A TURKISH CHEESE-BASED DESSERT

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Abstract


Mustafakemalpasa (cheese) dessert is a traditional dessert, prepared with sugar syrup, mainly consumed in western parts of Turkey. The dessert is made from fresh unsalted cheese (40-70%), semolina flour (40-50%), baking powder and eggs. The shelf life of the dessert packed in polyethylene bags varies according to being single- or double-baked, the process applied to decrease moisture content, and thus water activity, from 3 days up to 6 months at room temperature.

Key words: Mustafakemalpasa, traditional, dessert, cheese

Introduction

Tradition is an important issue when considering food that can be described at different levels within social groups as small as a family or as a function of time scale. Traditional foods can be related to special events such as weddings, religious days for every country, and are often concerned with local foods and artisan foods referring to specific ingredients, location of the production and know-how. It could be the food made by grandmothers or by the native people of a country (ethnic food) (Cayot, 2007).

Turkish cuisine is considered as one of the three richest and oldest cooking traditions of the world together with French and Chinese cooking. It has a rich and variegated tradition of soups, olive oil dishes, rice pilafs, stuffed vegetables, pastries, puddings and syrupy desserts underlying the popular dishes of kebab and baklava. The diversity of Turkish cuisine reflects the cultures of the populations living in regions highly dissimilar in geography and climate. This has led to an abundance of ingredients and cooking styles.

An old Turkish saying advises one to “eat sweet, speak in a sweet way”. The main characteristic of desserts is the high energy and pleasure they give with regard to the ingredients. Sweets and desserts have always been important and distinctive elements of Turkish cuisine. They fulfill an important social and ritual function. Some, such as baklava, are preferred during weddings and religious days, whereas dairy-based desserts can be consumed either with each meal or any time of the day.

The aspects of taste and health of foods, particularly desserts, are to be considered in an equal line, and should be improved and clarified for the consumers (Cayot, 2007). People are being more concerned about dessert consumption along with their consciousness on health and physical appearance, due to rapid change in popular life style and eating habits.

A broad range of ready-to-eat dairy-based des-
serts of varying textures, flavors and appearances with the use of different thickening and gelling agents, equipment and process conditions is available (Rapaille and Vanhemelrijk, 1992; Mleko, 1997; De Wijl et al., 2003; Tarrega et al., 2004).

There is a wide range of desserts in Turkish cuisine either served with or after main meal, being very light to the rich in body and flavour. Mustafakemalpasa (cheese) dessert is one of the outstanding traditional dairy-based desserts, prepared with sugar syrup, which is consumed particularly in western parts of Turkey. The name of the dessert has been attributed to the town owning the same name, Mustafakemalpasa (Bursa, Turkey), where the sweet was originated. The baking process to reduce moisture content in the sweet to less than 10% is a descriptive step of manufacturing. The sweet can be single- (280-300°C) or double-baked (280-300°C followed by drying at 130-150°C). Double-baked sweets have a longer shelf life of up to 6 months; however, the consumer demand is for single-baked products for desired palatability and flavour. The main problem in single-baked products is the higher moisture content limiting the shelf life to 3 days, due to higher water activity that encourage yeast and mould growth. Considering the increase in the interest of prolonged-shelf life of products, significant pressure is mounting to modify product formulations or preserving methods (Anonymous, 2002).

As defined in TS 12102, Mustafakemalpasa dessert is “a half product, known also as cheese dessert, fully baked until desired yellowish-brown color in baking pans, without boiling with syrup”. The dessert dough has to be prepared with high-quality wheat Triticum aestivum flour, fresh unsalted cheese, semolina flour, eggs, drinking-quality water, baking powder, and other additives, if necessary, using traditional production methods.

The dessert is served generally with kaymak and crushed nuts following medium-flame boiling in sugar syrup and cooling to room temperature.

