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Studies on quality parameters of bun incorporated with wheat flour water chestnut flour and soya flour

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Abstract
A study was conducted to develop bun incorporation of different levels of wheat flour water chestnut flour and soya flour. Quality was evaluated on parameters such as protein, fat carbohydrate, ash, moisture and Total solid There were four treatments and each were replicated five times. Control (To) was prepared by adding 100% wheat flour.T1 was pre aped by adding 85% wheat flour,10% water chestnut flour and 5% soya flour,T2 was prepared by adding 80% wheat flour,10% water chestnut flour and 10 % soya flour.T3 was prepared by adding 75% wheat flour,10% water chestnut flour and 15% soya flour, T2.was found to be the best with average score of (10.51%) for Protein, (8.14%) for fat, (56.55%) for carbohydrate, (22.24%) for moisture, (2.57%) for ash and (77.76%) for total solid

Keywords: wheat flour, water chestnut flour, soya flour, protein, quality.

1. Introduction
Bakery products are important sources of nutrients viz. energy, protein, iron, calcium and several vitamins. Most bakery products can easily be enriched and fortified to meet the specific needs of the target groups and vulnerable sections of the populations who are undernourished. Bread is an important part of the diet of a majority of the world's inhabitants. Making bread by baking leavened cereal dough is a very ancient practice. The present study was carried out to develop different varieties of breads incorporated with functional ingredients like wheat bran, finger millet flour, ginger, garlic and spice mix. Soybean (*Glycine max L. merril*) is an important legume belonging to family *Leguminasae,* sub family *Papilionideae*. Several varieties of soybean have been evolved by the scientists, mostly based on their maturity diseases pest resistance (Mugurkar, 2009) [3].
Bakery products are important sources of nutrients viz. energy, protein, iron, calcium and several vitamins. Most bakery products can easily be enriched and fortified to meet the specific needs of the target groups and vulnerable sections of the populations who are undernourished
Carried out study on preparation of soy milk and soy yogurt, they reported that soy milk is, a stable emulsion of oil, water, and protein, it is produced by soaking dry soybeans and grinding them with water. Soy milk contains about the same proportion of protein as cow's milk: around 3.5%; also 2% fat, 2.9% carbohydrate, and 0.5% ash. Soy yogurt is a yogurt prepared using soymilk, yogurt bacteria, mainly *Lactobacillus bulgaricus* and *Streptococcus thermopilus* and sometimes additional sweetener, like fructose, glucose, or raw sugar Shurtleff *et al*., (2008) [7]. Demand for ready-to-eat processed food with better shelf life, satisfying taste and with high nutritional quality is increasing throughout the world because of growing urbanization. Bakery products are important ready-to-eat processed foods (Chavan and Kadam, 1993) [2] Soybean is rich in protein. It contains 32.4-50.2% protein. Oil content ranges from 13.9-23.2%. About one third of soybean consists of carbohydrates, including polysaccharides such as, stachyose (3.8%), raffinose (1.1%), sucrose (5%), phosphatides; sterols, ash and other are also as minor constituents.
Wheat forms the major source of protein and calories for large section of population. Traditionally it has been consumed as chapatti (unleavened bread) but with advancement in baking technology and changing food habits, wheat is milled to flour and being used for production of numerous products. The globalization scenario in new millennium year has increased the demand for bakery products along with ready to eat foods, due to change in perception, economic consideration, westernization, urbanization, busy life, increased women employment and increased per capita income.

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Water chestnut (Trapa bisinosa Roxburg) commonly known as "Singhara", is an annual aquatic warm season crop. They are almost fatless and are therefore, a healthy food option. Ground water chestnut powder mixed with water can relive cough. Boiling water chestnuts in water makes the best drink for measles patients and is appropriate for all measles patients from the third day till the ninth day of the cycle. Is helps to speed up the measles cycle. They are good sources of calorie, carbohydrate, dietary fiber, vitamin B6 and also contain fair amount of calcium, potassium, iron and zinc. Water chestnut used for many therapeutic purposes e.g. for jaundice, measles, cough and summer heat etc.

