

Study On Quantifying and Correlating the Texture Profile of a Chocolate Based Khoa Confection with Its Moisture Content during Storage

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ABSTRACT

The present study was undertaken to study the effect of storage temperature on the textural properties of market samples of Rajmalai and to investigate the significance of the effect of ambient (fluctuating) versus steady storage temperature conditions on the textural properties of products. Ambient storage in the glass shelves or jar is the most common and preferred method of storage by sweet vendors in India. So the market samples of product were procured and stored at designated temperature conditions, $5 \pm 1^\circ\text{C}$, $80 \pm 5\% \text{RH}$ incubator at $(18 \pm 1^\circ\text{C}$, $55 \pm 5\% \text{RH}$) and $(30 \pm 1^\circ\text{C}$, $55 \pm 5\% \text{RH}$), and at ambient condition $(18 - 30^\circ\text{C}$, $70 \pm 5\% \text{RH}$) for different time periods, i.e. up to the acceptability of products (designated shelf life as per manufacturer norms) and analysed for change in textural properties.

Key word: Rajmalai, Textural Properties, Confection products.

INTRODUCTION

A chocolate based khoa confection 'Rajmalai' is very popular in Maharashtra, especially among the child population. Normally, the product is stored in shelves under ambient storage conditions which are subject to fluctuations with that of the atmosphere. The typical mouth feel of the confection has been its main appealing characteristic and experts suggest that such mouth feel is not experienced with any other product. Hence, the research significance of quantifying its mouthfeel in terms of textural attributes was felt. The need to study correlation with its water content, which is a crucial parameter for

most of the khoa based products, was also realized. A study was undertaken to evaluate the chemical composition and textural properties of Rajmalai as affected by the storage temperature and to check for correlation between moisture content and textural characteristics.

MATERIALS AND METHODS

The confection *Rajmalai* of single lot of production was procured and stored in sealed plastic bottles and stored at 5°C , 18°C and 30°C . The samples were then analyzed for chemical composition and texture profile.

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The moisture content, titratable acidity, ash content, protein contents were estimated as per BIS (SP:18, Part XI, 1981). The fat content was determined by BIS (SP:18, Part XI, 1981) and total carbohydrate content was determined by difference. The chemical composition of Rajmalai is shown in Table 1. The texture profile was determined by using TA-XT2i Texture Analyzer (Stable Micro Systems Ltd., UK) equipped with 50 kg load cell. The deformation curve obtained for a two-bite deformation cycle, using 75 mm diameter compression plate was used to determine textural characteristics viz. hardness, fracturability, resilience, cohesiveness, springiness, gumminess, chewiness and adhesiveness² at specific analyzer settings.

Statistical Analysis:

The data obtained was analyzed according to Snedecor and Cochran⁴ using Microsoft Office Excel® 2007 software utilizing the add-on Data Analysis tools to calculate the means, variances, correlations and for performing one way ANOVA. Results were presented in means \pm standard error of mean (SEM) and statistical significance was set at $p < 0.05$. Analysis of variance (ANOVA) was used to determine the main effects of treatments³. Further verification of statistical results was done by making use of Daniel's XL toolbox version 5.08, an MS Excel add-on.

Salient Findings:

The adhesiveness of Rajmalai stored at refrigeration temperature ($5 \pm 1^\circ\text{C}$) showed a decrease with increase in storage period. The initial adhesiveness value, obtained 2 hrs after preparation of the product was $- 6.669 \pm - 1.045$ Ns which tended to decrease to $- 2.797 \pm - 0.549$ Ns after 13 weeks of storage. The product becomes less adhesive and decreased to $- 1.336 \pm - 0.099$ Ns after 14 weeks of storage. At $18 \pm 1^\circ\text{C}$ and $30 \pm 1^\circ\text{C}$ temperatures, the adhesiveness decreased with increase in storage period and decrease in moisture content. The cohesiveness of Rajmalai stored at refrigeration temperature ($5 \pm 1^\circ\text{C}$) showed an overall decrease with increase in storage period. The springiness of Rajmalai stored at refrigeration temperature ($5 \pm 1^\circ\text{C}$) showed little increase with increase in storage period. At other selected temperatures of $18 \pm 1^\circ\text{C}$ and $30 \pm 1^\circ\text{C}$, the recorded product springiness showed a similar increase with increase in storage period and decrease in moisture content. The secondary textural parameters viz. gumminess and chewiness of Rajmalai stored at refrigeration temperature ($5 \pm 1^\circ\text{C}$) showed a general increasing trend with increase in storage period.

