

EFFECT OF GOAT LIPASE ON SENSORY PROPERTIES OF CURD

EFEITO DA LIPASE DE CABRA NAS PROPRIEDADES SENSORIAIS DA COALHADA

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ABSTRACT: Curd is one the main dairy products in Iran with high nutritional value. People tend to consume traditional products with special taste and odour and this has led industrial manufacturers to use some additives to adopt the sensory properties similar to traditional ones. Animal lipase is a good choice with three sources including calve, lamb and kid ones which create perfect taste and aroma. The aim of this study was to evaluate the effect of kid goat lipase at 5 levels (0, 50, 100, 150, 200 ppm) on some physic-chemical and sensory properties of curd in batch system. Results showed that addition of enzyme improved sensory properties and the highest score was gained in treatment containing 150 ppm of lipase.

KEYWORDS: Lipase. Kid goat. Curd.

INTRODUCTION

Dairy products are highly regarded in recent years for both consumers (in terms of health and prevention of diseases) and manufacturers (in terms of added value to milk) (BYLUND, 2001). Curd is a dairy product manufactured by boiling and drying of Dough (a by-product of butter making) (ANONYMOUS, 2015; ANONYMOUS, 2001) Curd is a nutritive product containing high amount of calcium, protein and vitamins, therefore has a special place in Iranians diet (RAMAZANI, 1985). By the development of technology, traditional products such as Curd are produced by industrial techniques but people like traditional aroma and taste, hence manufacturers attempt to produce the traditional flavor (KARABULUT, et al., 2007. QORBAN SHIROUDI, 2009).

Lipase as a lipolytic enzyme has been used in dairy products to improve sensory properties (GORJAN, et al., 2014). This enzyme is available in three animal's calves, lambs and kids and has been used in cheese ripening and production of enzyme modified cheeses. Lipase is widely used in the production of cow milk cheeses with taste similar to goat's or sheep's milk (SAXENA, et al., 1999). Therefore, this study investigated the effect of goat lipase on sensory properties of pasteurized curd produced by industrial method.

MATERIAL AND METHODS

Goat's lipase and starter culture YBC/1 was obtained from Micromilk (Italy). Curd was produced using different concentration of enzyme (0, 100, 150, 200, 500 ppm). For this purpose, at

first enzyme was dissolved in cold water and then simultaneously with the starter added to milk at 43°C and incubated for 16-18 hours to reach the acidity about 300 dornic. Boiling the mixture lead enzyme inactivation (ANONYMOUS, 2015).

pH measurement

pH measured by pH meter (HANA model, Portugal) (ANONYMOUS, 2005).

Texture analysis

A TPA texture analyser (CNS Farnell, Hertfordshire, UK) was used to measure the force required for penetration of a round-bottom (3.5 cm diameter) probe at a velocity of 60 mm/min and descended 30 mm and Trigger value 0.5 N (KEALY, et al., 2006. SHAHIDI, et al., 2012)

Sensory properties

The sensory evaluation of the curd was done by 10 trained panellists using a hedonic scale of five points for overall acceptability (SHAHIDI, et al., 2012)

Statistical Analysis

Data were statistically analyzed by Duncan test using SPSS software version 17. A p-value of less than 0.05 was considered significant.

RESULTS AND DISCUSSION

pH value

pH is one the most important parameters in dairy products and national standards emphasizes pH to be in the specified ranges. pH measurement showed all samples were at acceptable limits. As can be seen in Figure 1, pH reduced by increasing the concentrations of lipase.

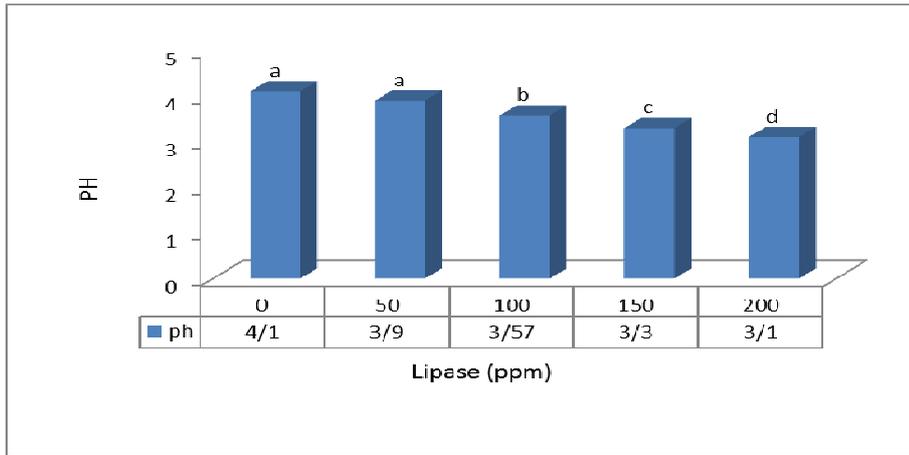


Figure1. pH of curd with different concentrations of lipase

Texture of curd

Using lipase in curd production, increased softness and increasing the enzyme concentration, led the curd texture to become softer. Curd containing 200 ppm lipase had the softest texture and the control sample was the hardest one.