Trapa bispinosa is commonly grown throughout India and locally known as Singhara (Water Chestnut) (Singh *et al*., 2011) [5]. In addition to being important for aquatic ecosystems, *Trapa bispinosa* species are also food for humans and animals in India, China, and Southeast Asia. It is grown throughout Asia and tropical Africa in lakes and ponds and is often cultivated for its edible fruit. The medicinal values of the whole herb and fruit have long been recognized in folklore medicine as a cure for various diseases (Rahman *et al*., 2001) [4] The fruits are eaten raw or boiled. When the fruit has been dried, it is ground to a flour called singhare ka atta which is used in many religious rituals and can be consumed as a Phalahar diet on the Hindu fasting days, in Indian traditional festival "Navratri" (Chandana *et al*., 2013)

Material and Methods
The experimental work was carried out in the food laboratory of department of Dairy, Technology, Warner College of Dairy Technology, Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad. Wheat flour, water chestnut flour, soya flour, butter, dry yeast, salt and Skim milk powder were procured from local market.

Treatment Combination of Bun
Bun was prepared by blending different levels of wheat flour, water chestnut flour and soya flour in following levels
T_0- Bun was prepared by blending of wheat flour.
T_1- Bun was prepared by blending 85% wheat flour + 5% soy flour + 10% water chestnut flour.
T_2- Bun was prepared by blending 80% wheat flour + 10% soy flour + 10% water chestnut flour.
T_3- Bun was prepared by blending 75% wheat flour + 15% soy flour + 10% water chestnut flour.

In order to prepare bun by wheat flour, water chestnut flour and soya flour were taken as per level and all the ingredients were mixed together. 2.5 % *Saccharomyces cerevisiae* was added and dough was prepared. thereafter dough was incubated at 30 ºC for a period of 1 hour.dough was them divided and shaped.proofing was done 45 min.after then dough was kept in baking oven for 300 ºC for 15 min.the prepared bun was then cooled. The final product was subjected to gross composition and sensory analysis. Number of treatments were four which were replicated five times.

Schematic diagram of preparation of Bun
Flow diagram for manufacturing bun by using wheat flour, soy flour and water chestnut flour:
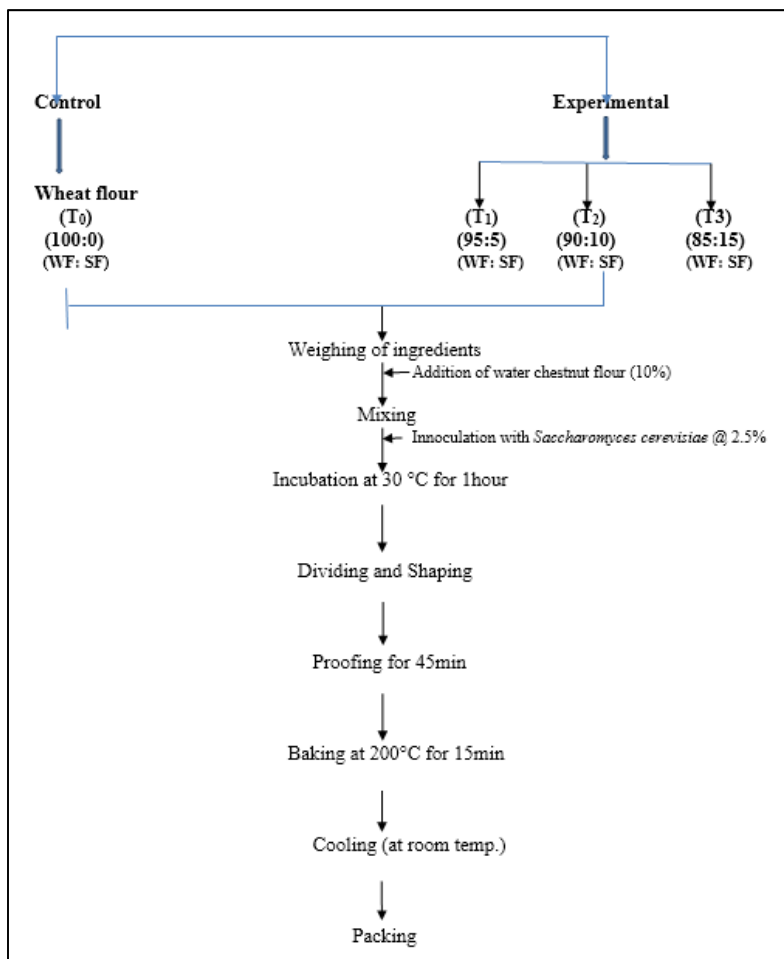
Result and Discussion

The present study was based to evolve "Studies on quality parameters of bun incorporated with wheat flour water chestnut flour and soya flour". The data collected on different aspects were tabulated & analyzed statistically using the methods of analysis of variance & critical difference. The significant & non-significant differences observed have been analyzed critically within & between the treatment combinations. The results obtained from the analysis are presented in this chapter under the following headings:

Physico-chemical characteristics of bun

From table 1 it can be observed that the highest value of protein was found to be in T3 (11.14) containing 75% wheat flour, 10% water chestnut flour and 15% soya flour. lowest value for protein was found to be in To (8.02) containg 100% wheat flour this may be due to addition of ingriendients which are rich in protein has eventually elevated the level of protein in T3. it was also observed that fat percentage in T3 (8.30) was highest containing 75% wheat flour,10% water chestnut flour and 15% soya flour and lowest fat was found to be in To (7.67) containg 100 % wheat flour. this increase in fat may be due to use of soya flour which has 17.3 % fat. Highest percentage of carbohydrate was observed in To(58.50) containg 100% wheat flour lowest value for carbohydrate was observed in T3 (55.73) contaimg 75% wheat flour,10% water chestnut flour and 15% soya flour. highest percentage for ash was observed in T3(2.90) containing 75% wheat flour,10% water chestnut flour and 15% soya flour. lowest percentage for ash was observed in To (1.01) containg 100% wheat flour. highest percentage for moisture was observed in To(24.60) containing 100% wheat flour lowest percentage for ash was observed in T3(21.78) containg 75% wheat flour,10% water chestnut flour and 15% soya flour. highest percentage for total solid was observed in T3(78.22) containing containg 75% wheat flour,10% water chestnut flour and 15% soya flour. lowest percentage for ash was observed in To(75.40) containing 100% wheat flour

Water Chestnut is readily available and it is cheap, thus it can be a good substitute during fasting in India. Singh. S *et al.*, (2017) [6]

Table 1: Physicochemical parameters for bun

Parameters	To	T_1	T_2	T_3
Protein	8.02	9.74	10.51	11.14
Fat	7.67	7.92	8.14	8.30
Carbohydrate	58.50	57.62	56.55	55.73
Ash	1.01	1.48	2.57	2.90
Moisture Content	24.60	23.23	22.24	21.78
Total Solid	75.40	76.74	77.76	78.22

Protein content of bun

Protein percentage in bun samples of different treatment and control, the highest mean protein percentage was recorded in the sample of T_3 (11.14) followed by T_2 (10.51), T_1 (9.75) and T_0 (8.02).
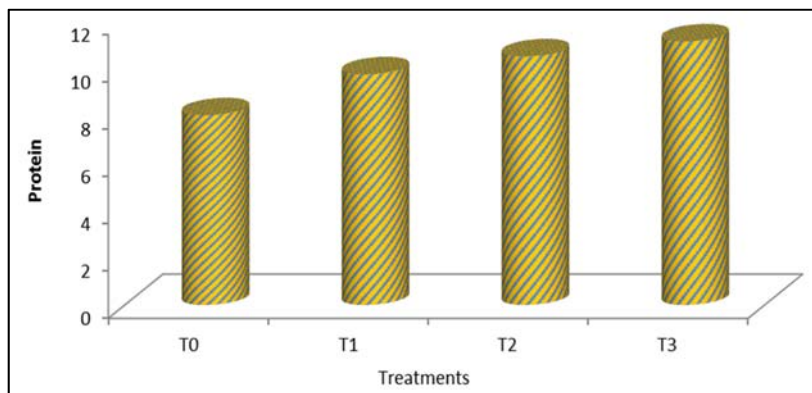

Fig 1: Protein content of bun

Carbohydrate of Bun

Carbohydrate percentage in bun samples of different treatment and control, the highest mean carbohydrate percentage was recorded in the sample of T_0 (58.50) followed by T_1 (57.62), T_2 (56.55) and T_3 (55.73).
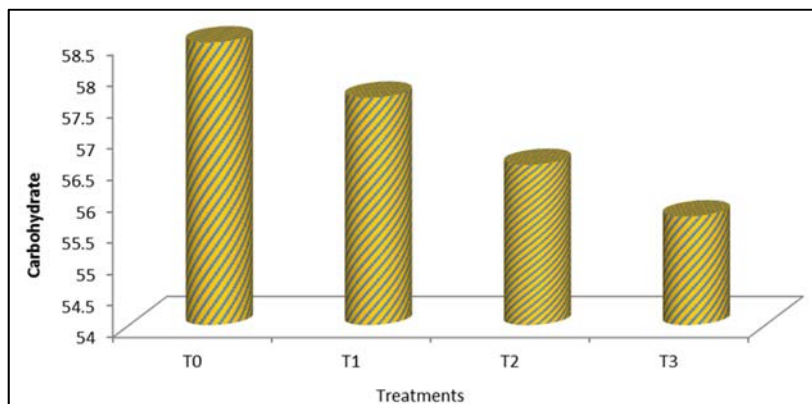

