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K Ashotosh
M.Sc. (Food Tech) Student
Warner College of Dairy Technology, SHUATS, Allahabad, (UP), India.

Shanker Suwan Singh
Assistant Professor
Warner College of Dairy Technology, SHUATS, Allahabad, (UP), India.

Narendra Nath
M.Sc. (Food Tech) Student
Warner College of Dairy Technology, SHUATS, Allahabad, (UP), India.

Correspondence
K Ashotosh
M.Sc. (Food Tech) Student
Warner College of Dairy Technology, SHUATS, Allahabad, (UP), India.

Preparation and quality assessment of bread prepared by using wheat flour, tapioca sago flour (Sabudana) and oat meal (Daliya)

K Ashotosh, Shanker Suwan Singh and Narendra Nath

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Abstract
Baking industry is currently seeking to expand its products range, but also to constitute a way of maintain and improving people's general health. Bakery products are mainly prepared from wheat as its main ingredient. Bread is widely consumed and is an ideal vehicle for functional delivery. The objective of this work was to develop sago flour and oat meal based aata bread. The use of wheat flour, sago flour and oat meal blends as a source of high protein, fat and low gluten content in production of aata bread was studied. The flour blends of wheat, sago and oat meal were composites at replacement levels of 70:25:05 (T_1), 70:20:10 (T_2), 70:15:15 (T_3), % while the wheat flour bread 100:00:00 (T_0) served as control bread. Various analysis parameters were analyzed by two way ANOVA to obtained a predicted optimum result Prepared bread was subjected to chemical, microbial, and sensory analysis to evaluate the suitability of breads were T_2 protein (10.75 %), fat (4.35%),ash (0.72%), moisture (31.55%) and carbohydrate (52.63%) as comparable to control without adversely affecting the sensory parameters. Based on the result it was indicated that beneficial components of sago flour and oat meal made them more favorable choice for food technologist to develop Atta bread especially for celiac disease.

Keywords: Quality assessment, Atta breads

1. Introduction
Bread is one of the oldest and largest consumed foodstuffs and is consumed across the globe by all age groups. Bread may be described as a fermented confectionery product which is produced mainly from wheat flour, yeast, water, sugar, salt and other ingredients needed accordingly, by a series of process involving mixing, kneading, proofing, shaping, baking Bakery products like bread. Throughout recorded history it has been popular around the world and is one of the oldest artificial foods, having been of importance since the dawn of agriculture.

Bread supplies a significant portion of the nutrients required for growth, maintenance of health and wellbeing. It is an excellent source of proteins, vitamins, minerals, fibre and complex carbohydrates. It is also low in fat and cholesterol. Bread is quite bulky so it takes longer to digest and is therefore more satisfying and less fattening than the fats, sugars and alcohols commonly consumed in excess. All breads are nutritious, and the differences between them in nutritional value are not significant if we eat a balanced diet.

Due to the high consumption of bread, the baking sector constitutes the most important section of the food industry. Frequently changing quality prevents the development of these industries and oft en leads to consumer dissatisfaction. Consumer demand is one of the most important factors in the production progress and development. Therefore, technological development of the bread industry is done for the purpose of boosting quality. Additionally, the quality of bread and reducing bread waste are extremely important. Wheat gluten quantity and quality are closely related to bread quality. Addition of high-quality wheat into the blend and the use of permitted baking additives are recommended to obtain a desirable standard of quality

Wheat (*Tritium aestivum*) is the principal crop used for bread making. Many epidemiological studies have been carried out on consuming whole wheat and indicated that whole wheat foods could reduce the risk of cancers,, diabetes and coronary heart disease.

Wheat flour is a powder made from the grinding of wheat used for human consumption. More wheat flour is produced than any other flour. Wheat varieties are called "soft" or "weak" if gluten content is low, and are called "hard" or "strong" if they have high gluten content. Hard flour, or *bread flour*, is high in gluten, with 12% to 14% gluten content, and its dough has

elastic toughness that holds its shape well once baked. Soft flour is comparatively low in gluten and thus results in a loaf with a finer, crumbly texture. Soft flour is usually divided into cake flour, which is the lowest in gluten, and pastry flour, which has slightly more gluten than cake flour.

