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The Special Fermented Turkish Drink: Boza

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Abstract

Fermented foods are a significant part of the ready to eat products all over the world in recent years. A traditional cereal based fermented drink called as Boza is made from various raw materials including millet, maize, rice, and wheat and several techniques in different countries. The quality parameters of boza can change according to the type of raw materials and fermentation techniques used in production. This very special drink has a characteristic sweet-sour taste, light yellow colour and acidic-alcoholic odor. It has an important place because of its taste, flavour and nutritive value. Boza is made and consumed in Turkey especially in winter season because of its high energy content and nutritional value. It becomes available in the first days of autumn and continues until the early cold days of spring. Turkish people are familiar with the shouting of the boza sellers which starts their rounds in the streets following the evening prayers during cold and snowy winter days. The purpose of this study is to give a small review about the product characteristics, history, production (both home-made and commercial) and service, storage and health benefits of Boza.

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INTRODUCTION

The origin of the word Boza comes from “Buze” which means “millet” in Persian language. It is also named as a Boza in Italian, Spanish, Portuguese, Bulgarian, Hungarian and Albanian languages. It is referred as “Bozan” in Romanian, “Bozas” in Greek, “Buza” in Russian, Polish and Czech, “Bouza” in French, and “Busa” in German (Birer, 1983). Although there are big differences between Boza and today's beers, it is admitted as the oldest or the simplest type of beer. Boza has a history of 8000-9000 years. Boza was described as “buhoun” in Kaşgarlı Mahmut's Divan-ü Lügat-it Türk piece in 1074 and it was stated that Boza was produced from millet (Topal and Yazıcıoğlu, 1985). The Central Asian Turks have been consuming the boza from ancient times. The Turks have taught boza to the people of that region in other geographic regions where they emigrated from Central Asia and helped to expand the geographical area of this product. Boza, a traditional fermented Turkish drink, has spread all the way to the Balkans, the Crimea, the Caucasus, Central Asia and Egypt (Tangüler, 2014). Although the first producers of boza are Turks, it has been ignored in the country for long years and remained as a food sold and consumed in winter between the streets only. This situation created an opportunity for Eastern Europe and the Balkans to see boza as their traditional foods.

Boza is produced by fermenting various cereals such as corn, barley, rice, oats, wheat & millet by using lactic acid bacteria and yeast (Uysal ett al., 2009). Fermented products are produced by converting raw materials to more durable and robust food with the contribution of different microorganisms at a suitable temperature (Yücel and Köse, 2002). The nutritional value, functional and digestible properties of fermented foods are superior as compared to the non-fermented products (Hancıoğlu and Karapınar, 1998). In Boza production, different raw materials and fermentation processes take place at different rates and therefore the quality of the product may change (Genc, Zorba and Ova, 2002). The fermentation process at the production step contributes to the development of both functional and digestible characteristics of boza. Cereals used in the boza production are very rich in phenolic acids and the phenolic acids have many protective features especially against cancer and heart diseases (Salovaara, 2004; Mattila, Pihlava and Hellstrom, 2005). Apart from carbohydrates, grains contain nutrients that help the development of microorganisms such as minerals, vitamins and sterols (Salovaara, 2004). Flavor and aroma components formed at fermentation step develops the nutritive and sensory properties of Boza (Hancıoğlu and Karapınar, 1998). In overall, boza is an important food product for human nutrition because of the lactic acid, protein, carbohydrates, fat, vitamins and fiber content (Arici and Daglioglu, 2002). Table 1 shows some nutrients found in boza (Arici and Daglioglu, 2002). In addition to having high nutrient and energy content, Boza is consumed due to its relaxing effect on the digestive system (Güven and Benlikaya, 2005). Moreover, it is an ideal beverage as a vitamin source for those who spend a lot of energy during the day. It is also suggested for pregnant women or women who recently gave a birth, because of its lactogenic properties. Two glasses of boza can meet the daily vitamin B need of an adult. The substances of boza have positive effects on the nervous system. Whole grains used in boza production are good sources for phenolic substances. Phenolics in foods have an important place in human nutrition because of their beneficial effects on health (Izli, Izli, Taskin and Yildiz, 2018; Yildiz, 2019; Yildiz and Izli, 2019a; Yildiz and Izli, 2019b). Phenolic acids contribute to the antioxidant potential of cereals (Naczk and Shahidi, 2006). Foods with high antioxidant activity may play a significant role in the prevention of many diseases and are beneficial for health because they inhibit oxygen derivatives and free radicals that cause many degenerative diseases (Li, Friel and Beta, 2010).

