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Effect of incorporation of wheat flour and soy flour on nutritional and sensory quality of bun fortified with water chestnut powder

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Abstract

The research study was conducted to evaluate the quality character of wheat flour – soy flour-water chestnut powder enriched bun which could be used as a protein fiber supplemented cereal baked food in this study wheat flour and soy flour at different level's that is 15% (T₃), 10%(T₂), 5%(T₁) and without soy flour was kept as control (T₀). Water chestnut was added in bun with different levels. Bun were analyzed for sensory parameters result's from organoleptic evaluation indicate that good quality bun T₂ can be prepared by substituting wheat flour with 10% soy flour and addition of 10% water chestnut flour may affect the backing quality.

Keywords: bun, sensory quality, soy flour, wheat flour, water chestnut flour

Introduction

Buns are much popular along with sliced bread, but there are variations in taste and sizes globally. Moreover, much popularly buns are used as a base in burgers or in the form of sweet buns. Bread baking involves various physicochemical and biological transformations; such as evaporation of water, volume expansion, starch gelatinization, protein denaturation and browning reactions that occur simultaneously, which make bread baking a complex process to model (Purlis and Salvadori 2009; Chhanwal *et al.* 2012) [5, 2]. A population balance model for aeration during mixing of dough was used by Martin *et al.* (2004) [3]. Mills *et al.* (2003) [4] studied bubble formation and stabilization in bread dough during baking process. The structural change also occurs during the bread baking process which consists of solidification and expansion. The network like structure of bread crumb formation is mainly due to starch gelatinization and protein denaturation. Bread baking is considered as an irreversible process, which makes it economically critical; hence, producing consistent good quality bread has always been a great challenge for the bakery industry. 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. In recent years, enhancement of the nutritional profile of bakery products is a key trend that has gained a great deal of momentum. Manufacturers are also trying to enhance the nutritional value of bakery products through the addition of functional ingredients, such as omega-3, multigrain, dietary fibre, prebiotics, multivitamins and phytosterols.

Multinational food industries, especially baking industries have responded well to the increased interest in nutrition and are developing products that meet the nutritional requirement and dietary recommendations of the consumers. Baking products especially bread form an important part of Indian dietary Morris *et al.*, (1977).

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 Vaidehi *et al.* (1989) [7].

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

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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 Masrizal *et al.*, (1997)

Materials and Methods

The experimental work was carried out in the research laboratory of department of Dairy, Technology, Warner college of Dairy Technology, Sam Higginbottom university of Agriculture, Technology and Sciences Allahabad. Wheat flour and soy flour and water chestnut flour were obtained from the local market of Allahabad city. Bun was prepared by wheat flour and different levels of soy flour and water chestnut flour. Numbers of treatment were 4 which were replicated 5 times. The product was evaluated organoleptically by a panel of judges with the help of nine point hedonic scale. (Sri Lakshmi 2005) [6].

Results and Discussions

Sensory analysis: It was found that the highest score was observed in treatment T₂ in which value added bun was prepared by wheat flour 80% with soy flour (10%), 10 % water chestnut flour.

Treatment Combination

T₀-Bun was prepared by blending of wheat flour.

T₁-Bun was prepared by blending 85% wheat flour + 5% soy flour + 10% water chestnut flour.

T₂-Bun was prepared by blending 80% wheat flour + 10% soy flour + 10% water chestnut flour.

T₃-Bun was prepared by blending 75% wheat flour + 15% soy flour + 10% water chestnut flour.

The product was evaluated organoleptically by a panel of judges with the help of nine points hedonic scale (Sir Lakshmi, 2005) [6]. The panel mean scores of the data were analyzed by ANOVA. Statistically significant differences in the result were tested by F test, (Chandel, 1991).

Results and Discussions

For the sensory analysis it was found that the highest score was observed in treatment T₂ in which value added Bun prepared by wheat flour (80%) and soy flour with addition (10%) and 10 % water chestnut flour flavor and peculiar taste.

Colour and appearance

The average sensory score of colour and appearance of the formulated product clearly indicated that treatment which had combination of wheat flour (80%) and soy flour with addition (10%) and 10 % water chestnut flour had the significantly highest score followed by T₂ (8.10), T₁ (7.80) and T₃ (7.06). Thus making it quite obvious that the addition of wheat flour and soy flour and water chestnut flour increases the colour and acceptability of value added bun.

