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A Survey of Some Quality Characteristics of Frozen-Raw, Precooked, and Dried Manti Samples, A Traditional Food, Offered For Sale In Turkey

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Abstract

The main differences that distinguish stuffed pasta (mantı), one of the traditional foods produced in Turkey, from pasta are using thick dough technique, having white color, and including mortar. Introduction, standardization, and commercialization of mantı products will contribute to the local, national, and international economy. For this purpose, the physicochemical and histological properties, microbiological content of different trademarks of mantı samples were determined in Turkey production. The results indicated that no difference was between the physicochemical and microbiological parameters of mantı samples except one sample. Furthermore, it was determined that 20 mantı samples having soy protein. Because of the high cost of samples containing minced beef, it is added soy protein to cheat instead of minced meat. It was concluded that production costs should be reduced in order to prevent these adulterations from increasing and this requires short-term operations including low-cost heat treatments at low temperatures such as microwave radiation.

Keywords: Manti, Traditional Foods, Mantı Forms, Quality Parameters, Microbial Quality

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Introduction

Traditional foods are described that "a special product frequently consumed or associated with specific celebrations and/or seasons, normally forwared by one generation to another, made accurately in a specific way according to the culinary heritage, with little or no processing or distinguished,manipulation, and known because of its eating characteristics and associated with local city, area or country" (Cayot, 2007; Guerrero et al., 2009; Pieniak et al., 2009; Guerrero et al., 2010; Almli et al., 2011; Gökmen et al., 2019). It is very difficult to determine the quality criteria of traditional foods. Therefore, it is necessary to standardize the unique characteristics of traditional foods (Trichopoulou et al., 2007; Imm et al., 2011).

It is has emerged Geographical Indication with this proposal. One of these geographical signs is mantı (stuffed pasta). Mantı is included composed of two parts, dough and meatball based filling or soya protein. Manti production stages were given below. (1)mantı mortar preparation with meatball and variety spices for fillings, (2) preparation of dough, (3) sheeting and cutting as about 0.5 cm in diameter of this dough, (4) fillings with manti mortar on the shaped dough and finally enclosing, (5) freezing/drying or cooking (Heldman and Lund, 2007; Sitti, 2011).

After mantı samples are produced, these samples are stored with 3 different methods.

(1) Mantı samples are directly stored in cold storages at -18 ºC.
(2) Pre-pasteurized samples are stored at refrigerator temperature (cold storage at 4 °C)
(3) It is dried until below 12% moisture of samples. These samples are stored at room temperature.

Stuffed pasta (manti) mortar is the most important part for microbial load of stuffed pasta. Therefore, heat treatment should be applied in industrial production. Drying is one of the food preservation methods to decrease chemical, enzymatic and microbiological load of the foods (Varlik et al., 2004). Although mantı has often consumed, researches related to quality criteria of manti is limited (Anonymous, 2008).

For this purposes, the physicochemical, histological properties, and microbiological content of differenttrademarks of mantı products were carried out. Moreover, it was also the aim of this study to determine the relationships among the quality parameters of mantı samples having various forms, belonging to 240 different producers, producing in 24 various cities, Turkey investigated.

Material and Method

Material

Frozen, precooked, and dried manti samples were purchased from local markets, belonging to 240 different producers, in 24 different city (Afyonkarahisar, Ankara, Antalya, Bursa, Çanakkale, Çorum, Denizli, Elazığ, Erzincan, Erzurum, Eskişehir, Gaziantep, Is parta, İstanbul, İzmir, Kastamonu, Kayseri, Kocaeli, Konya, Mersin, Sivas, Şanlıurfa, Tekirdağ, Van), Turkey. Manti samples were stored in sterile bags and maintained at refrigerator temperature until laboratory analyses. Mantı samples and their quantities were given below (Table 1).

Table 1. Mantı forms and theirs total quantity

Mantı Forms	**Total Quantity (1 kg $^{-1}$)**
Frozen mantı	240 unit
Precooked mantı	240 unit
Dried manti	240 unit

Physicochemical analyzes

Moisture determination

It was determined as gravimetrically (Sitti, 2011).

Determination of foreign matter

It was visually determined (Sitti, 2011).

Microbiological analyses

Before microbiological analyses, manti samples were homogenized in isotonic solution with a ratio of 1:9. Then, these homogenates were tested taking suitable chromogenic solid medium for microorganisms (AOAC, 2012a-c) (Table 2).