Table 1: The Nutrients Found in Boza

Nutritient	Average
Invert sugar	6.2 %
Total sugar	15.1 %
Dextrin	1.0 %
Protein	1.23 %
Ash	0.15 %
Fiber	0.02 %
Fat	0.25 %
Acidity	between 0.3 and 0.5 %
Volatile acidity	between 0.04 and 0.13 %
Alcohol	less than 0.6 %
B1 Vitamin	0.19 – 0.25 mg/100g DM
B2 Vitamin	0.18 – 0.21 mg/100g DM
B6 Vitamin	0.32 – 0.36 mg/100g DM

Boza, a valuable beverage with several health benefits mentioned previously, is made both in homes and commercially. In following section, boza production in different methods will be explained in details.

METHODOLOGY

In this section, the production, serving, storage and shelf life of Boza will be covered. In the production part, both home-made and commercial boza will be introduced and compared. In addition, the differences in the shelf-life of Boza will be explained by taking account of production type, storage conditions, and ingredients.

Production and Service of Boza

Boza is made both in homes and commercially. But, there is an increasing demand in the production of boza in a large scale. Even though there might be some differences for the techniques used in the production, cereals are the main component every time (Akpınar-Bayizit, Yılmaz-Ersan and Özcan, 2010). Boza is produced from different types of cereals including millet, maize & wheat. Boza can be made by the mixture of any of these cereals as well. However, the best quality and taste are achieved when Boza is produced from milet flour (Arici and Daglioglu, 2002; Yegin and Fernandez Lahore, 2012).

Production of Boza Commercially

The commercial Boza production is given in Figure 1. A traditional boza production mainly has six main steps (Yegin and Fernandez-Lahore, 2012).

Preparation of boza consists up:

1) Broken a selected cereal passed through sieves and cleaned from foreign materials, then milled into semolina size pieces,

2) Boiling around 2 hours in an open and/or steam jacketed boiler following the addition of drinkable water. At the time of boiling, stirring and hot water addition are crucial steps in order to prevent aggregation and obtain a homogenous mash/pulp (Arici & Daglioglu, 2002),

3) After that, the boiled material is transferred into suitable vessels to cool the pulp down to 20°C. In most cases, cooling time changes 12 hours to a day. Dilution of mash is achieved by water with stirring continuously until the reach of desired temperature. When dilution step is over, product goes to further sieving process in order to eliminate foreign materials (Yegin & Fernández-Lahore, 2012),

4) After sieving of boza, the addition of sugar (15–20 % sucrose) is needed since it is the essential substrate for lactic acid bacteria and yeast,

5) After including sugar, boza is left for fermentation at around 25-30 ºC for a day by adding previously fermented boza, sourdough and/or yoghurt as a starter culture. During the fermentation process, digestive features are formed,

6) When fermentation ends, boza is cooled down to 4°C and put in containers. The shelf life is limited for boza and it needs to be consumed within the next five days.

