

## Effet of bud size and brine concentrations on the sensory properties of caper (*Capparis ovata var. canescens Desf.*) buds

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### Abstract

The aim of the study is to determine the appropriate brine product depending on the salt concentration (%8, %12) and time of different size ( $x \leq 8$  mm,  $8 < x \leq 13$  mm,  $x > 13$  mm) capers buds. The panelists evaluated in terms of flavor, smell, color, appearance, hardness. While the flavor, smell, color high score (3.71, 4.00, 4.29) took small size applied 30 days fermentation at %12 salt concentration, in terms of appearance took medium size (3.86) applied 30 days fermentation at %8 and %12 salt concentration. In terms of hardness high score (4.14) took small size applied 30 days fermentation at %8 salt concentration. In terms of flavor low score (1.57) took large size applied 45 days fermentation at %8 salt concentration. In terms of fragrance the same score (2.14) took small size applied 5 days fermentation at %12 salt concentration, large size applied 10 days fermentation at %12 salt concentration. While in terms of color low score (2.29) took medium size applied 45 days fermentation at %8 salt concentration, in terms of appearance took large size (1.71) applied 45 days fermentation at %8 salt concentration. In terms of hardness low score (1.82) took large size applied 45 days fermentation at %12 salt concentration.

**Keywords:** capers, brine, sensory properties

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### 1. Introduction

Capers which belong to Capparacae family are tropical/subtropical origin, thick and ivy rooted, esmi-woody, oblique or high-branched, large and simple leaves, mostly thorny and hairy, large and showy white-pink flowers, brownish seeds containing many brownish seeds, it is a perennial herb that contains more than 350 species and can grow naturally on all continents [1-5]. There are two varieties including *Capparis spinosa* L. and *Capparis ovata* L. of the caper plant in Turkey [2,6,7].

Caper varieties that are not very selective in terms of climate demands are extremely resistant to all kinds of environmental conditions [6]. This a drought-resistant plant due to its deep root system and physiological properties [8,9].

In all over the world, various parts of the caper plants are used according to the type and variety.

Flower bud, root, fruit, seeds and fresh shoots are used as nutrition. Other plant parts are used in medicine and cosmetics [4].

The most used part of the plant which has an important commercial value on an international scale is flower buds. In addition, the ends of the fruit and shoots, but not as much as seeds, are preserved in brine and vinegar and are used for nutritional purposes [7,10]. Caper flower buds which is rich in protein, vitamin and mineral substances, are collected and eaten by pickle. Harvesting of buds starts in May and continues until September [11,12]. Caper pickle is a very expensive product. It has a sour, salty and acrid taste and appetizing [13].

Various studies have been carried out for the current characteristics and production of capers [14-17]. The aim of this study is to determine the effect of brine salt concentration and fermentation time on the sensory properties of capers in different sizes.

The brine products were also subjected to sensory analysis and it was decided by the panelists which part and in what period of the capers were tastier.

## 2. Material and Methods

### 2.1. Material

Capers buds grown in Konya were collected in June. Caper buds are divided into 3 different sizes ( $x \leq 8$  mm,  $8 < x \leq 13$  mm,  $x > 13$  mm). It was kept in a cold environment until it was brought to the laboratory. Capers buds separated from their stems are prepared for pickling. Natural drinkable spring water and clean iodine-free rock salt for the brine process were used.

### 2.2. Method

The buds of the caper plant are placed in glass jars and completed with brine prepared in %8 and %12 concentrations. The buds of capers plant is analysed on the 5th, 10th, 30th and 45th days after the fermentation. Sensory analyzes were evaluated in terms of taste, smell, color, appearance and hardness by 7 panelists [18,19].

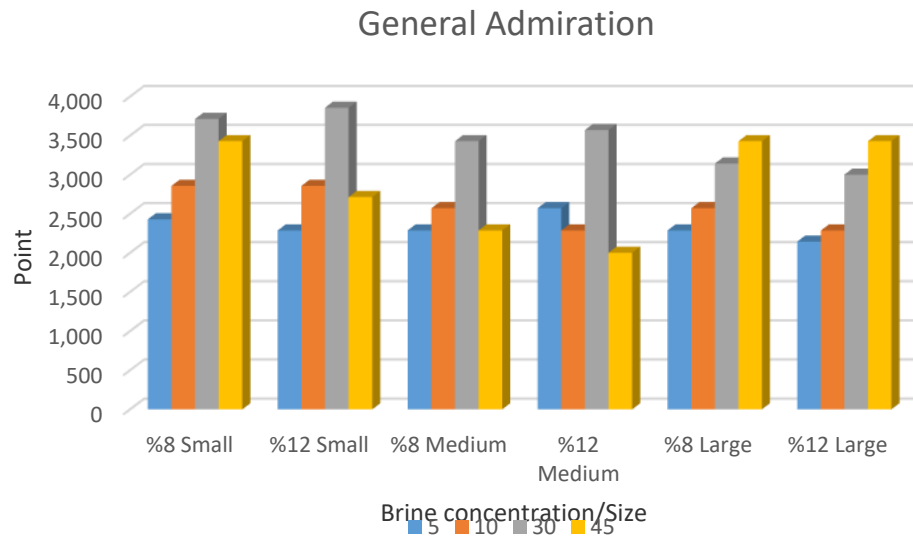
## 3. Results and Discussion

The capers (*Capparis ovata* var. *canencensis*) plant grown in Konya were subjected to 45 days fermentation in two different brine concentrations (%8, %12) in three different sizes ( $x \leq 8$  mm,  $8 < x \leq 13$