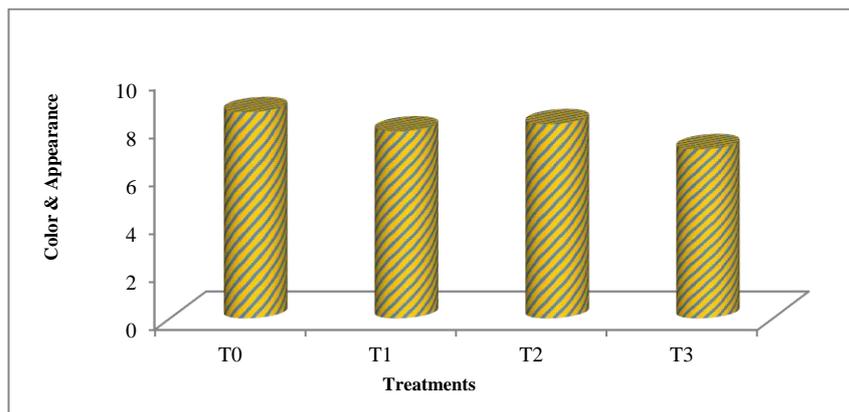


Fig 1: Colour and appearance in the sample of control and experimental Soy and water chestnut flour incorporated bun.

Body and Texture

Average sensory scores of body and texture of the formulated product clearly indicated that treatment T₂ which had combination of wheat flour (85%) and soy flour with addition

(5%) and 10 % water chestnut flour T₁ (8.60) followed by T₀ (8.48), T₂ (8.22) and T₃ (7.52). Thus making it quite obvious that the addition of wheat flour with soy flour (5%, 10%, and 15 %) improve the body and texture of value added bun.

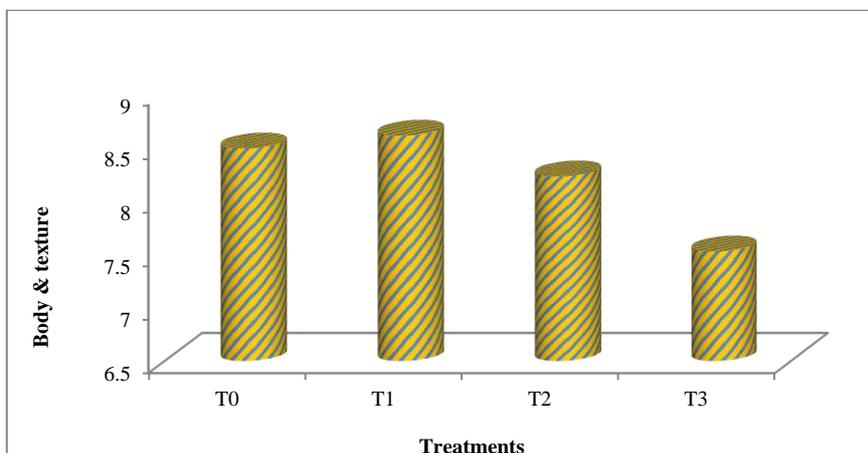


Fig 2: body and texture in the sample of control and experimental Soy and water chestnut flour incorporated bun.

Table 1: Average Sensory Score Of Value Added Bun With Different Levels Of Wheat Flour, Soy Flour And Water chestnut Flour

	T ₀	T ₁	T ₂	T ₃
Colour And Appearance	8.6	7.8	8.1	7.06
Body And Texture	8.48	8.6	8.22	7.52
Flavour and Taste	8.58	8.32	8.54	7.36
Overall Acceptability	8.44	7.96	8.46	7.17

Flavour and Taste

The treatment T₂ (8.54), which had combination of bun combination of wheat flour (80%) and soy flour with addition (10%) and 10 % water chestnut flour had the significantly highest score followed by T₂ (8.54), T₁ (8.32) and T₃ (7.36). improves the taste and flavour of value added cottage cheese (Table.1). The variation in flavour and taste was probably due the effect of some development of chemical (Kosikowski, 1997).

