus (Thermo Electron Corporation. D-63505 Langenselbold, Robert Boschstr.1, Germany) which was pre-sterilized by ultraviolet irradiation observing all possible aseptic precautions.

**Sensory evaluation:** The sensory evaluation of the product was carried for appearance, flavour, juiciness, texture and the overall acceptability by a panel of trained members composed of scientists and research scholars of the division based on a 8-point hedonic scale, wherein 8 denoted “extremely desirable” and 1 denoted “extremely undesirable”.

**Statistical analysis:** The experiment was replicated six times and the data generated up to seven days of storage were expressed as mean ± SE. The statistical differences between the means were assessed by ANOVA-one way classification (Snedecor and Cochran, 1980). A difference at P<0.05 was considered statistically significant.

### RESULTS AND DISCUSSION

The mean values of various physicochemical parameters of Kashmiri saffron phirni are presented in the Table-2. The pH recorded a non-significant (P>0.05) trend with increase in the level of semolina and the mean values of pH at 5, 7.5 and 10 % levels were comparable to each other. Jain (2003) also reported a similar effect of different levels of binder (SMP) on pH of skimmed milk nuggets.

A non significant (P>0.05) influence of the level of semolina was also observed on the various proximate parameters of the product. The mean values of the proximate parameters were comparable at all the three levels. Although, a non-significant (P>0.05) decreasing trend was observed in all the proximate parameters with the increase in level of semolina.

The mean values of various sensory parameters of Kashmiri saffron phirni containing 5, 7.5 and 10 % semolina are presented in the Table-3. Treatments (levels of semolina) had a significant (P<0.05) influence on flavour, juiciness, texture and overall acceptability of Kashmiri saffron phirni. Appearance scores, although having a non-significant trend was highest for the product containing 7.5% semolina. Flavour and texture scores showed a significant (P<0.05) increasing trend with increase in the level of semolina. However, the flavour and texture scores of the product prepared with 7.5 % semolina were comparable with the scores of other two products containing 5 and 10 % semolina. Jain (2003) also reported a similar effect of different levels of binder on texture and flavour scores of whole milk and skimmed milk nuggets. Juiciness scores of the Kashmiri saffron phirni showed a significant (P<0.05) decease with increase in the level of semolina. Juiciness of the product was perceived by the juices released during first few chews. However, the juiciness scores of the product prepared with 7.5% semolina were comparable with the scores of other two products containing 5 and 10 % semolina. Similar results were also reported by Jain (2003). Overall acceptability score was significantly (P<0.05) highest for the product containing 7.5% semolina in comparison to the other two which were comparable to each other. Thus, based on the various

### TABLE 1: Ingredients used for preparation of Kashmiri saffron phirni.

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
<td>1Kg</td>
</tr>
<tr>
<td>Semolina (5, 7.5 and 10% w/w)</td>
<td></td>
</tr>
<tr>
<td>Sugar (10% w/w)</td>
<td></td>
</tr>
<tr>
<td>Saffron (0.01% w/w)</td>
<td></td>
</tr>
<tr>
<td>Dry fruits (almonds 4% w/w and resins in 2:1 ratio)</td>
<td></td>
</tr>
</tbody>
</table>
physicochemical and sensory parameters, 7.5% level of semolina with 10% level of sugar was optimized as best in the product development and was selected for further studies at refrigeration temperature (4±1°C) for one week.

Mean values of various physicochemical parameters of aerobically packaged Kashmiri saffron phirni during refrigerated storage at 4±1°C are presented in Table-4. The mean pH values of the product increased significantly (P<0.05) during the refrigerated storage. The value observed on day 0 (7.01) was significantly lower than the values recorded on day 4 (7.23) and day 7 (7.47) which also varied significantly (P<0.05) with each other. This increase in product pH during storage might be due to the liberation of metabolites resulting from increased bacterial activity. This was in agreement with the findings of Jain (2003) who also reported an increase in pH of milk nuggets during refrigerated storage.

The TBA values of the product also rose significantly (P<0.05) with increase of storage period but overall the values were within the limits of acceptability. This increase in TBA values during the storage period might be due to the oxidation of fatty acids. This was in agreement with the findings of Pal et al. (1993) who also reported a similar increase in TBA values of processed paneer at refrigeration temperature. Kumar et al. (2011) also reported a significantly increasing trend in the TBA values of shrikhand under refrigerated storage.

The mean values of various microbiological characters of the product containing 7.5% semolina are also presented in the Table-4. Studies indicated that the samples had lower aerobic counts as cooking is reported to have pronounced effect in reducing bacterial load if done for longer times at higher temperature (Bryan et al, 1980).

The mean values of the total plate count increased significantly (P<0.05) throughout the storage period but overall the values were within the limits of acceptability. Bhat et al. (2010) reported a similar increase in the total plate count of dietetic phirni prepared from reconstituted skimmed milk during refrigerated storage. Kumar et al. (2011) also reported a significantly increasing trend in the total plate count of shrikhand during refrigerated storage.

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studying the microbiological quality of paneer and milk nuggets at refrigeration temperature.

The mean values of the psychrotrophic count increased significantly (P>0.05) throughout the storage period and overall the values were within the limits of acceptability. Bhat et al. (2010) and Kumar et al. (2011) reported a similar increase in the psychrotrophic counts of dietetic phirni and shrikhand respectively during refrigerated storage. Jain (2003) also observed a similar increase of psychrotrophic count while studying the effect of refrigerated storage on the quality of milk nuggets.

**CONCLUSION**

Kashmiri saffron phirni prepared from semolina at 7.5% and sugar at 10% was highly acceptable to the panelists and had good physicochemical and sensory properties. Product gave the aerobic counts in acceptable range during 7 days of refrigerated storage. Thus it may be concluded that semolina at 7.5% level and sugar at 10% level in milk can be successfully utilized for preparation of Kashmiri saffron phirni which is well acceptable upto 7 days of refrigerated storage at 4±1°C.

**REFERENCES**


### TABLE 4: Effect of refrigerated storage on chemical and microbiological quality of packaged (in LDPE) Kashmiri saffron phirni with 7.5% semolina. (Mean ±SE)*

<table>
<thead>
<tr>
<th>Quality attributes</th>
<th>Storage Period (Days)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>pH</td>
<td>7.01 ±0.01&lt;sup&gt;A&lt;/sup&gt;</td>
</tr>
<tr>
<td>TBA (mg malonaldehyde /Kg)</td>
<td>0.32±0.01&lt;sup&gt;A&lt;/sup&gt;</td>
</tr>
<tr>
<td>Total plate count (Log10 Cfu/g)</td>
<td>1.57±0.06&lt;sup&gt;A&lt;/sup&gt;</td>
</tr>
<tr>
<td>Psychrotrophic count(Log10 Cfu/g)</td>
<td>1.15±0.32&lt;sup&gt;A&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

*Mean ±SE with different superscripts in a row for different parameters differs significantly (P<0.05). n<sub>1</sub> (pH) = 3, n<sub>2</sub> (TBA, TPC & PC) = 6 for each treatment.