Table 2. Microbiological analyzes performed on mantı samples

Microorganism Name	**Medium**	**Incubation Conditions**	**Formed Colonies**
C.perfiringens	Bacterial media (Sulfite-polymyxin-sulfadiazine Agar	37 ºC	Black Colonies
B. cereus	Compact Dry X-BC chromogenic agar	30 ºC	Blue Colonies
L. monocytogenes	Compact Dry LS chromogenic agar	37 ºC	Light Blue/Blue
S. aureus	Compact Dry X-SA chromogenic agar	35 ºC	Light Blue/ Blue
E.coli	Compact Dry EC chromogenic agar	35 ºC	Blue Colonies
Salmonella typhimurium	Compact Dry SL chromogenic agar	41 ºC	Reddish-Purple or Red Colonies

Histological analyses

Soy protein detection

GMO3-GMO4 primer pairs were used to determine soy gene. With 35S-3-35S-6 primer pairs for the detection of the 35S promoter region; For the NOS terminator region, tNOS2F and tNOS2R primers were studied Polymerase Chain Reaction (PCR). 35S3 and 35S6 primers (Aslan, 2012) were used for the detection of the 35S promoter (CaMV) region, and tNOS2F and tNOS2R (Cardarelli et al., 2014) for detection of NOS terminator region.

Results and Discussion

It was taken to the total 720 samples from 24 different cities from frozen-raw, precooked and dried manti samples making Production in Turkey, it was made psychochemical, microbiological and histological analyses in these samples, and obtained results were given in below (Table 3).

Table 3. Negative results in mantı samples *

Samples	**Soy gene detection**	***Salmonella spp.***
Frozen-raw mantı samples	-	1
Precooked mantı samples	5	-
Dried mantı samples	5	-
Total	10	-
Overall total	240	240

** No negative results were found in the other analysis parameters.*

Foreign matter from physical analyses was detected, and it was found in one manti sample. The main reasons for this result are which is considered that the product is caused by disruption of control in production, carelessness in personnel and errors in the metal detector. Another quality parameter is the moisture content. The moisture values of the dried mantı and pre-cooked mantı should be 12 and 20%, respectively. In frozen mantı, there is no limitation (Sitti, 2011). It was determined that the moisture values of the analyzed mantı samples were appropriate with standard (Table 3). In addition that in this study, mantı samples was found to be safe in terms of food pathogens but Salmonella was found in only 1 frozen-raw mantı. In this context, in a study conducted in Kayseri province, it was reported that 147 unit mantı samples have low microbial quality (Ozturk et al., 2009). In another study conducted in this context, it was found that mantı samples having 15 different trademarks had different microbial loads (Uzunlu, 2011). In this study, it was found that pathogenic microorganism was in only one of the mantı samples (Table 3). Mantı samples having low microbiological quality were in frozen form.

The reasons for this negativity are thought that it is caused by breakage in the cold chain, recontamination, having lower microbial quality of the minced meat and insufficient-heat treatment. Therefore, it is seen that pre-pasteurization is also required in frozen mantı. It can be applied short-term operations at low temperatures such as microwave radiation to avoid these negative (Louvier et al., 2000; Aslan, 2012; Kayişoğlu and Türksoy, 2023). In the another study conducted in this context, it was raported that the mantı samples were dried by infrared, UV-C and vacuum drying methods and drying times of the mantı samples were shortened and their microbial qualities were increased. Furthermore, in another study, the shelf life of mantı samples was prolonged through they were stored in a modified atmosphere. Because of the high cost of mantı samples containing minced beef, is added soy

protein to cheat instead of minced meat (Louvier et al., 2000; Van Den Bergen, 2001). In our study, it was detected in only < 1% of the samples. In order to prevent these adulterations from increasing, production costs should be reduced.

Although mantı is the most famous in Turkey, the studies regarding its quality features and microbial safety are very limited. Thus, this study made to determine the quality characteristics of the manti offered for sale. To ensure microbial safety, to extend shelf life, to simplify storage conditions, to reduce product losses, and to the commercialization of the mantı production, thermal or non-thermal processes in mantı are required.

In Conclusion

In this study, it was determined that microbial safety was provided in precooked and dry mantı samples and adulterations in products were less. Production costs need to be reduced to avoid adulteration. The way to do this is to extend the shelf life of the mantı and maintain its quality properties. The way to achieve this is by applying heat treatment to the mantı. However, nowadays it is necessary to improve and standardize in the long term heat treatment at high temperatures. In order to achieve this, studies on infrared, microwave and UV radiation applications need to be increased. Thus, the nutrient losses in the mantı will be reduced and it will be possible to produce an economic product with higher quality and longer shelf life.

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