Mustafakemalpasa dessert is becoming increasingly popular in Turkey because of its convenience, nutritional quality, and palatability. The present study is designed to inform about physical and chemical quality criteria and production methods of Mustafakemalpasa cheese-based dessert.

**Production of Mustafakemalpasa Cheese Dessert**

**Ingredients Used in Production of Mustafakemalpasa Cheese Dessert**

**Flour**

For centuries baked cereal products have been present in our diets. Bread and wheat flour-based products are consumed throughout the world in different forms, being one of the major foodstuffs (Cayot, 2007). Wheat, currently the most important cereal crop in the world, is unique because of the special properties of its flour that forms the cohesive dough used in baking. The gluten network of dough is formed by the aggregation of different types and quantities of protein, especially glutenins and gliadins, which together form different doughs of distinctive viscoelastic properties (MacRitchie, 1984; MacRitchie, 1992; Payne, 1987; Shewry et al., 2001). Gluten formation is the key factor in determining baking quality of the products (Belton, 1999).

The protein mixture of wheat flour is very complex and contains many molecular species with different sizes, structures, and conformations (Pence et al., 1964; Stone and Hamdy, 1964; Kan and Sade, 2002; Autio, 2006). Proteins in flour can be mainly grouped into three main categories: glutenin, gliadin and albumin/globulin. Gliadin has a good extensibility, but lacks elasticity. Glutenin has a better elasticity but a low extensibility (Cheftel et al., 1985). Blending both of them in the dough brings a specific elasticity and extensibility, which can then be used in the processing of different flour products. When flour is mixed with water, glutenin swells and incorporates gliadin, and some other water-soluble proteins. Along with mixing processes, the network structure of gluten is gradually develops (Huebner, 1977; Bietz and Wall, 1980). Gluten functionality in flours is affected by, particularly, the cell wall derived polysaccharides. The flour could be conditioned sometimes with ascorbic acid.
to increase volume and improve texture of bakery product (Nakamura and Kurata, 1997; Every et al., 1999).

The flour of *Triticum aestivum* wheat variety is the type of flour used in Mustafakemalpasa dessert, generally attributed as “bread” flour. This is unbleached white flour made from high-protein wheat with more gluten strength as defined in TS 12102 (Anonymous, 1996). The quality of flour used greatly influences the quality of the final product, leading to inconsistent quality and limited opportunities for standard product manufacture.

**Semolina Flour**

Semolina flour is the milled endosperm of hard durum wheat (*Triticum durum*) and is pale yellow in color. It is highly glutinous wheat with a nutty-flavor, is available coarsely ground or ground twice for a fine texture, and most commonly used in the manufacturing of pasta and golden-colored bakery products. Semolina gives the dessert dough thickness, increases degree of density, and enhances color of the dough. *Triticum durum* is the best raw material for processing into pasta products due to its unique color and flavor. Pasta made from durum wheat varieties results in a bright yellow color and it retains, after cooking, firmness and is resistant to surface disintegration and stickiness (D’Egidio et al., 1990; Feillet and Dexter, 1998).

**Fresh Semi-Hard Cheese**

Cheese is an essential dairy product in human nutrition for centuries that can be consumed either fresh or matured. It is manufactured by draining the whey after coagulation of casein in milk by acid produced by selected microorganisms either with coagulating enzymes or by adding food-grade acidulants (Naber, 1979; Anonymous, 1995; Özcan, 2000; Hayaloglu et al., 2002).

The cheese used in Mustafakemalpasa dessert is a fresh unripened semi-hard cheese that is manufactured, from cow’s milk, daily in the plant in a fashion similar to unripened Turkish white cheese or quark. The cheese is made from whole milk to enable the fat to contribute to the flavour and smoothness of the cheese.

The first step in the creation of the fresh cheese used in Mustafakemalpasa dessert is pasteurization of the milk. Since fresh cheeses are consumed without aging, to ensure the safety of the cheese the milk used must be pasteurized. Starter culture is added to cheese milk to generate lactic acid from lactose that improves gelation properties with rennet. Whey is removed breaking the curd by cutting. The cheese is used as an ingredient to add sensory appeal, flavour, characteristic texture, and nutritional value to the dessert.