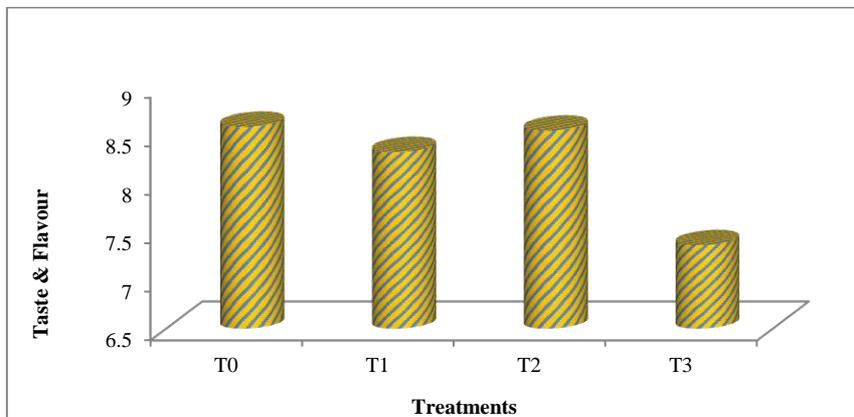


Fig 3: Flavor and Taste the Sample of Control and Experimental Soy and Water Chestnut Flour Incorporated Bun.

Overall Acceptability

The average sensory score of body and texture of the formulated product clearly indicates that treatment wheat flour (80%) and soy flour with addition (10%) and 10 % water chestnut flour had a highest score T₂ (8.46) followed by

T₀ (8.44), T₁ (7.96) and T₃ (7.17) Thus making it quite obvious that the addition of wheat flour and soy flour, water chestnut flour improves the overall acceptability of value added bun.

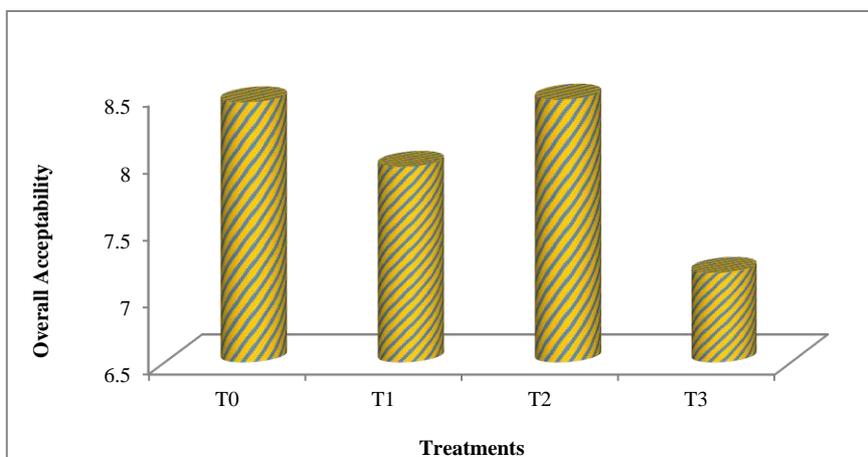


Fig 4: Overall acceptability in the sample of control and experimental Soy and water chestnut flour incorporated bun.

Body of Product

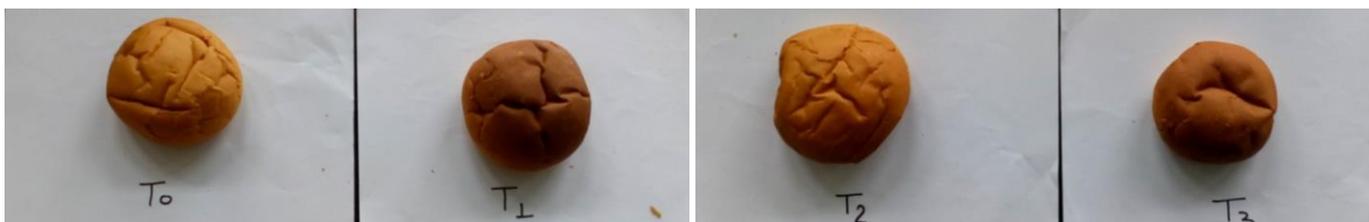


Fig 5

Conclusion

Result of sensory attributes in terms of colour, flavour. Taste. Texture and overall acceptability, T₂ showed maximum colour mean score which the highest was obtained among the type of

bun. This is due to the fact that as Blanding ratio with wheat flour and soy flour water chestnut flour increase. This in turn affects and led to the colour changes of the bun to fairness.

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