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Changes of Weight of Grain String Beans at Soaking in Room Temperature

Aibek U. Bodoshov
Kyrgyz-Turkish «Manas» university, Bishkek, KYRGIZ REPUBLIC

Abstract

Beans boiled soft slow, so before cooking, they should be soaked. Pre-soaking makes it possible not only to reduce the duration of their heat treatment, but also to keep the grain during cooking in general form. The collection of recipes of dishes and food products for catering noted, that soaking can be considered complete when the mass of beans will be doubled. To investigate the changes in hydro-processing of new trade beans soak at room temperature.

In studying dynamics of absorption water of a string bean have been used 15 grades of a string bean which grown up in Kyrgyzstan. Research of change of weight was spent in time intervals from 20 mines till 30 o'clock at room temperature. The obtained data has been analyzed and compared to results of similar researches in this area. As has shown research some grades of a string bean absorb sufficient quantity of waters in a current of 8-12 hours. Some kinds of a string bean demand soaking more than 12 hours. Also at studying of dynamics of absorption of water changes of physical indicators have been studied.

Keywords: Grain, Bean, Weight, Soaking

Introduction

String bean (The Latin name Phaseolus vulgaris) belongs to group of the major leguminous cultures having big food value, especially for the population of developing countries. Bean cultures, along with grain and vegetable, make the base of vegetative food of the person. They are characterized by a peculiar structure of food substances – contain a lot of protein, food fibers, mineral substances, it is not enough fat. The content of protein in the bean reaches 20-30 %. From amino acids there is a lot of lysine, leonine, asparagines and glutamine acid. Different types of haricot contain 10-18 % of cellulose that does them irreplaceable in prevention of a number of diseases. Mineral substances include a wide range of elements – iron, calcium, magnesium, selenium, etc.

Table 1 Food value of 100 g string bean

100 g string bean content			
Protein – 23%	B1 (thiamin) – 0,50	phosphor – 480	potassium – 1100
Carbohydrates – 46.6%	B2 (riboflavin) – 0,18	Iron – 5,9	Calcium - 150
Fat acids – 2.3 %	PP (nicotine acid) – 2,10	magnesium – 103	Power value – 292 kcal (for comparison mutton – 203 kcal; beef – 187 kcal; a horse-flesh – 167 kcal)

String bean is one of most export of the focused and competitive types of production of Kyrgyzstan in a foreign market. Production is exported for 90 % to 20 countries of the world. In Kyrgyzstan grow up more than 20 grades of a string bean. In scales of the Kyrgyz Republic, the Talas area is the main producer of leguminous cultures. Gathering string bean in 2009 made 54552 (37.7 billion dollars) tons, in 2010 made 71498 tons and in 2011 made 65820 tons (45.5 billion dollars). It makes 32,3 % in specific volume to the general gross output of plant growing of the region [1, 9]. Despite rather huge scale of manufacture, technological properties of a string bean of local grades aren't studied. [9,

11, 12]. Local population doesn't use so valuable, rich food as string bean in the diet. Because of shortage of sufficient quantity information about local string beans [1, 13, 14].

Material and Methods

In the researches we studied the main physical parameters of seeds: color, form and size of seeds, mass of 1000 grains, hade, volume weight, hardness, water activity. After researches of physical parameters we could classify these grades of string bean shown in Table 2.

Table 2. Classification of Type String Bean

№	Name of bean	Type
1	Lopatka	**I Type – Monophonic, white**
2	Kitayanka	
3	Saharniy	
4	Chernaya Fasol	**II Type – Color monophonic**
5	Elita	
6	Tashkentskiy	
7	Pestriy	**Color motley**
8	Rebaya	
9	Yubka	
10	Korolevskiy	
11	Motosiklist	
12	Dichka	
13	Gusiniye Lapki	
14	Skorospelka	
15	Bokser	

Time, hour	I I Type – color monophonic		
	Chernaya Fasol	Elita	Tashkentskiy
	Weight after soaking at room temperature, g	Weight after soaking at room temperature, g	Weight after soaking at room temperature, g
1	0.56	2.46	2.47
2	1.08	3.77	5.68
3	1.15	4.71	4.21
4	1.23	7.90	4.82
5	1.33	10.20	8.41
6	1.49	10.51	11.57
7	1.68	10.97	9.58
8	**1.81**	12.55	16.61
12	2.76	**20.49**	**20.56**
24	2,45	21,98	22.25
30	2,50	23,25	22.90

