
**DEVELOPMENT AND QUALITY ASSESSMENT OF BREAD PREPARED BY USING
WHEAT FLOUR, ALMOND FLOUR AND INULIN POWDER**

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Abstract

This research highlights the potential of using almond and inulin powders to produce a more Nutritious bread product, offering a valuable alternative to conventional bread formulations. The Findings contribute to the growing body of knowledge on functional ingredients in baked goods And provide a foundation for future studies on the health benefits and market potential of enhanced bread products. This Research investigates the formulation and quality evaluation of bread incorporating wheat flour, almond powder, and inulin powder. The primary objective is to enhance the nutritional profile of traditional bread by integrating almond powder and inulin, which offer potential health benefits such as increased protein content and improved dietary fiber intake. The study involves developing various bread formulations with varying proportions of almond powder (5%, 10%, and 15%) and inulin powder (10%, 15%, and 20%), and assessing their impact on bread quality attributes including texture, volume, color, and sensory characteristics. Bread samples were subjected to a series of evaluations: physical easurements, including loaf Volume and crumb texture; chemical analyses to determine nutrient content; and sensory Assessments to gauge consumer preference. Results indicated that the incorporation of almond powder significantly enhanced the bread's protein content and flavour, while inulin contributed to a higher fiber content and improved texture. Optimal formulations were identified based on a balance of nutritional benefits and sensory acceptability, Treatment 1 having 85% wheat flour, 5% almond powder and 10% inulin powder showing best promising results.

Keyword: Bread, Inulin, Almond, Dietary fiber.

Introduction

Bread is a staple food prepared from a dough of flour (usually wheat) and water, usually by baking. Throughout recorded history and around the world, it has been an important part of many cultures diet. Bread is one of the oldest and most universal foods known to humanity. It has been a staple in the diets of many cultures throughout history, symbolizing sustenance and community. The making and consumption of bread span numerous cultures, traditions, and centuries.

Bread is a significant source of carbohydrates, providing energy. Whole grain breads are particularly nutritious, offering dietary fiber, protein, and essential vitamins and minerals such as B vitamins, iron, and magnesium. The nutritional value can vary widely depending on the type of bread and the ingredients used. Whole grain and multigrain breads generally offer more nutrients and fiber compared to white bread.

Bread is among the most common foods for the world's population. Therefore, it can be fortified to eliminate deficiencies of nutrients or be a carrier of these substances with a nutritional or physiological effect, bringing health benefits to its consumers, thus impacting sustainable health. The technique of purposefully adding nutrients or non-nutrient bioactive ingredients to food items is known as fortification. It is widely utilized across the world to avoid and/or balance dietary deficiencies and shortages in essential nutrients. Additionally, fortification can be carried out to give consumers useful food items, restore nutrients lost during processing, and provide a diet with a sustainable nutritional profile.

Inulin is a type of soluble fiber found in a wide variety of plants, most notably chicory root, but also in foods like onions, leeks, asparagus, and bananas. In recent years, inulin has gained popularity as both a prebiotic and a carbohydrate replacement, particularly in low-carb and gluten-free recipes.

Materials and Methods

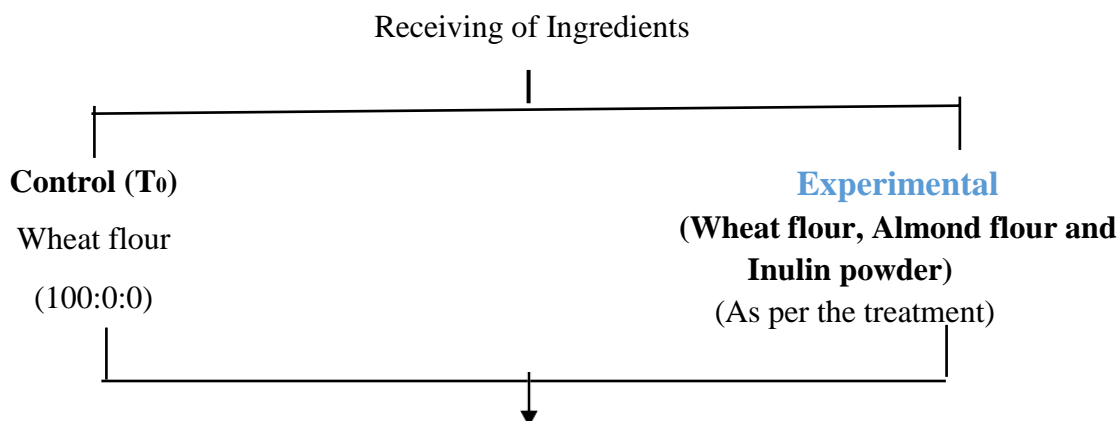
This Chapter includes materials and methods required for the preparation of Inulin bread. The experiment “Preparation of Inulin Bread from Wheat flour, Almond Flour and Inulin powder” was carried out in the Research laboratory of Warner College of Dairy Technology, SHUATS, Prayagraj.