Fig 2: Carbohydrate of Bun

Ash Content of bun

Ash percentage in bun samples of different treatment and control, the highest mean ash percentage was recorded in the sample of T_3 (2.90) followed by T_2 (2.57), T_1 (1.48) and T_0 (1.01).
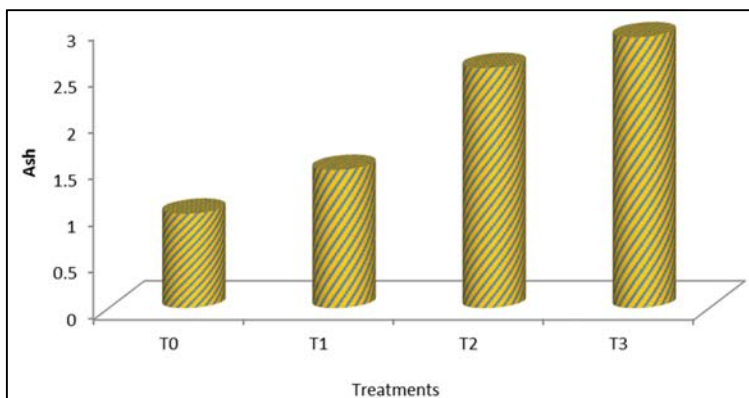

Fig 3: Ash Content of bun

Fat content of bun

Fat percentage in bun samples of different treatment and control, the highest mean fat percentage was recorded in the sample of T_3 (8.30) followed by T_2 (8.14), T_1 (7.92), T_0 (7.67).
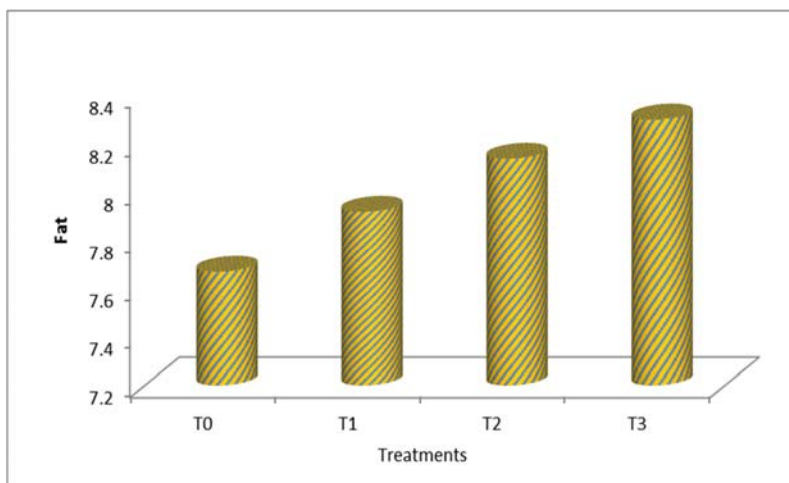

Fig 4: fat content of bun

Total solid in bun

Total solid percentage in bun samples of different treatment and control, the highest mean total solid percentage was recorded in the sample of T_3 (78.22) followed by T_2 (77.76), T_1 (76.77) and T_0 (75.40).
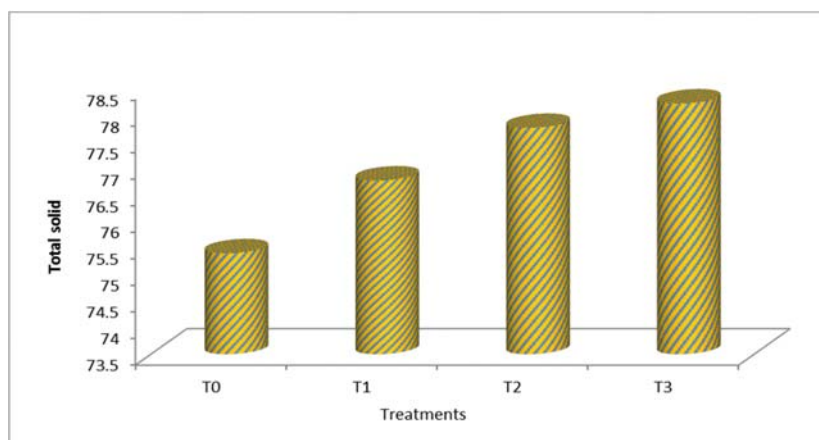

