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## Production of potato breads

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### Abstract

This study conduct to produce nutritious bread using locally abundant and available raw materials such as wheat, potato, soybean flour & oil. Potato ranks third in Bangladesh behind rice and wheat, in terms of total production. Potato is commonly used as a vegetable in Bangladesh, but in many other areas potato is treated as a staple food. Policy makers and administrators realize that, to meet the country's growing food requirements, the dependence on cereals must be reduced. A bounty production of potatoes in Bangladesh should channelize to product diversification to legitimize the price of Potatoes will help the potato farmers. It is relatively labor-intensive and land-intensive and would combine well with other crops in cropping systems to use land that would otherwise be idle. A sharp revenue earning will be enjoyed for the Government provided potato diversified use occurs here in Bangladesh. This study was dedicated to very high share use of potatoes in various frequently used foods like bread. Trying to use upto 50% of potato to make various products like bread, cakes & potato flakes. The proximate analysis test or laboratory test shows containing protein 2.26% comparing with market breads 1%. The taste of bread produced in our laboratory was compared with other five company wheat breads, available in market. The product showed extraordinary softness & flavor relative to other market available breads.

**Keywords:** Potato; Wheat; Bread; Nutritional value; Revenues

### Introduction

Huge production of potato in Bangladesh can earn huge revenue for government by increasing its diversified use through consumption of mass people in all geographical areas of Bangladesh. Farmers are for a long time deprived here for illegitimate price. A perfect potato policy will improve government-farmer relationship. This will be visible through a diversified use & products of potatoes. A flow of various potato products will show a flow of revenues for government. Farmers will get the right earnings. Diversification can be done through production of breads, chips, and potato flakes. Our concern was to use potato into a mass consumable product like bread. Bread may be described as a fermented product produced mainly from wheat flour, water, yeast and salt by a series of process involving mixing, kneading, proofing, shaping and baking (Dewettinck *et al.*, 2008). Today bread is an important staple food. Consumption increasing to a big size. A big price hike in recent years goes against the general norm of busy

working people. Bread produced with potato can popularize again, financially easy, and nutritionally better for wider zone marketing. Potato production in Bangladesh figure is, metric tons in the following regions, Rangpur -17 lac, Bogra -17 lac, Dhaka -12 lac, Dinajpur -11 lac, Rajshahi- 11 lac, Comilla- 6 lac (Bangladesh Bureau of Statistics 2011). Cultivation has been getting popular in Bangladesh over the last several years. The cost of potato cultivation gives high return when it is pumped into markets of potato chips packs. It has been observed that the average costs of potato production were tk 15,000 per hectare (Elias, 1984). When all the variable costs were considered, seed costs 35%, Labor 22% and fertilizer 20% of the total cost (Aniedu and Agugo, 2010). The average yield of potato was 30,000 Kg/hectare. Taka 16,000 on a full cash cost. The benefit-to cost ratios on cash cost basis were 2.5. Prior introducing potato as a mass food we need to check the nutrient content of the three Major Agro products in Bangladesh (Ayubur, 1990).

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Nutrients / 100g	Rice	Wheat	Potato
Energy(kcal)	1528	1419	322
Protein(gm)	7.10	13.7	2.0
Fat(gm)	0.66	2.47	0.09
Carbohydrate(gm)	80	71	17
Fiber(gm)	1.3	10.7	2.2
Sugar(gm)	0.12	0	0.78
Vitamin C(gm)	0	0	19.7
Vitamin A(IU)	0	0	2
Vitamin E(mg)	0.11	0	0.01
Vitamin K(mcg)	0.1	0	1.9

(United States Department of Agriculture 2011)

The consumption of bread and other baked goods produced from wheat and potato is very popular but they contain relatively low protein. Recently consumers awareness of the need to eat high quality and healthy foods known as functional foods, that is foods which contain ingredients that provide additional health benefits beyond the basic nutritional requirements is increasing (Ndife and Abbo, 2009). Soybean is one of the most important oil and protein crops of the world. Soybeans contain 30-45% protein with a good source of all indispensable amino acids (Serrem *et al.*, 2011). With increased awareness of healthy life style based on consumption of functional foods, bread containing wheat, potato, soy flour will increasingly become more important in the baking industry.

