

The Effect of Tragacanth Gum in Physicochemical and Textural Properties of Lighvan Cheese during Ripening

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Abstract

In this research, the effect of tragacanth gum (*Astragalus gummifer*) at 5 different concentrations of 0.25, 0.5, 0.75 and 1 g of gum per 1 kg of consumed milk on physicochemical (moisture, ash, pH, salt, fat and protein), colorimetric measurement and textural properties of Lighvan cheese during 90 days of ripening (0, 15, 30, 45, 60 and 90 days) was evaluated. The results showed that gum addition, decreased the fat content of Lighvan samples in comparison of control one. Gum increased the moisture and protein of samples in comparison with control. Fat, ash, salt and protein of Lighvan cheese increased during ripening. Textural properties (hardness, cohesiveness, gumminess, chewiness and springiness) significantly ($P < 0.05$) increased with addition of 0.25 g of gum in 1 kg of primary milk before cheese-making; however, these parameters decreased at higher gum concentrations. All textural parameters of cheese decreased during 90 days of ripening. Colorimetric observation revealed that L* and b* parameters decreased and increased during ripening, respectively. Finally, based on textural properties of Lighvan cheese, X0.25 sample was selected as the best formula in 5 produced cheeses.

Keywords: Lighvan Cheese, Physicochemical Properties, Ripening Period, Texture, Tragacanth Gum

Introduction

Lighvan cheese is one of the most popular Iranian traditional cheeses, in the north-west of Iran and is a starter-free cheese. It is traditionally produced from raw ewe's milk with 20-30% ovine milk. Texture is the most important cheese characteristics for consumer acceptability. Texture is greatly affected by factors such as milk type, processing technology, operation temperature and ripening time. The aim of this study is improving the physicochemical, textural and sensory

properties of Lighvan cheese during storage. In addition, determination of the suitable tragacanth concentration for improving Lighvan cheese properties.

Methods

Lighvan cheese was prepared from raw sheep milk according to a method previously described by Aminifar *et al.*, (2013). Tragacanth gum was added in 4 concentrations as follow:

X0.00: without gum

X0.25: cheese with 0.25 g tragacanth in 1 kg milk

X0.50: cheese with 0.50 g tragacanth in 1 kg milk

X0.75: cheese with 0.75 g tragacanth in 1 kg milk

X1.00: cheese with 1.00 g tragacanth in 1 kg milk

Chemical composition of cheeses was measured using official methods of AOAC (2003). The pH of samples was determined using pH-metre. Moisture content was determined by oven drying. Fat was measured by the Gerber extraction method. Protein content was determined by the Kjeldal method with a conversion factor of 6.38. To determine total ash, samples were heated in electric ovens (at 550 °C for 5 h). Salt was measured with Mohr method.

Color and texture profile analysis (TPA) were determined with the previous methods (Rahimi *et al.*, 2007; Aminifar *et al.*, 2013).

Results and discussions

Physicochemical properties results showed that fat content of Lighvan cheese samples reduced with gum addition (0-1 wt. %) from 10.16 ± 1.75 to $7.00-1.00$. These phenomena may be related to the water absorption of tragacanth gum. In addition, ash content of samples increased with increasing gum and during storage. Salt of samples changed between 2.08 and 2.34. In first day, X0.75 had highest moisture content and X1.00 had lowest value between other samples. pH of samples reduced from 5.33 ± 0.16 to 4.40 ± 0.11 during 90 days storage. Protein value of Lighvan cheese increased with gum addition and X0.50 had highest than others related to the protein-polysaccharide interactions. Textural properties of samples reduced with tragacanth gum addition and these parameters were reduced during storage. X0.25 sample had better textural properties between other samples. Colorimetric analysis of cheeses showed that L^* of samples reduced with gum addition and during storage. Yellowness and redness of Lighvan cheese increased with increasing gum. Based above results, X0.25 sample suggested the best formula in 5 produced cheeses.

Conclusion

In the case of processing, Lighvan cheese had unique properties trends and chemical characteristics during storage. The results showed that the tragacanth gum addition reduced the fat content; but the amount of protein and moisture increased. Textural properties of samples were significantly ($P < 0.05$) improved at 0.25 g gum addition in 1 kg milk, but at higher concentration was reduced. Textural properties of all samples were reduced during storage. Based on sensory evaluation analysis, Lighvan cheese after 60 days storage had high score than 90 days stored cheese. L^* and b^* parameters of all cheese samples reduced and increased during storage, respectively. As the tragacanth gum addition to Lighvan cheese increased the moisture of cheese texture, but reduced the fat content and cause improve sensory evaluation. In addition, nutritional properties of cheese samples enhanced with fat reduction. The above results showed that the

textural properties of Lighvan cheese improved with tragacanth gum at X0.25 concentration and suggested for cheese production.

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