**Eggs**

Eggs are valued for their better nutritional quality and other functional properties compared to many food commodities (Naber, 1979; Van Elswyk et al., 1992). They, particularly, hen’s eggs, constitutes a well-known source of high quality proteins, phospholipids, vitamins and minerals (Powrie and Nakai, 1985). Eggs are used in bakery products to i) improve color, ii) coagulate, iii) aerate, iv) fat enrichment, v) emulsify, vi) bind, vii) leaven and viii) add texture, enabling bakers to eliminate the use of additives or additional ingredients. Color is enhanced because of the carotenoids present in eggs. They give the crusts of bakery foods a golden brown color; provide a soft texture due to ingredients’ emulsification properties; coat liquid and fats to give bakery foods a smooth, creamy texture (Anton et al., 2001; Akpinar-Bayizit, et al., 2004). One key functional property of egg proteins that determines the rheological and textural characteristics of foods such as heat-set creams, omelettes, cakes, is their ability to coagulate and form a gel network exhibiting a solid-like behavior (Paraskevopoulou and Kiosseoglou, 1997; Paraskevopoulos et al., 2000; Kalkani et al., 2007). Egg whites provide foaming properties. The excellent foaming capacity of the egg white protein and the stability of the resulting foams, even when subjected to heating, are applied in food industry particularly in the preparation of bakery products. Through whipping eggs incorporate air and foam, which gives volume
and structure to the product (Van der Plancken et al., 2007).

**Raising agent**

Raising agents liberate gases, thereby increasing the volume of the bakery dough. Ammonium bicarbonate and sodium bicarbonate are the preferred raising agents used for Mustafakemalpasa cheese based dessert.

**Mustafakemalpasa Cheese Dessert Manufacturing Process**

The production of Mustafakemalpasa dessert, with slight differences varying from plant to plant, had started firstly at home-scale 1960s, and industrialized nationwide (Figure 1). The origin of the process is attributed to another traditional cheese-based dessert named “hosmerim”, mainly of Balikesir region, substituting sugar with flour, and obtaining a higher consistence.

According to the Geographical Registration Certificate, the distinctive feature of Mustafakemalpasa cheese dessert is the usage of unsalted cheese made from cows’ milk, gathered from Mustafakemalpasa town boundaries, where the name is attributed (Anonymous, 2002).

**Cheese Manufacture**

For cheese production, milk is pasteurized at 72-74°C for 15-20 seconds and cooled. The milk cooled to 35°C is transferred to cheese vats and then inoculated with a lactic starter culture of *Lactococcus lactis* ssp. *lactis* and *Lactococcus lactis* ssp. *cremoris* at a level of 1-2 g/100 g. This is followed by the addition of 40% (w/v) CaC$_2$ solution (i.e. 0.02 % v/v) to

![Fig.1. The manufacturing process of Mustafakemalpasa cheese dessert](image-url)
each batch. The inoculated milk is held for 30 minutes, and liquid rennet is added at a level (10 g/100 kg cheese milk) sufficient to coagulate the milk in 90 min. The milk starts to form a gel after 30-45 min, and the gel is sufficiently firm after 75-90 min. The coagulum is cut into cubes (1-2 cm³) and the curds are allowed to rest in the whey for 5-10 min. The curds are then transferred to stainless steel moulds, which vary in sizes and are lined with cheesecloth. The surface of the cheese is covered with cheesecloth and pressure is applied to compact the curd at room temperature (21°C) for 3-6 hours or until whey is completely drained (Yetismeyen, 1995; Hayaloglu et al., 2002).

Preparation of dough

Dessert consists of 57 % unsalted cheese, 30 % semolina flour, 10 % wheat flour, 2 % eggs and 1 % raising agents (Anonymous, 1996).