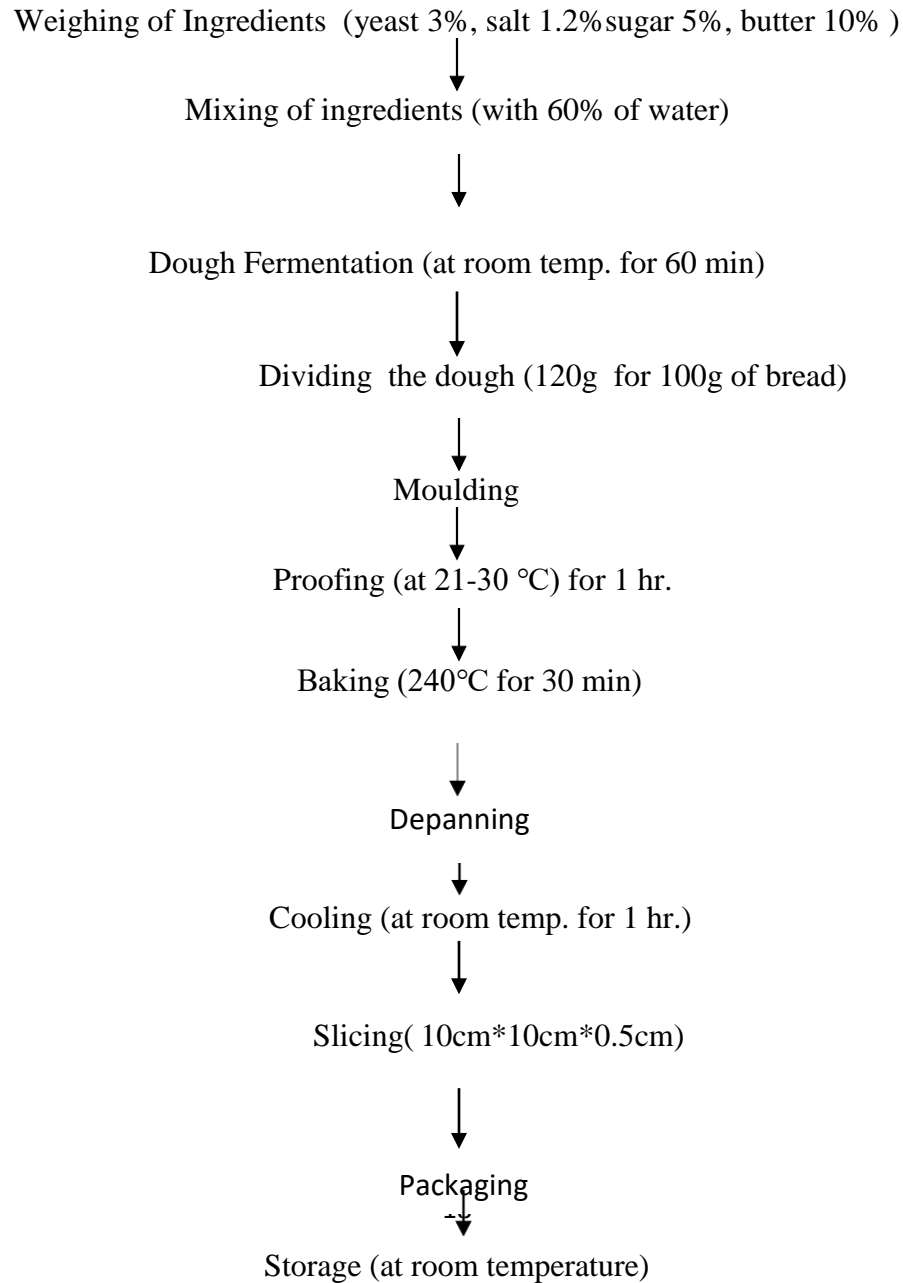
Treatment Table

Table no. 01 treatment combinations

Treatments	Wheat Flour (%)	Almond flour (%)	Inulin powder (%)
T0	100	0	0
T1	85	05	10
T2	75	10	15
T3	65	15	20

Flow chart for preparation of bread





Result and Discussion

The obtained data were analyzed under following headings.