### Materials and methods

The potato used in this study to produce potato breads with a high proportion of potato with small amount of wheat and soya flour.

#### Processing of potato

Potato was boiled, peeled and smashed to make breads.

#### Blend formation

Blend formation of our final product (for 100gm Bread) is,

Wheat flour-30gm

Potato -45gm

Soy flour -3gm

Sugar-15gm

Yeast-1.5 gm

Soya-4gm

Oil-5ml

Salt-0.5gm

#### Baking process

Blended mixture of bread was baking for 25 minutes at 180°F. We used electric oven for baking.

#### Analysis for biomolecules

Ash, moisture, protein (micro-kjeldahl), fat (soxhlet apparatus), fiber, sugar (ts/rs) (lane and eynon method), carbohydrate. A panel test for checking bread taste was done.

### Result and discussion

The proximate composition of the Potato Bread sample was done. Mentioned in Table I.

**Table I. The proximate analysis for potato bread**

Sl no	Item	Test specification for potato bread	Results
1.	Moisture	Moisture (%)	33
2.	Nutritional value	Ash (%)	0.5
		Protein (%)	2.26
		Fat (%)	5
		Carbohydrate (%)	60
		Total sugar (%)	6
		Fiber (%)	0.2
		Energy(kcal)	291

#### Observation with experiments

Variations of amount of raw materials (wheat and potato), soy flour, sugar, yeast, leavening time.

**Table II. Variation of Potato, sugar, yeast & soy flour in bread**

Item	(%)	Maximum public acceptance on taste, texture and color
Variation of Potato	60	50%
	50	
	40	
	30	
	20	
Variation of Sugar	10	15%
	15	
	20	
Variation of Yeast	5	2%
	4	
	3	
	2	
Variation of soy flour	4	4%
	5	
	5	
	6	

**Table III. Variation of incubation time for leavening**

Variation of incubation time	Maximum public acceptance for taste, texture and color
45min	
1hr	1hr
2hr	

**Table IV. Public acceptability index, done as a panel test of feeding**

Sl. no	Name of breads	Panel test score
1.	Rana Bread	7
2.	All time bread	5
3.	Energy Bread	4
4.	Rani Bread	6
5.	Potato Bread	8

No.1, 2, 3, 4 are Market wheat breads. No.5 is potato bread.

**Table V. Analysed and compared composition of potato & market breads, where a is potato bread**

Samples	Ash (%)	Moisture (%)	Fat (%)	Protein (%)	Carbohydrate (%)	Fiber (%)	Energy (kcal)
A	0.5	33	5	2.26	59.18	0.2011	290.74
B	1.13	31.75	3.5	0.915	62.5	0.164	285.16
C	0.40	28.27	6	0.58	64.65	0.055	314.94
D	0.69	28.16	2.5	0.81	67.7	0.154	269.54
E	0.5	28.38	2.89	1.05	71.74	0.4367	317.17
F	0.516	29.70	2.83	1.01	65.83	0.1135	292.832

A-potato bread, B-Energy mini bread, C-Rana mini bread, D-All time bread, E-Rani foods bread, F-Dano slice bread.

The Composition of the potato bread supplemented by soy flour is presented in Table V. High protein was observed in the potato breads compared to the local wheat based breads, as shown. The sensory evaluation testes of potato bread and other breads were done with a simple and practical feeding as a panel test. Public acceptance of potato bread was overwhelming comparing to other market wheat breads though analytically it's not too much different from others.

## Conclusion

At our laboratory mass panel tests, a high public response to potato breads shown. The difference of major nutrients like protein, carbohydrate & fat doesn't show the significance of this occurrence. High amount of sodium (3 Times) with respect to wheat can be the answer. Moreover, very high amount of vitamin K, Vit.A, Vit. E (comparing with wheat) in potato can be a leader to popularize potato breads in mass marketing and work of interested researchers. We recommend the use of potato upto 50% in breads as a public acceptable food. More increasing upto 60%, 70%, 80% with introducing sweets will show a type of potato snacks, quite popular t in snacks shops.

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