Sago is a starch extracted from the spongy centre, or pith, of various tropical palm stems, especially that of *Metroxylon sagu*. The largest supply of sago comes from Southeast Asia, particularly Indonesia and Malaysia. Large quantities of sago are sent to Europe and North America for cooking purposes. Any starch can be pearled by heating and stirring small aggregates of moist starch, producing partly gelatinized dry kernels which swell but remain intact on boiling. Pearl sago closely resembles pearl tapioca. Both are typically small (about 2 mm diameter) dry, opaque balls. Both may be white (if very pure) or colored naturally grey, brown or black, or artificially pink, yellow, green, etc. When soaked and cooked, both become much larger, translucent, soft and spongy. Both are widely used in Indian, Bangladeshi and Sri Lankan cuisine in a variety of dishes and around the world, usually in puddings.

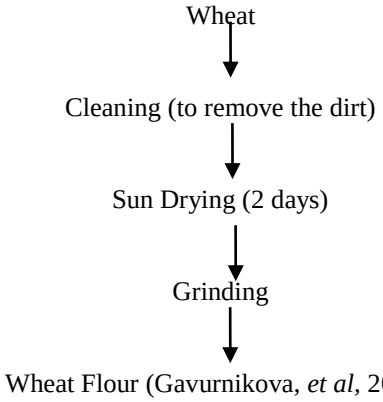
Oat meal is a cereal food made from the several different wheat species, most often from *durum* wheat. It has a light, nutty flavor. Oat meal is a kind of dried cracked wheat. It is most common in European, Middle Eastern, and Indian cuisine. Oat meal is recognized as a whole grain by the U.S.D.A. and the Whole Grains Council.

Compared to unenriched white rice, Oat meal has more fiber and protein, a lower glycemic index, and higher levels of most vitamins and minerals.

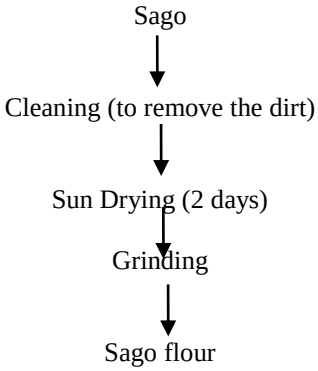
Material and Methods

The experimental work based on "Preparation and Quality Assessment of Bread Prepared by Using Wheat Flour, Tapioca Sago Flour (Sabudana) And Oat Meal (Daliya)" was carried out in the research laboratory of department of Warner College of dairy technology, SHUATS Allahabad. The experimental samples used for this study were wheat flour, buck wheat flour and pearl millet flour.

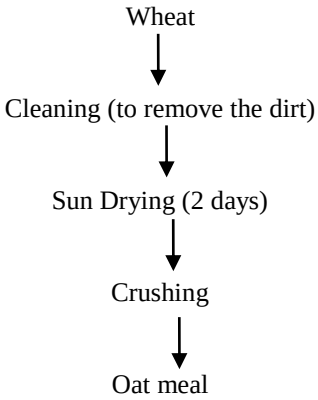
Multigrain bread Manufacturing Materials