Lipase affected on reducing firmness through hydrolysis of di- and triglycerides to monoglycerides, which due to the emulsifying properties softened the texture (Figure 2).

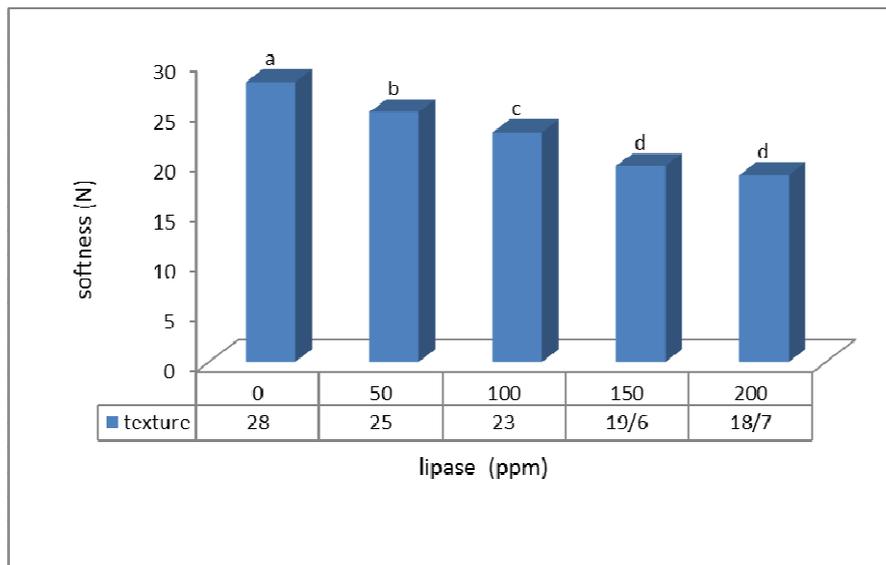


Figure 2. The softness of curd with different concentrations of lipase

Sensory properties

Effect of lipase on the sensory properties is shown in Table 1 which indicates that using lipase increases the acceptance of curd by consumer. The texture score of the samples significantly increased at lipase concentrations of 100 and 150 ppm. This is fully matched with the results obtained from the texture analyser test. The color score increased by increasing the concentration of lipase up to 150 ppm, but at 200 ppm, decreased significantly ($p < 0.05$). This has been because of bleaching effect

of lipase on the curd which is not favorable for consumers. Addition of enzyme increased the score of taste and aroma in comparison to the control sample. The highest score obtained at 150 and 200 ppm lipase without significant difference ($P < 0.05$). Lipase improves the taste and color though hydrolysis of fat and production of aroma and flavor (ASTON; CREAMER 1986) Researches suggested that lipase enzymes can act as flavor enhancers in dairy product (ASTON; CREAMER 1986), (DYTE 2006). The result of total acceptance test showed

sample containing 150 ppm lipase gained the maximum score. Application of lipase in the formulation of curd improved sensory properties and thus developed overall acceptance of the final product. Today, people tend to consumption of

traditional products and believe that it is difficult for the industries to produce the product with traditional taste and aroma. Therefore industrial manufacturers should try to products with the same flavor, color and characteristics of traditional ones.

Table 1. Effect of lipase on sensory properties of curd

Lipase (ppm)	taste	Aroma	Color	texture	Overall acceptance
control	3.5 ^d	3.5 ^d	3.3 ^e	3.5 ^e	3.3 ^e
50	3.8 ^c	3.7 ^c	3.8 ^d	3.8 ^d	3.6 ^d
100	4.2 ^b	4 ^b	4.2 ^b	4 ^c	4 ^c
150	4.4 ^a	4.5 ^a	4.4 ^a	4.5 ^a	4.5 ^a
200	4.5 ^a	4.6 ^a	4 ^c	4.3 ^b	4.2 ^b

CONCLUSIONS

The results showed that pasteurized liquid curd which produced with lipase had higher quality, although produced with industrial methods but had features similar to traditional curd.

Overall evaluation of the tests measured (texture analysis, pH and sensory properties) suggested that curd with 150 ppm lipase had the best quality and maximum acceptance.

RESUMO: a coalhada é um dos principais produtos lácteos no Irã com alto valor nutricional. As pessoas tendem a consumir produtos tradicionais com gosto e odor especiais e isso levou os fabricantes industriais a usar alguns aditivos para adotar as propriedades sensoriais semelhantes às tradicionais. A lipase animal é uma boa escolha com três fontes, incluindo bezerro, cordeiro e cabrito que criam sabor e aroma perfeitos. O objetivo deste estudo foi avaliar o efeito da lipase de cabrito em 5 níveis (0, 50, 100, 150, 200 ppm) em algumas propriedades físico-químicas e sensoriais da coalhada no sistema de lote. Os resultados mostraram que a adição de propriedades sensoriais melhoradas enzimáticas e a maior pontuação foi obtida no tratamento contendo 150 ppm de lipase.

PALAVRAS-CHAVE: Lipase. Cabrito. Coalhada.

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