Fig 5: Total solid in bun

Moisture content of Bun
Moisture percentage in bun samples of different treatment and control, the highest mean moisture percentage was recorded in the sample of To (24.60) followed by T_1 (23.23), T_2 (22.24), T_3 (21.78).
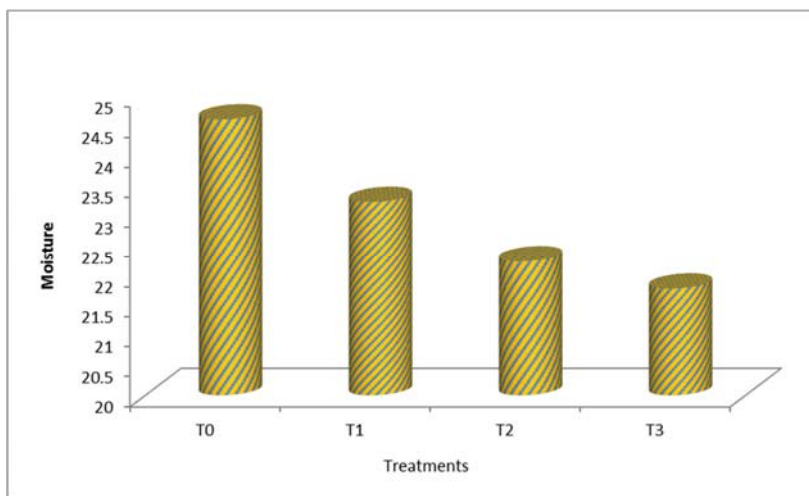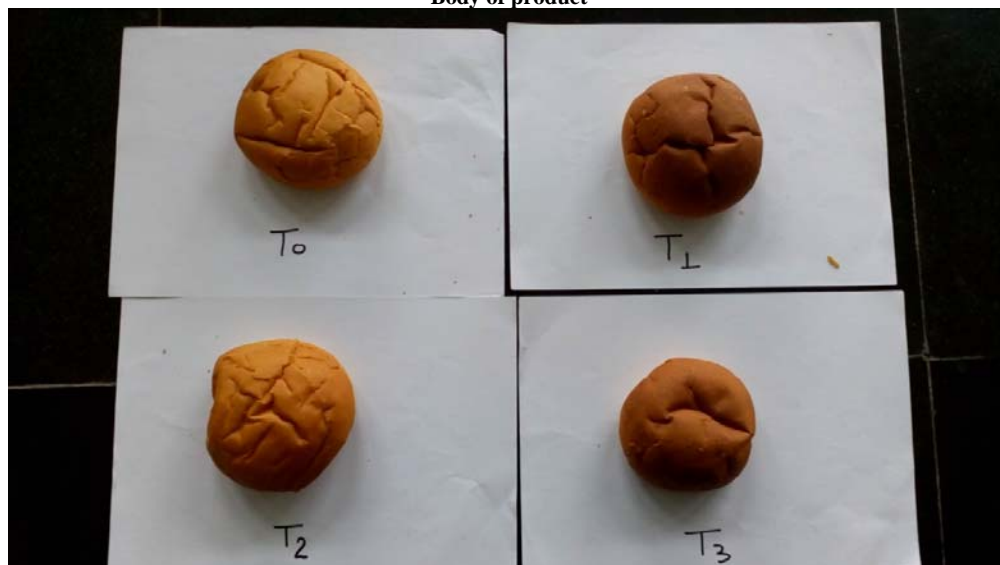

Fig 6: Moisture content of Bun

Body of product

Conclusion
On the basis of the results obtained during the study it is concluded that wheat soy and Water chestnut flour can be successfully employed for the preparation of bun. Soybean is recognized for its value in enhancing protecting health, soybeans have all eight essential amino acids. It lowers blood cholesterol, relaxes constipation, well for diabetes, prevent cardio-vascular diseases, overall health promotion, and prevent cancer helpful in menopause and osteoporosis. Soybean has also functional health benefits especially to those who suffer from lactose intolerance. Water chestnut powder They are good sources of calorie, carbohydrate, dietary fiber, vitamin B6 and also contain fair amount of calcium, potassium, iron and zinc. The data obtained on various parameters were statistically analyzed. Chemical evaluation showed that bun prepared by using wheat flour, soy flour and water chestnut flour (80:10:10), i.e. (treatment T_2) was found to be more acceptable in term of sensory quality.

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