Preparation of Sago flour



Preparation of Oat Meal



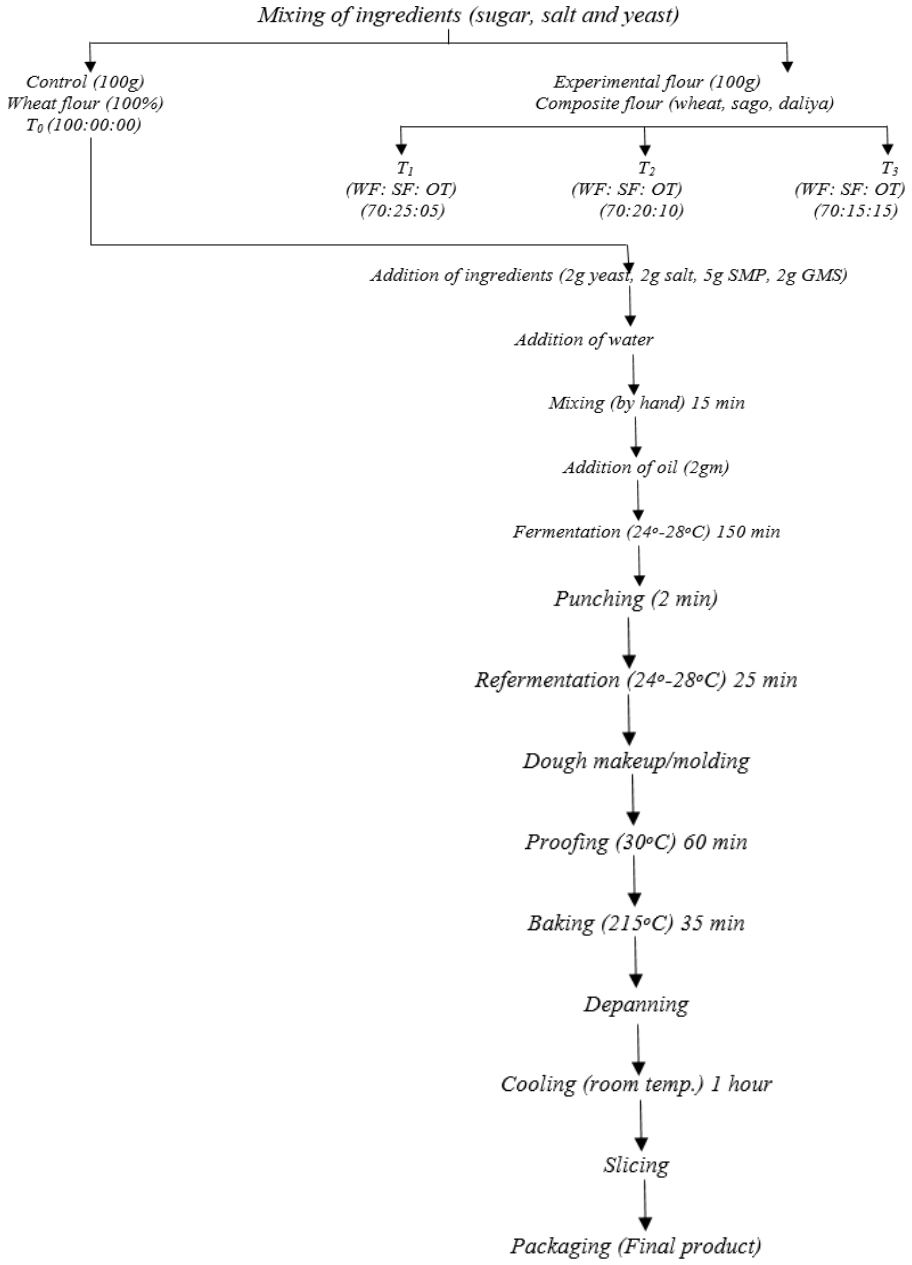
Treatment Combination

T_0 -Control prepared from wheat flour (100:00:00)
T_1 –Experimental sample prepared from wheat flour, sago flour and oat meal (70:25:05)
T_2 –Experimental sample prepared from wheat flour, sago flour and oat meal (70:20:10)
T_3 –Experimental sample prepared from wheat flour, sago flour and oat meal (70:15:15)

Plan of layout:

Number of replication : 5
Number of treatment : 4

Plan of work



Average data for different parameters of control and experiments (in percent)