mm,  $x > 13$  mm). After fermentation products were subjected to sensory analysis on the 5th, 10th, 30th and 45th days. Analysis results are given in Table 1. Sensory analysis results of capers buds are given in Table 1. According to the scores given by the panelists The panelists in terms of flavor, smell, color took the highest score (3.71, 4.00, 4.29) small size capers seeds applied 30 days fermentation at %12 salt concentration. In terms of appearance took medium size applied 30 days fermentation at %8 and %12 salt concentration by getting 3.86 points. In terms of hardness, the small size subjected to 30 days fermentation at %8 salt concentration received 4.14 points. At the fermentation, in terms of flavor the lowest score (1.57) took large size applied 45 days fermentation at %8 salt concentration. In terms of fragrance the same score (2.14) took small size applied 5 days fermentation at %12 salt concentration, large size applied 10 days fermentation at %12 salt concentration. While in terms of color took the lowest score medium size applied 45 days fermentation at %8 salt concentration received 2.29 points, in terms of appearance took large size applied 45 days fermentation at %8 salt concentration received 1.71 points (Fig.1). According to the hardness characteristics of the capers took the lowest score large size applied 45 days fermentation at %12 salt concentration received 1.82 points.

Figure 1. Sensory analysis results of capers buds

Size	Brine	Time	Flavor	Smell	Color	Appearance	Hardness	General Admiration	
Small	8	5	2.000±0.378	2.429±0.325	3.571±0.419	3.286±0.415	3.286±0.397	2.429±0.381	
		10	2.857±0.388	2.286±0.390	3.286±0.373	3.000±0.502	3.286±0.480	2.857±0.418	
		30	3.286±0.407	3.714±0.382	3.714±0.288	3.714±0.390	4.143±0.358	3.714±0.370	
		45	3.286±0.330	3.000±0.345	3.714±0.397	3.571±0.333	3.571±0.429	3.429±0.649	
	12	5	1.857±0.378	2.143±0.325	3.286±0.419	3.286±0.415	3.429±0.397	2.286±0.381	
		10	2.571±0.388	2.857±0.390	3.429±0.373	2.857±0.502	2.714±0.480	2.857±0.418	
		30	3.714±0.407	4.000±0.382	4.286±0.288	3.571±0.390	4.000±0.358	3.857±0.370	
		45	2.857±0.330	2.571±0.345	3.000±0.397	2.857±0.333	2.714±0.429	2.714±0.649	
	Medium	8	5	1.857±0.378	2.571±0.325	3.143±0.419	3.286±0.415	2.857±0.397	2.286±0.381
			10	2.429±0.388	3.000±0.390	3.000±0.373	3.286±0.502	2.714±0.480	2.571±0.418
			30	3.143±0.407	3.286±0.382	3.857±0.288	3.857±0.390	3.571±0.358	3.429±0.370
			45	2.000±0.330	2.571±0.345	2.286±0.397	2.714±0.333	2.857±0.429	2.286±0.649
12		5	1.714±0.378	2.857±0.325	3.000±0.419	3.429±0.415	2.714±0.397	2.571±0.381	
		10	2.286±0.388	2.429±0.390	2.571±0.373	2.857±0.502	2.286±0.480	2.286±0.418	
		30	2.714±0.407	3.286±0.382	3.571±0.288	3.857±0.390	3.857±0.358	3.571±0.370	
		45	1.714±0.330	2.429±0.345	2.714±0.397	2.857±0.333	2.429±0.429	2.000±0.649	
Large		8	5	2.000±0.378	2.571±0.325	3.857±0.419	3.429±0.415	2.714±0.397	2.286±0.381
			10	2.286±0.388	2.714±0.390	2.714±0.373	2.714±0.502	2.714±0.480	2.571±0.418
			30	2.857±0.407	3.143±0.382	3.286±0.288	3.429±0.390	2.857±0.358	3.143±0.370
			45	1.571±0.330	2.714±0.345	2.429±0.397	1.714±0.333	2.429±0.429	3.429±0.649
	12	5	1.857±0.378	2.429±0.325	3.286±0.419	3.429±0.415	2.857±0.397	2.143±0.381	
		10	1.857±0.388	2.143±0.390	3.143±0.373	3.143±0.502	2.857±0.480	2.286±0.418	
		30	2.571±0.407	3.429±0.382	4.000±0.288	3.571±0.390	3.000±0.358	3.000±0.370	
		45	2.000±0.330	2.286±0.345	2.429±0.397	2.429±0.333	1.857±0.429	3.429±0.649	



**Figure 1.** Evaluation of capers buds as general appreciation

As shown in the figure, in terms of general appreciation scored 3.86 the highest points applied 30 days fermentation at %12 salt concentration, the lowest was given 2.00 points medium size 45 days fermentation at %12 brine concentration. According to the results of Belviranlı [20], brine varieties affected the color, smell, appearance and flavor of the capers, and did not affect the hardness. Large buds are liked in terms of taste and color and small buds are liked in terms of hardness. Length difference did not affect fragrance and appearance characteristics [21]. Results showed some differences. These differences can be probably due to brine concentrations, maturation and bud sizes.

**Compliance with Ethics Requirements.** Authors declare that they respect the journal's ethics requirements. Authors declare that they have no conflict of interest and all procedures involving human / or animal subjects (if exist) respect the specific regulation and standards.

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