Table 1: Chemical composition of Rajmalai

Constituent	Rajmalai
Moisture (%)	14.85
Fat (%)	8.70
Protein (%)	6.92
Acidity (%)	0.43
Ash (%)	1.72
Total carbohydrate(%)	67.81
Total solid (%)	85.15

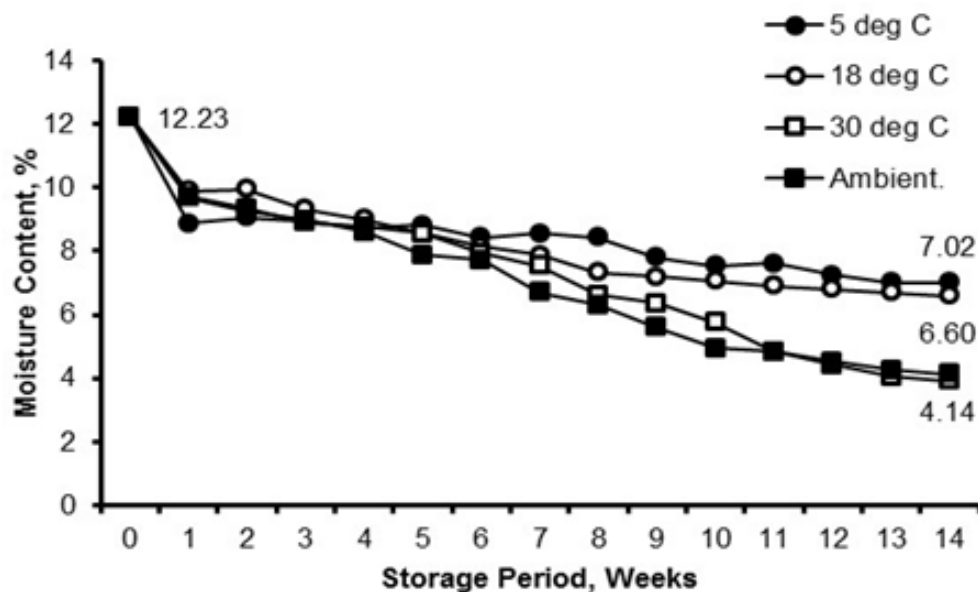


Fig. 1: Variation in the moisture content of Rajmalai with storage period at different storage temperature conditions

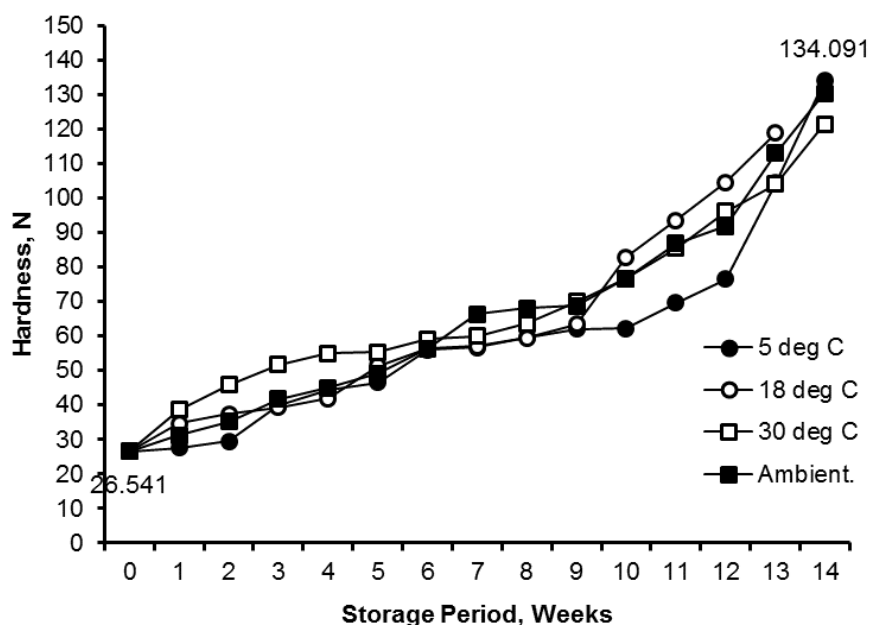


Fig. 2: Variation in the hardness of Rajmalai with storage period at different storage temperature conditions

CONCLUSIONS

Moisture content of a product has direct bearing on its textural characteristics. The variation profile of the moisture content over the storage period is an important factor for determining consumer acceptance of the product based upon texture. The common market practice of storage of Indian dairy products under ambient temperature conditions

affects the textural quality for long shelf life products but for short shelf life products, the textural variations over the storage period are insignificant.

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