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Effect Of Salts Added To Soaking Water On Cooking Properties Of Legumes

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Abstract

In this study, we aimed to investigate the effects of these salts added to the soaking water on the cooking time and protein and starch properties by selecting chickpeas and white beans, which are the two most consumed legumes in our country. It is found that some of the salt solution used in this study shorten the cooking time of the all legumes samples studied. Studies on the effects of soaking in different salt solutions on starch and protein properties are ongoing

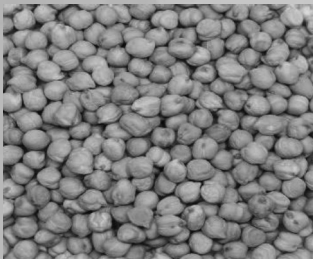
Introduction

Some studies in the literature show that adding various salts to the soaking water before cooking shortens the cooking time of legumes [1-2]. It is seen that this effect of salts is generally related to the legume microstructure. However, the relationship of this softening mechanism with starch structure and properties has not been investigated. At the same time, there is very limited information in the literature about the effects of this process on the protein/starch complex. It is thought that the consumption of chickpeas and beans, which are consumed a lot in our country and have high nutritional values, will increase if the soaking and cooking process is shorter. As a result of this study, it is thought that it will shed light on future studies.

Materials and Methods

Material

The most consumed legumes in Turkey are chickpea and white beans. Three different chickpea and three different types of white beans were used in this study. Chickpea samples were Russian, Mexican and a Local type (Figure 1).



7mm Russian chickpeas



12 mm Mexican chickpeas

Figure 1. Chickpea types used in the study.

Sıra and Çalı were selected for white beans (Figure 2). The selection of chickpea and white bean types was determined according to their consumption values.



10 mm Çalı beans



7 mm Sıra beans

Figure 2. White bean samples used in the study

Methods

Analysis of basic chemical compositions of legume samples.

Moisture, total protein (Nx6.25) and ash determination were conducted according to AACC-Method No. 44.01, AACC-Method No. 46.12, and AACC-Method No. 08.01, respectively [3].

Before the experiments, foreign materials, broken and cracked grains in the material were separated and sieved to eliminate the size effect.

Soaking process

Four different samples of 20 grams in a 300 ml beaker at room temperature (25°C) were kept in two different salt solutions and unsalted water for 8 hours, and then the cooking process was conducted.

Cooking process

The experiments were carried out after soaking. Soaked grains were boiled at atmospheric pressure until the white part in the middle of the grain disappears.

Results and Discussion

Moisture determination results of Russian chickpeas and Mexican chickpeas were found to be 10.01% and 9.22%, respectively. Ash content were also given in Table 1. The results agreed with the studies in the literature available for the similar samples.

Table 1. Moisture and ash content of the samples (% dm)

Sample	Moisture content	Ash content
Russian chickpeas	10.01	2.78
Mexican chickpeas	9.22	3.23
Domestic chickpeas	9.32	3.17
Sıra beans	11.65	3.83
Çalı beans	9.85	3.20
Domestic beans	12.10	3.75

Cooking times of the soaked samples were given in Table 2. It is obtained that the samples soaked in sodium bicarbonate solution has shorter cooking time than the ones soaked in distilled water. However, the samples soaked in calcium chloride has longer cooking time.

Table 2. Cooking times of legume samples soaked in different salt solutions.

Sample/min.	NaHCO ₃	CaCl ₂	Distilled water
Mexican chickpeas	23	87	54
Russian chickpeas	19	83	49
Domestic chickpeas	34	97	64
Sıra beans	20	84	50
Çalı beans	30	93	58
Domestic beans	45	103	68

According to the results obtained in this study, soaking in some salt solutions shortens the cooking time of legumes. However, the opposite is true (eg soaking in calcium chloride). In this study, it is aimed to reveal the effects of these obvious changes in cooking time on starch. Studies completed so far have shown that soaking in different salt solutions may also have partial effects on legume starches.

Acknowledgements

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