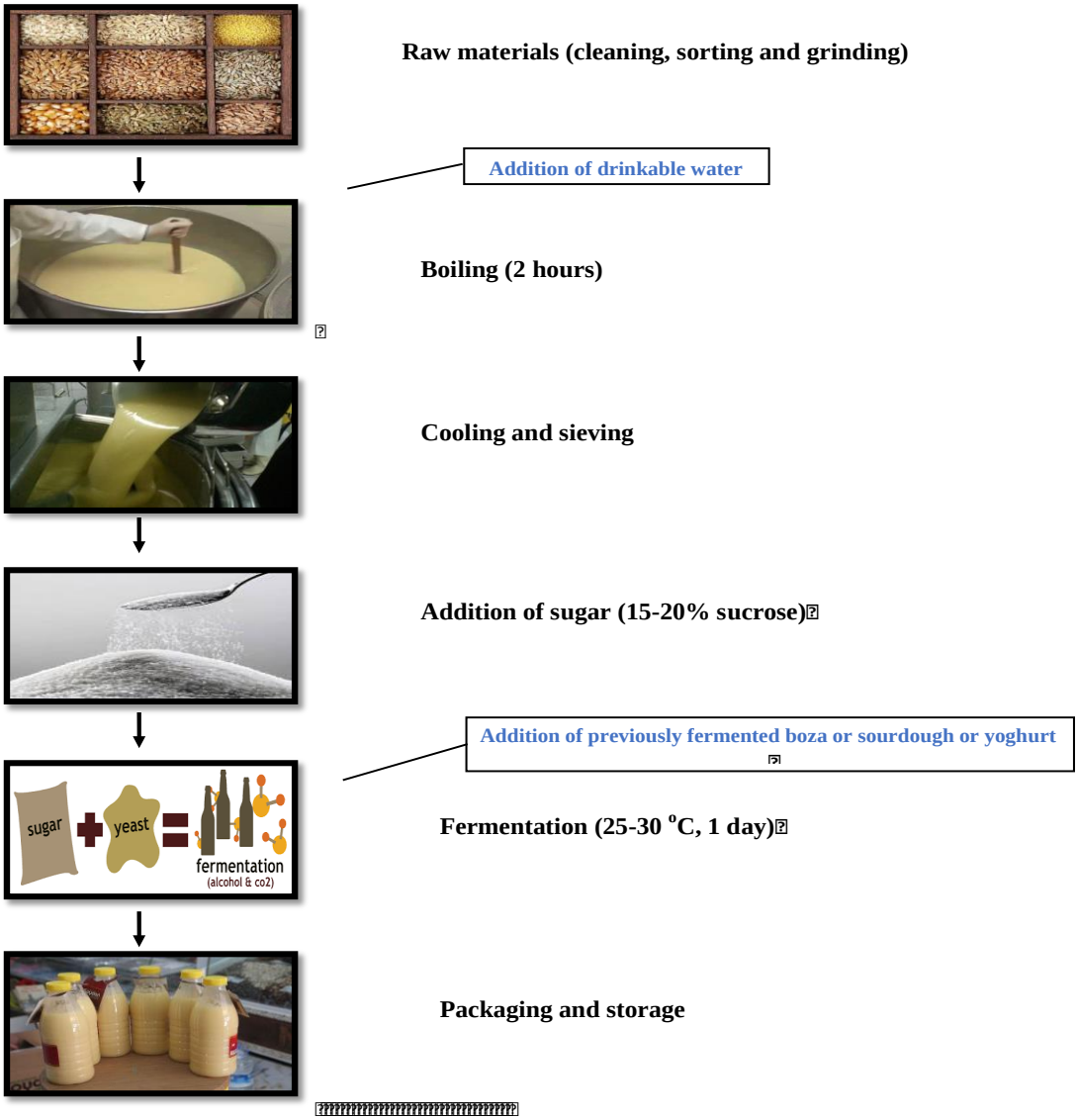

Figure 1: Commercial Boza Production (Yegin and Fernández-Lahore, 2012)

Production of Home-made Boza

The names and quantities of ingredients in recipe and production of boza at homes are given in Table 2 and Figure 2, respectively. A home-made boza production mainly has six main steps.

Preparation of boza includes:

1. Well-washed bulgur is placed into a large and deep pot and mixed with water,

2. Boiling until mushy,

3. Straining the mixture by a fine strainer and pressing with a spatula,

4. Then, waiting for around an hour to cool down the mixture,

5. Mixing well a sugar (1 tablespoon) and yeast (1 teaspoon) with a cup of hot water in a glass and adding into the pot. After covering pot with the lid, put it in a cool place for around 15-20 hours by stirring every once in a while (fermentation step),