The ingredients are added in a mixer; dough is kneaded and shaped with the help of a spherical encrusting machine. Dough development requires mixing of flour and other ingredients with water by an input of mechanical energy (Campos et al., 1997). This energy input contributes to a uniform distribution of all ingredients and to the hydration of the flour particles, leading to the formation of a continuous gluten structure (Peighambardoust et al., 2006).

Shaped dough is placed on a baking tray and baked in the preheated oven. The oven temperature is set at 280-300°C for 15 min till the outer skin color is bright yellow. The baked pastry is described as “single-baked”, and has a shelf life of 3 days. To prolong the shelf life, an option of a subsidiary baking at 100-150°C for 5 min is applied, and the baked dessert is called as “double-baked” with a shelf life up to six months (Korukluoglu et al., 2001; Ozener, 2006). The cooled baked dessert is packed in polyethylene bags and should be kept under dry conditions at room temperature (25±1°C) until consumption.

Preparation of Sugar Syrup

Consumption of foods and beverages results in simultaneous perceptions of aroma and taste and trigeminal sensations coupled to tactile sensations induced by the texture of the food matrix. All these perceptions lead to an overall impression of flavour. Sweetness and aroma perceptions directly depend on the sweetening agents and the aroma concentrations in the food, however, interactions between sweetness and aroma perceptions do occur when food is consumed (Lethuaut et al., 2005).

Mustafakemalpasa cheese-based dessert is consumed after boiling in sugar syrup until desired softness. The sugar syrup used is prepared as: i) dissolve sugar in water (3:5, w/v), ii) allow boiling for 2-3 min on a medium flame, and iii) add 0.01 % lemon juice.

Characteristic Properties of Mustafakemalpasa Cheese Dessert

Physical Properties

Mustafakemalpasa dessert should have a bright and yellowish-brown color, convex shape, and an intensive fresh cheese flavour. It should not be broken, burned, or pale in color, and should have no undesired contaminants. Color is a key quality characteristic because of the visual impact at the point of sale. The diameter of desserts should be uniform, ranging from 0.59 to 0.98 inches (Anonymous, 1996).

Chemical Properties

Mustafakemalpasa dessert is retailed as a dry product. The maximum allowed levels for some chemical properties of the dessert is given in Table 1 (Anonymous, 1996; Anonymous, 2002).

Table 1
Some chemical properties of Mustafakemalpasa cheese dessert

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture, %</td>
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<tr>
<td>Total ash, %</td>
<td>3</td>
</tr>
<tr>
<td>Protein, %</td>
<td>3</td>
</tr>
<tr>
<td>Total lipid, %</td>
<td>1.95</td>
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<tr>
<td>Carbohydrate, %</td>
<td>85.25</td>
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<tr>
<td>Ca, mg</td>
<td>80.2</td>
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<tr>
<td>Iron, mg</td>
<td>0.41</td>
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</tbody>
</table>
Conclusion and Future Development

The main problem observed during storage and exportation possibility of Mustafakemalpasa cheese-based dessert is the microbiological deterioration due to the increase in water activity. The manufacturing process requires a concise understanding of a number of factors, including the knowledge of possible hazards, their occurrence and management in final product, control of water activity during prescribed shelf life, and possible applicability of edible coatings which display effective barrier properties.

Edible films are used primarily to extend the shelf life and preserve the quality of foods by preventing changes in aroma, taste, texture, appearance, or handling characteristics. They accomplish prolonging shelf life by inhibiting the migration of moisture, oxygen, carbon dioxide, flavors and lipids (Gennaidos et al., 1993; Debeaufort et al., 1998; Akpinar and Ozcan, 1999a; Akpinar and Ozcan, 1999b).

Considering the tradition and consumer demands, the future research and studies should focus on using edible films of appropriate properties to improve the quality and shelf life of the dessert.

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