The aim of research was find optimum time soaking for each kind of string bean which grown up in Kyrgyzstan. The water absorb ability of string bean is one of important indicators when using string bean in food appointments. Beans boiled soft slow, so before cooking, they should be soaked. Pre-soaking makes it possible not only to reduce the duration of their heat treatment, but also to keep the grain during cooking in general form. The collection of recipes of dishes and food products for catering noted, that soaking can be considered complete when the mass of beans will be doubled. Double mass after soaking and we take as a reference for researching.

Results

For I Type – monophonic, white 12 hours is optimum soaking time for Kitayanka and Saharniy. After 8 hours weight of Kitayanka and weight of Saharniy increases in 1.2 and 1.4. As showed research string bean Lopatka as much as possible increases in 1,5 after 30 hours (Table 3, Fig. 1(a).

Table 3. Change of weight of I type string beans after soaking

Time, hour	I Type – monophonic. white		
	Lopatka	Kitayanka	Saharniy
	Weight after soaking at room temperature, g	Weight after soaking at room temperature, g	Weight after soaking at room temperature, g
1	1.61	2.11	3.43
2	2.42	3.58	4.80
3	1.77	2.21	7.72
4	3.39	3.69	8.22
5	2.05	4.15	10.26
6	3.95	4.89	12.58
7	3.45	10.59	15.20
8	2.58	11.95	13.37
12	6.26	**23.22**	**21.93**
24	12.60	21.64	21.41
30	15.84	22.19	21.73

For type Chernaya fasol 8 hours its optimum for soaking. 12 hours it is enough, during this time its weight increased more then in 2.8 times. 12 hours optimum time for Elita and Tashkentskiy. The increases in mass for Elita and Tashkentskiy is given Table 4, Fig. 1 (b).

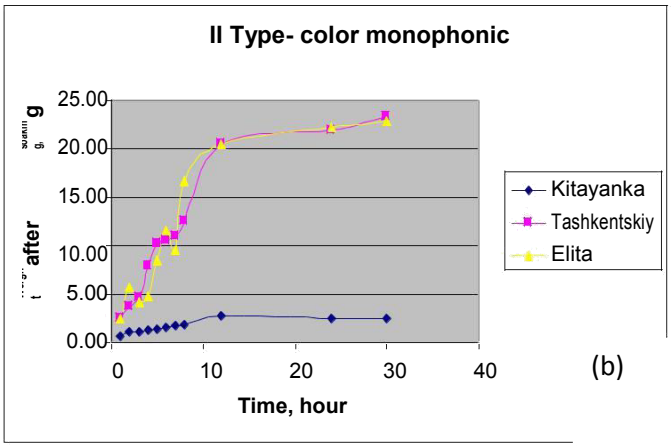
Table 4. Change of weight of II type string beans after soaking.

Form water absorption features we can classify string beans of III Type two groups. I group enter type: Korolevskiy, Pestriy, Rebaya, Motosiklist, Skorospelka and Yubka (Fig. 1 (c). They absorb water faster then other types. The 12 hours is optimum for this type. Some of them a little bit don't gather weight (Pestriy and Motosiklist). But for food appointments it's enough.

II group enter 3 types: Dichka which actual don't absorb water, Bokser and Gusiniye Lapki. During 24 hours Gusiniye Lapki absorb more than 1.5 water. Bokser on the contrary decreases (Fig. 1 (d).

Table 5. Change of weight of III type string beans after soaking

Time, hour	III Type - Motley								
	Motosiklist	Korolevskiy	Dichka	Pestriy	Bokser	Rebaya	Yubka	Gusiniye lapki	Skorospelka
	Weight after soaking at room temperature, g								
1	1.05	1.69	1.29	1.53	0.88	1.74	2.08	0.88	2.34
2	1.06	2.65	1.19	4.27	2.28	2.86	4.55	1.24	2.83
3	1.41	3.66	1.85	3.66	1.19	2.06	4.33	2.16	2.34
4	2.97	4.06	1.35	4.72	1.41	4.86	7.30	1.55	2.83
5	2.65	8.68	0.84	6.18	1.70	4.70	7.92	3.25	2.77
6	3.69	9.01	1.55	6.63	2.60	4.94	7.87	3.25	4.71
7	5.37	9.06	1.12	7.82	4.43	8.16	10.09	4.67	4.63
8	5.92	13.28	2.00	11.19	1.90	11.23	11.91	4.92	3.97
12	**17.14**	**20.42**	1.00	**16.49**	10.97	**19.57**	**18.52**	9.98	**18.32**
24	20.69	23.33	3.43	21,21	13.92	19.84	22.19	**15.12**	21.50
30	21.66	24.35	**3.97**	21,56	14.32	21.81	23.43	16.00	23.81



