

Development and Quality Assessment of Low Sugar Wheat Bread Prepared by Using Refined Wheat Flour, Wheat Flour and Sago Flour

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Abstract

It is concluded that Low sugar wheat bread can be prepared with different ratio of Refined Wheat Flour, Wheat Flour, Sago Flour and Stevia at different levels of concentration (T0, T1, T2, and T3). The concentration of T0 were 100:0:0; T1 were 75:22.5:2.5:1; T2 were 70:25:05:1 and T3 were 65:27.5:7.5:1. The data collected on different aspects were tabulated & analyzed statistically using the methods of variance & critical difference. Physicochemical analysis (Total solids, Ash, Carbohydrate, Protein, Fat, Fiber and Moisture) was done for estimating its nutritional content and for organoleptic characteristics (Color and Appearance, Body and Texture, flavor and Taste & Overall Acceptability) were judged by 9-point hedonic scale. The Cost Analysis of final product for treatments T0, T1, T2, and T3 were 17.00/-, 18.00/-, 18.50/- and 19.00/- Rs/200g respectively. According to Physicochemical analysis treatment T3 with ratio 65:27.5:2.5 was found to be the best among all with highest fiber content and T2 with 70:25:05:1 was best among all the treatment according to Organoleptic score.

Keywords: Organoleptic, Physicochemical analysis.

Introduction

Breads are fermented bakery product which provides decent amount of nutrients required for growth, maintenance of health and well-being. It is an excellent source of protein, vitamins, minerals, fiber and complex carbohydrates.

Refined Wheat Flour popularly known as Maida obtained from fine milling of Wheat endosperm is a key ingredient in bakery products because of structural protein in it known as Gluten. It is complex mixture of two proteins called Gliadin and Glutenin. Gluten is not readily subject to altered by heat and it has capacity to act as binding agent which helps in improving texture, retaining moisture and flavor hence widely used in baking. Wheat Flour also known as Atta is flour obtained from milling of whole wheat grain and is high in fiber as compared to refined wheat flour. Sago (*Tapioca*) is a type of starch extracted from the tropical palm stems. Sago has low calorie, fat and protein content and is free from casein and gluten. Sago is safe to be consumed by diabetic people because it has low glycemic index.

Stevia is a natural zero calorie sweetener prepared by steeping the leaves of the stevia plant to extract the sweet compounds from leaf. The sweet tasting components of stevia are called steviol glycosides, which are naturally present in stevia leaf and is 200 times sweeter than sucrose despite artificial sweeteners are low in calories but such additives if used for prolonged period of time may exhibit adverse health effects whereas Stevia is a safer alternative being a natural sweetener. After combining all the ingredients, a low sugar Wheat bread can be prepared which would be safe to consume by diabetic patients as well.

Materials and Method

The Experiment “Development and Quality Assessment of Low Sugar Bread Prepared by Using Refined Wheat Flour, Wheat Flour and Sago Flour” was carried out in a research lab of “Warner College of Dairy Technology” Sam Higginbottom Institute of Agriculture, Technology and Sciences, Deemed to be University, Prayagraj. Ingredients were collected from local market of Naini, Prayagraj.

The required materials can be listed under Raw materials and Equipment section.

Raw Materials:

Refined wheat flour, Wheat Flour, Sago Flour, Stevia extract, Yeast, Butter, Sugar, Salt.

Equipment:

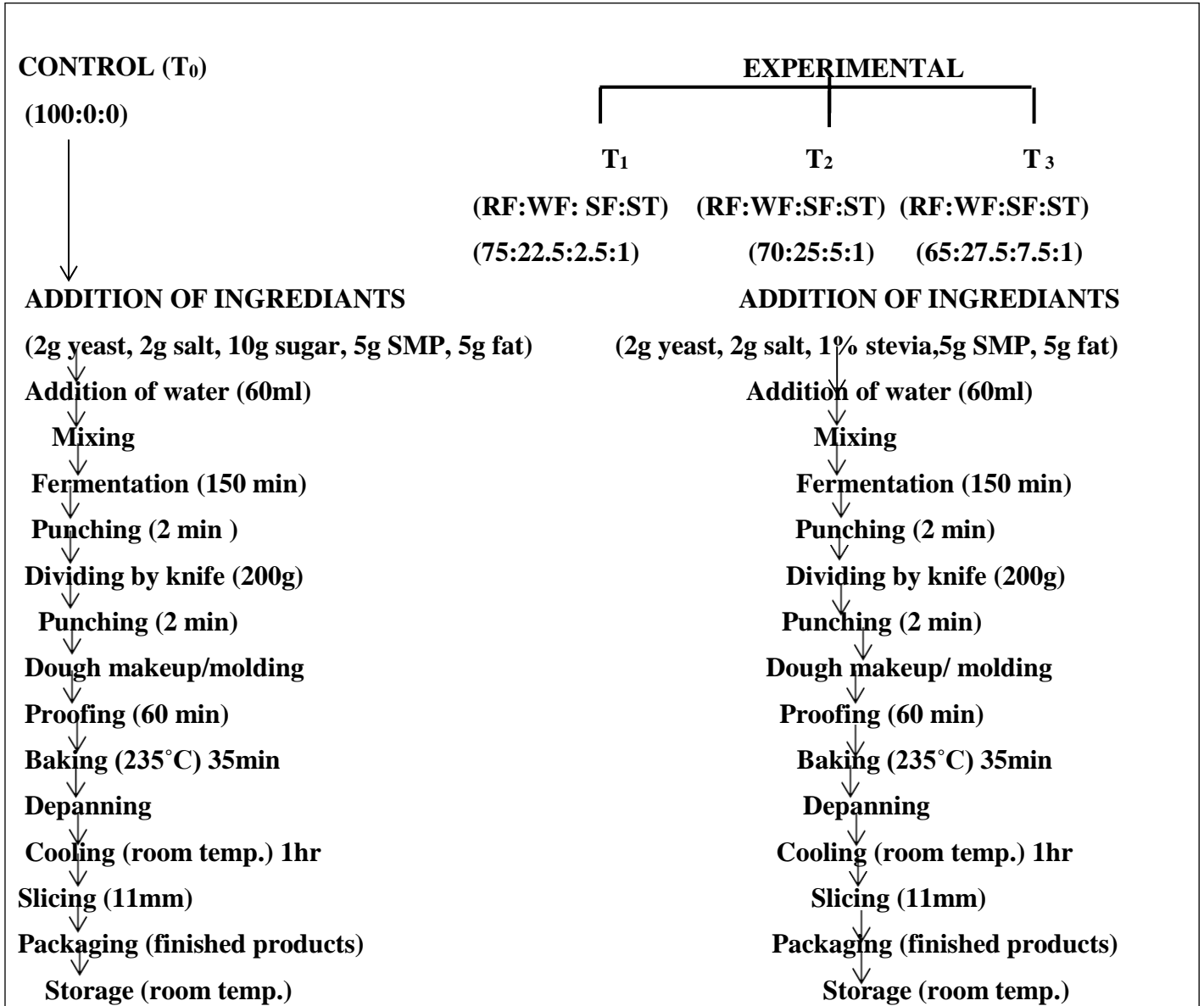
Weighing balance, baking oven, Moulds, Measuring cylinder, Beaker.

Treatment Table:

Treatments	Refined flour%	Wheat flour%	Sago flour%	Stevia%
T0	100	0	0	0
T1	75	22.5	2.5	01
T2	70	25	05	01
T3	65	27.5	7.5	01

Two types of Treatments were prepared the first one was T0 which was the control treatment prepared to compare the texture and appearance, the remaining treatments T1, T2 and T3 were the experimental treatments, these were decided according to the minimum amount required of the ingredient to fulfill the required amount of dedicated nutrient of such ingredient.

Plan of Work



The above flowchart shows the processes involved to prepare Low Sugar Wheat bread using Refinedwheat flour, Wheat flour, Sago Flour and Stevia.

Result and Discussion

The analyzed data is presented in this chapter under the following headings:

1. Physicochemical analysis
2. Organoleptic analysis
3. Microbial analysis
4. Estimation of Cost of production

Table no. 1. Physicochemical analysis

Parameters	Treatments			
	T 0	T 1	T 2	T 3
Physicochemical analysis				
Fat	1.00	1.15	1.16	1.17
Protein	12.20	12.75	12.54	12.34
Carbohydrate	70.50	66.87	66.81	66.71
Dietary fiber	3.00	5.08	5.24	5.41
Ash	1.17	1.56	1.59	1.62
Moisture	12.13	12.59	12.66	12.75
Total Solids	87.87	87.41	87.34	87.25

Table no. 2. Organoleptic Score (9 Point Hedonic Scale)

Organoleptic Score				
Color & Appearance	8.30	7.90	8.10	8.04
Body & Texture	9.00	8.01	8.80	8.30
Flavor & Taste	8.50	7.70	8.20	7.90
Overall Acceptability	8.12	7.41	8.09	6.85

Table no. 3. Microbial analysis

Microbiological Score				
Yeast & Mold (x10⁷ cfu/g)	1.40	1.64	1.82	2.20
Standard Plate Count (x10³cfu/g)	4.25	3.82	3.49	3.40
Coli Form Count	NIL	NIL	NIL	NIL