1. Physico-chemical analysis
2. Microbiological Analysis
3. Sensory Evaluation
4. Estimation for cost of production

Table no. 03 Physco-chemical analysis

PARAMETER	Treatment				CD Value
	T0	T1	T2	T3	
Moisture %	27.20	27.34	27.43	27.49	0.08
Protein %	10.99	10.16	9.76	9.66	0.01
Fat %	1.49	3.67	5.32	6.50	0.01
Ash %	1.22	1.20	1.18	1.16	0.01
Carbohydrate %	59.10	57.63	56.31	55.19	0.03
Fibre %	8.32	16.95	25.72	28.02	0.01

Table no. 04 -Microbiological Analysis

SPC($\times 10^{-3}$ cfu/g)	3.04	3.44	4.19	4.44	0.02
Yeast & Mold(cfu/g)	1.26	1.48	1.96	2.18	0.02
Coliform count	Nil	Nil	Nil	Nil	-

Table no. 05 - Sensory attributes

Colour and appearance	9	9	8	7	0.68
Flavour and taste	9	9	8	7	0.53
Body and texture	9	8	7	6	0.35
Overall acceptability	9	9	8	7	0.53

This is well known recognition that diet is habitual nourishment which plays an important role in both health and goodness. Inulin bread powder offers a range of nutritional and therapeutic benefits which enhance the gut health, fibre rich, and antidiabetic activities. Therefore, the present study entitled “**Development and Quality Assessment of Bread Prepared by using Wheat, Almond and Inulin powder.**” was undertaken with following objectives-

- To prepare bread using Wheat flour, Almond flour and Inulin powder.
- To assess the Physico-chemical and microbiological analysis of developed bread.
- To assess the sensory attributes of developed bread.
- To estimate the cost of developed bread.

Organoleptic Parameter

Colour and Appearance: T0(10), T1(9), T2(8), T3(7).

Flavor and Taste: T0(9), T1(8), T2(7), T3(7).

Body and Texture: T0(9), T1(9), T2(8), T3(7).

Overall Acceptability: T0(9), T1(9), T2(8), T3(7).

Physico-Chemical Analysis

Moisture: T3 (27.49), T2 (27.43) T1 (27.34), T0 (27.20).

Protein: T0 (10.99), T1 (10.16) T2 (9.78), T3 (9.66).

Ash: T0 (1.22), T1 (1.20) T2 (1.18), T3 (1.16).

Fat: T3 (6.50), T2 (5.30), T1 (3.65), T0 (1.49).

Fiber: T3 (28.02), T2 (25.72), T1 (16.95), T0 (8.93).

Carbohydrate: T0 (59.10), T1 (57.60), T2 (56.31), T3 (55.19).

Microbiological Parameters

Total Plate Count: T3 (4.44), T2 (4.19) T1 (3.44), T0 (3.04).

Conclusion

Based on the experimental results obtained in this investigation, it can be concluded that inulin bread was successfully prepared using a combination of wheat flour, almond flour, and inulin powder. inulin is great soluble fibre which The physico-chemical analysis indicated that the T3 treatment had the best nutritional composition. However, sensory evaluation revealed that the T1 treatment was preferred, achieving the highest overall acceptability score(9.0),having superior organoleptic characteristics. Microbial evaluation showed that T3 had the highest standard plate count (4.39×10^4 cfu/g) which is not preferred. The cost analysis determined that T3 was the most expensive, costing ₹43.89 per 100g.

In conclusion, the T1 treatment, with a composition ratio of 85:05:10 (WF:AF:IP)

Have emerged as our best treatment with best overall acceptability (9) ,good nutritional value Having rich fibre content ,protein content and with best cost efficiency. overall acceptability in samples of different treatments and control, the highest mean was recorded in the sample of T0 (8.8) followed by T1 (8.6), T2 (7.6), T3 (7).

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