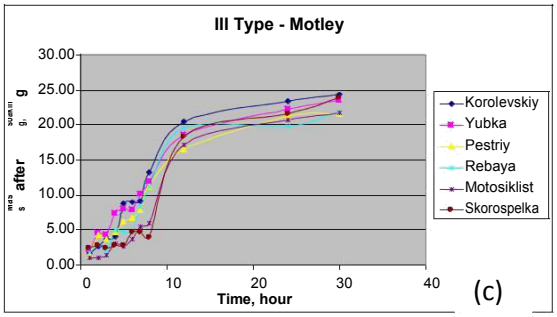
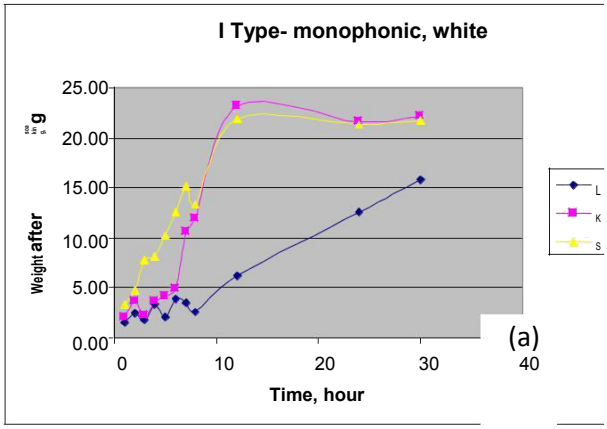
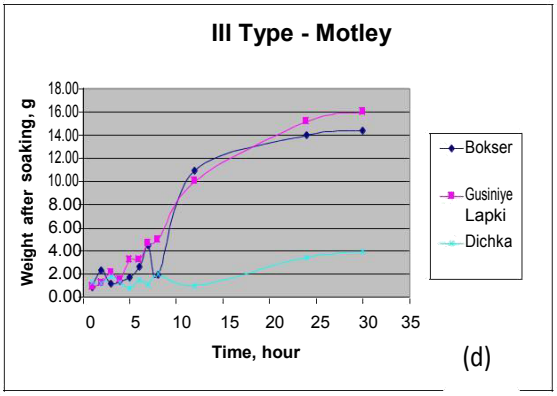


Figure 1 Changes of weight of string beans (all types)





Thus, various types of string beans have a various swelling capacity and dynamics of absorption of water. In the course of soaking that it is necessary to consider by drawing up of compounding and conducting technological process of production of these raw materials. 12 hour is optimum soaking time for majority of samples. We can classify string beans depending of their water absorption dynamics.

For I Type – monophonic, white 12 hours is optimum soaking time for Kitayanka and Saharniy,

as showed research string bean Lopatka as much as possible increases in 1,5 after 30 hours. We conclude this features of Lopatka connected with chemical structure of bean.

For II Type – color monophonic 8 hours it is enough for Chernaya fasol and 12 hours optimum time for Elita and Tashkentskiy.

For III Type – motley 12 hours is optimum for Korolevskaya, Rebaya beans. Yubka, Pestriy, Motosiklist and Skorospelka require a little more time than 12 hours. Lack of the required mass of less than 1 gram. Other beans Bokser, Gusiniye Lapki gaining more than 1.5 mass from initial mass. String bean Dichka does not absorb more water even for 30 hours.

Thus, various types of string beans have a various dynamics of absorption of water in the course of soaking that it is necessary to consider by drawing up of compounding and conducting technological process of production of these raw materials. Research revealed that some types of string beans (Dichka) don't absorb water. It is speak that Dichka can be used for other purpose. At further soaking the mass of samples practically doesn't increase.

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