Table no. 4. Estimation of Cost of production

Cost Analysis				
COST (per 200gm)	Rs.17.00	Rs.18.00	Rs. 18.50	Rs.19.00

CHEMICAL ANALYSIS

- ❖ **Fat percentage-** There was significant difference in fat content of different treatment combination. Maximum fat percentage was recorded in the sample T3 (1.17) followed by T2 (1.16), T1 (1.15), T0 (1.00). The difference in these values of fat T0 – T1, T1 - T3, T0 – T3 T1 - T2, T2 - T3, T0 -- T2 were significant.
- ❖ **Protein percentage-** There was significant difference in protein content of different treatment combination. Maximum protein percentage was

recorded in the sample T 1 (12.75) followed by T 2 (12.54), T 3 (12.34), T 0 (12.20). The difference in these values of protein T0 – T1, T1 - T3, T0 – T3 T1 - T2, T2 - T3, T0 -- T2 were significant.

- ❖ **Carbohydrate percentage-** There was significant difference in carbohydrate content of different treatment combination. The maximum carbohydrate percentage was recorded in the sample T0 (70.50) followed by T1 (66.87), T2 (66.81) and T3 (66.71). The difference in these values of carbohydrate T0 – T1, T1 - T3, T0 – T3 T1 - T2, T2 - T3, T0 -- T2 were significant.
- ❖ **Dietary Fiber-** There was significant difference in Dietary Fiber content of different treatment combination. The maximum Dietary Fiber percentage was recorded in the sample T3 (5.41) followed by T2 (5.24), T1 (5.08) and T0 (3.00). The difference in these values of carbohydrate T0 – T1, T1 - T3, T0 – T3 T1 - T2, T2 - T3, T0 -- T2 were significant.
- ❖ **Ash percentage-** There was significant difference in ash content of different treatment combination. Maximum ash percentage was recorded in the sample T3 (1.62) followed by T 2 (1.59), T 1 (1.56), T 0 (1.17). The difference in these values of ash T0 – T1, T1 - T3, T0 – T3 T1 - T2, T2 - T3, T0 -- T2 were significant.
- ❖ **Moisture percentage-** There was significant difference in Moisture content of different treatment combination. Maximum moisture percent was recorded in the sample T 3 (12.75) followed by T 2 (12.66), T 1 (12.59), T 0 (12.13). The difference in these values of moisture T0 – T1, T1 - T3, T0 – T3 T1 - T2, T2 - T3, T0 -- T2 were significant.
- ❖ **Total solids percentage-** There was significant difference in total solids content of different treatment combination. Maximum total solids percent was recorded in the sample T 0 (87.87) followed by T 1 (87.41), T 2 (87.34), T 3 (87.25). The difference in these values of total solids T0 – T1, T1 - T3, T0 – T3 T1 - T2, T2 - T3, T0 -- T2 were significant

Organoleptic analysis

- ❖ **Color and appearance score-** There was significant difference in color and appearance score of different treatment combination. Maximum color and appearance percentage was recorded in the sample T 0 (8.3) followed by T 2 (8.10), T 3 (8.04), T 1 (7.90).
- ❖ **Body and texture score-** There was significant difference in body and score of different treatment combination. Maximum body and texture score was recorded in the sample T 0 (9.00) followed by T 2 (8.8), T 3 (8.3), T 1 (8.01).
- ❖ **Flavor and taste score-** There was significant difference in flavor and taste score of different treatment combination. Maximum flavor and taste was recorded in the sample T 0 (8.5) followed by T 2 (8.2), T 3 (7.9), T 1 (7.7).
- ❖
- ❖ **Overall acceptability-** There was significant difference in overall acceptability score of different treatment combination. Maximum overall acceptability was recorded in the sample T 0 (8.12) followed by T 2 (8.09), T 1 (7.41), T 1 (6.85).

Microbiological parameters

Yeast and mold count

The highest mean value for yeast and mold count on bread for control and treatment samples was recorded and significantly viable as T 3 (2.20) followed by T 2 (1.82), T 1 (1.64), T 0 (1.4).

Standard plate count

The highest mean value for standard plate count on bread for control and treatment samples was recorded and significantly viable as T 0 (4.25) followed by, T1 (3.82), T2(3.42), T 3 (3.4).

Conclusion

- Low Sugar Wheat bread was prepared by using refined wheat flour, wheat flour and sago flour.
- Physicochemical analysis of low sugar wheat bread was performed and T3 was recorded as treatment with best nutritional composition.
- Sensory evaluation of the prepared low sugar wheat bread was performed and T2 was recorded as best in organoleptic characters.
- Estimation of Cost of prepared low sugar wheat bread was performed and T3 was recorded as having highest cost per 200g.

From the performed production and testing of prepared low sugar wheat bread T2 was recorded as best in organoleptic character and T3 has the highest production cost per 200g and it has highest nutritional value as well.

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