Parameters	Treatments			
	T_0	**T_1**	**T_2**	**T_3**
1. Chemical Analysis				
Moisture	31.72	31.68	31.55	31.45
Fat	4.21	4.30	4.35	4.49
Protein	9.64	10.28	10.75	11.21
Carbohydrate	53.86	53.16	52.63	51.05
Ash	0.57	0.58	0.72	0.80
2. Microbiological analysis				
Yeast & Molds count (cfu/gm)	1.4	1.6	1.6	2.2
Coliform count	Nil	Nil	Nil	Nil
SPC x 10^3 cfu/gm	3.8	4.2	4	4.4
3. Organoleptic Score (9-pointhedonic scale)				
Color and Appearance	7.68	7.79	8.0	7.66
Body and Texture	7.8	7.48	7.92	7.66
Flavor and taste	7.7	7.8	8.08	7.6
Overall acceptability	7.72	7.70	7.99	7.63
4. Cost analysis				
Cost in Rs./100g	5.20	5.80	5.87	5.90

Result and Discussion

Moisture percentage: There was non- significant difference in moisture content of different treatment combinations. T_3 (31.728) followed by T_2 (31.686), T_1 (31.55), T_0 (31.456).

The difference in moisture was due to the composition difference of wheat flour, sago flour and oat meal which are used in different propositions in different treatments.

Ash percentage: There was non- significant difference in ash content of different treatment combinations. Maximum ash percent was recorded in the sample of the difference in ash was due to the composition difference of wheat flour, sago flour and oat meal which are used in different propositions in different treatments.

Protein percentage: There was non- significant difference in protein content of different treatment combinations. Maximum protein percent was recorded in the sample of T_3 (0.804) followed by T_2 (0.72), T_1 (0.586), T_0 (0.574).

The difference in Protein was due to the composition difference of wheat flour, sago flour and oat meal which are used in different propositions in different treatments.

Fat percentage: There was non- significant difference in fat content of different treatment combinations. Maximum fat percent was recorded in the sample of T_3 (4.496) followed by T_2 (4.356), T_1 (4.304), T_0 (4.11).
The difference in fat was due to the composition difference of wheat flour, sago flour and oat meal which are used in different propositions in different treatments.

Carbohydrate percentage: There was non- significant difference in Carbohydrate content of different treatment combinations. Maximum Carbohydrate percent was recorded in the sample of T_0 (54.118) followed by T_1 (53.274), T2 (52.48), T_3 (51.756).
The difference in Carbohydrate was due to the composition difference of wheat flour, sago flour and oat meal which are used in different propositions in different treatments.

Organoleptic analysis
Color and appearance score: There was non-significant difference in color and appearance score of different treatment combination. Maximum color and appearance score was recorded in the sample of T_2 (8.00) followed by T_1 (7.79), T_0 (7.68), T_3 (7.66).
The difference in color and appearance was due to the composition difference of wheat flour sago flour and oat meal which are used in different proposition in different treatments.

Body and texture score: There was non-significant difference in Body and texture score of different treatment combination. Maximum Body and texture score was recorded in the sample of T_2 (7.92) followed by T_0 (7.8), T_3 (7.66), T_1 (7.48).
The difference in Body and texture was due to the composition difference of wheat flour sago flour and oat meal which are used in different proposition in different treatments.

Flavor and taste score: There was non-significant difference in Flavor and taste score of different treatment combination. Maximum Flavor and taste score was recorded in the sample of T_2 (8.08) followed by T_1 (7.8), T_3 (7.6), T_0 (7.7).
The difference in Flavor and taste was due to the composition difference of wheat flour sago flour and oat meal which are used in different proposition in different treatments.

Overall acceptability score: There was non-significant difference in Overall acceptability score of different treatment combination. Maximum Overall acceptability score was recorded in the sample of T_2 (7.9) followed by T_0 (7.72), T_1 (7.7) and T_3 (7.6).
The difference in Overall acceptability was due to the composition difference of wheat flour sago flour and oat meal which are used in different proposition in different treatments.

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