

## EFFECT OF TRADITIONAL STORAGE ON THE EXTRACTABILITY OF SOYMILK FROM SOYBEAN

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### ABSTRACT

During traditional storage of soybeans, no significant effect was found on the extractability of soymilk solids. Overall losses of nutrients ranged from 14-15 per cent. Proteins and carbohydrates are the major components that are lost during processing.

### INTRODUCTION

Soy milk is the water extract of dry mature soybean. It is generally prepared by boiling water grind method and filtering the residue. The product is a milky-looking liquid and in no way a new product. It is manufactured or home-made in most countries of East Asia and is consumed as a general drink.

Soy milk has nearly a protein content and quality that is quite comparable to cow's milk. However, the composition of soymilk varies depending upon the variety of soybean and process of manufacturing. It has been a subject of interest to agencies that intend to prepare milk-like beverages on commercial scale, especially for those areas of the world where protein malnutrition is serious problem. Unfortunately, soymilk has a strong characteristic 'beany' flavour (Hand *et al.*, 1964) which makes it unacceptable to non-oriental people. Studies on beany flavour in soymilk and flour (Mustakas *et al.*, 1967; Badenhop & Hackler, 1970) effect of processing (Khaleque *et al.*, 1967; Wilkens *et al.*, 1967) and model storage of soybean (Saio *et al.*, 1982; Sono *et al.*, 1985) were carried out but not much published work on extractability of soymilk from soybean stored at ambient conditions is available. Since soymilk is of commercial value, therefore, present studies were carried out to find out the effect of traditional storage of beans on the extraction of soymilk.

### MATERIALS AND METHODS

Soybean (light yellow variety) was directly procured from Seed Division, Ghee Corporation of Pakistan and stored in gunny bags at ambient conditions.

Soybean (200 g) on moisture free basis was treated with sodium bicarbonate solution (0.1%) according to the method described earlier (Arshad *et al.*, 1980). Treated soybeans were ground in soybean chopper with

the addition of 1.2 L hot water (80-90°C) for 12 minutes exactly. The milky extract was filtered through a nylon cloth (150 mesh). Residue was squeezed out to the last drop of eater and total volume of water-extract was measured. Total solids extracted in the milk were calculated in total volume. The residue left over was also dried and weighed. Experiments were repeated after regular intervals of 2 months for a period of ten months. Percentage of milk solids, soy residue and losses due to the treatment and processing were calculated on moisture free basis.

Chemical composition of soybean, milk solids and residue were determined according to AOAC method (AOAC, 1984).

### RESULTS AND DISCUSSION

The results of analysis of fresh soybeans are shown in Table-1, while that of soymilk solid and soy residue are shown in Table-3 and 4, respectively. Dispersive break-up of each experiment is also shown in Table-2. Overall extraction of soymilk solids ranged from 43.2 to 44.9 per cent of soymilk solids was found when the moisture content of seeds was 11-12 per cent as the seeds at this stage were tender. The lower yield 43.2-43.5 per cent of soymilk solids was found during dry months (April to June), when the moisture content of the seeds was 7-8 per cent. Hence it was concluded that there was no significant effect on the extraction of soymilk solids as a result of storage of soybeans. It was also observed that overall losses during treatment and processing of soybeans ranged from 14-15 per cent with average loss of 14.8 per cent (Table-2). The average losses (Table-5) of proteins, fat, ash and carbohydrates were 6.0, 2.0, 1.0, and 5.8 per cent, respectively. Proteins and carbohydrates are the major components that are lost during treatment and processing.

**Table 1. Analysis of fresh soybeans  
g/100 g (results on moisture free basis)**

Contents	Percentage
Protein	35.5
Fat	25.5
Ash	6.0
Fibre	6.5
Carbohydrates (by difference)	26.5

**Table 2. Break-up of each experiment  
g/100 g (results on moisture free basis)**

	Storage (in months)					
	0	2	4	6	8	10
Moisture % in seeds	12.0	11.1	8.0	7.0	11.0	11.9
Soy milk solids	44.5	44.6	43.5	43.2	44.4	44.9
Soy residue	40.5	40.4	42.5	42.0	40.6	40.1
Losses	15.0	15.0	14.0	14.8	15.0	15.0

**Table 3. Analysis of soy milk solids  
g/100 g (results on moisture free basis)**

	Months					
	0	2	4	6	8	10
Proteins	41.5	41.4	40.6	40.5	41.3	41.4
Fat	33.5	33.6	33.2	33.4	33.7	33.6
Ash	5.5	5.3	5.8	5.8	5.6	5.8
Carbohydrates (by difference)	19.5	19.7	20.4	20.3	19.4	19.2

**Table 4. Analysis of soy residue  
g/100 g (results on moisture free basis)**

	Months					
	0	2	4	6	8	10
Proteins	28.3	27.0	29.4	29.5	29.5	29.3
Fat	22.2	22.1	20.5	21.3	21.0	21.4
Ash	5.7	4.7	4.9	4.4	5.1	4.7
Fibre	14.0	14.2	13.5	12.9	15.8	14.1
Carbohydrates (by difference)	29.8	32.0	31.7	31.9	28.6	30.5

**Table 5. Average losses of components  
g/100 g (results on moisture free basis)**

Contents	Percentage
Protein	6.0
Fat	2.0
Ash	1.0
Carbohydrates (by difference)	5.8
Total	14.8

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