6. Adding rest of the sugar and water (for the right consistency) after fermentation and stirring well.

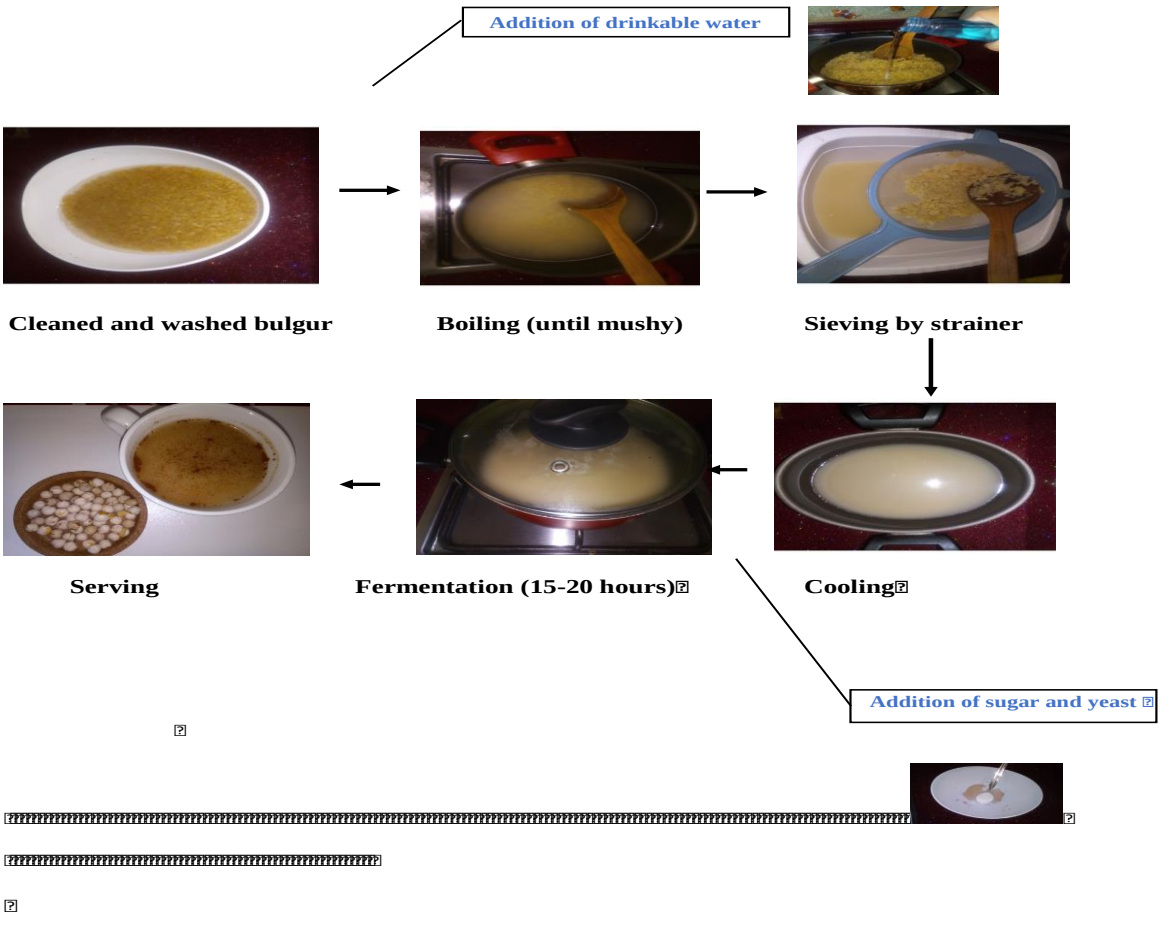

Figure 2: Production of home-made Boza

Table 2: The Ingredients Used in Boza Recipe

Ingredients	Quantity
Bulgur	1 and ½ cups
Water	10 cups
Instant yeast	1 tea spoon
Sugar	2 table spoon
• Cinnamon and roasted chickpeas for topping and serving	Optional

Serving of Boza

Turkish Boza is traditionally served in typical Turkish water glasses with cinnamon and roasted chickpeas either yellow or white (Figure 3). However, yellow one is preferred usually. A dessert spoon is just dipped into it and you can either drink it or eat it or do both based on your desire. That's not a tradition, but some people prefer to garnish their boza with mint sprigs and/or sometimes different fruits such as pomegranate or persimmon. Boza can also be served with a sprinkle of ginger. In addition, several people may prefer to use some honey to sweeten it (MEGEP,2006). It was recommended to keep Boza in healthy glass cup and then should be put up for sale. At the time of bottling step, boza should be used very fast since the fermentation step continues (MEGEP, 2006).

Figure 3: Serving of Boza with roasted white chickpea

Storage of Boza

The preserving conditions of boza is important since it contains food bacteria in it. At a high temperature, the amount of yeast and acetic acid bacteria increase quickly and cause differences in the sensory attributes of boza (Uysal et al., 2009; Petrova and Petrov, 2017). Boza can be consumed if the pH value of the product is below 3.5 (Altay et al., 2013). Studies show that storage condition is one of the most significant specifications to improve the shelf life of boza. Keeping boza at refrigerator condition (4 °C) helps to improve the shelf life of traditional boza.

But, boza can be stored just for 2 to 3 days at 25 °C (Yücel and Köse, 2002.). Caputo et al. (2012) stated that when the boza was stored at 4 °C, the shelf life was changed from 1 to 2 weeks and following days the product acidity was increased and became non-consumable. The shelf life of boza produced using probiotic starter culture was reported around 12 days at 4 °C (Arslan et al., 2015). In the study by Kentel (2001), it was aimed to prolong the shelf life of boza by methods such as pasteurization, using preservatives and cold storage. In the use of preservatives and cold storage, it was observed that pasteurized boza samples at 70°C-80 °C during 10 minutes can retain their drinkable properties for more than a month. It is stated that chemical preservatives (i.e. Na-benzoate and K-sorbate) are more effective in suppressing yeast growth, and this process has been found very successful in the non-fermented boza, especially at 4 °C. In the same study, it has been reported that cold storage (4 °C) is more effective in unfermented boza compared to the fermented boza and the boza can be stored for 10 days (Kentel, 2001).

CONCLUSION

There is an increasing interest for natural and functional foods in recent years due to the rise in awareness of not only food safety, but also of the risk derived from the chemical preservatives. Boza is a highly nourishing beverage that can be digest easily. It is a rich source of vitamins, essential amino acids and fatty acids. In addition, boza enriches the consumers' daily diet and supports the health maintenance of people of all ages.

Boza production has a long history and is produced both in our homes and in small-scale enterprises. But, there is an increasing demand in the production of boza in a large scale. The processing conditions in the boza should be standardized and boza should be brought to its deserved position.

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