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Rozeena Parvez

Ph.D. Scholar in Food Science and Technology, Department of Warner College of Dairy Technology, Sam Higginbottom University of Agriculture Technology and Sciences (SHUATS), Allahabad, Uttar Pradesh, India

Ankita Gautam

Assistant Professor, Department of Warner College of Dairy Technology, SHUATS, Allahabad, Uttar Pradesh, India

Vyakhaya

Ph.D. Scholar in Food Science and Technology, Department of Warner College of Dairy Technology, Sam Higginbottom University of Agriculture Technology and Sciences (SHUATS), Allahabad, Uttar Pradesh, India

Corresponding Author:**Rozeena Parvez**

Ph.D. Scholar in Food Science and Technology, Department of Warner College of Dairy Technology, Sam Higginbottom University of Agriculture Technology and Sciences (SHUATS), Allahabad, Uttar Pradesh, India

Ajwa dates, (*Phoenix dactylifera*) rice bran and wheat bran composition for healthier cookies, nutritional, antioxidant, and quality characteristics

Rozeena Parvez, Ankita Gautam and Vyakhaya

Abstract

Cookies are confectionery products primarily prepared from flour, fats, and sugar. Various types of cookies are commercially available, but today's people want to be healthy and functional cookies with high nutritional value, novel taste, and a variation on old goods flavors that are affordable, have a short ingredient list, and are as healthy as possible have to be introduced with health benefits. Cookies were the ideal traveling lunch when humans started traveling's because they stayed fresh for long periods and had long storage to improve the nutritional value of cookies by using ajwa date, rice bran, and wheat bran in the preparation of fortified cooking. The dietary composition of these cookies shows a significantly ($p < 0.05$) increased fibre and ash content, which play a role in the lowering the risk of diabetes, and cancer. The also consumption of cookies plays an essential role in providing the daily requirement of the mineral intake. This study estimated the chemical composition (fat, protein, moisture, ash, carbohydrate, crude fiber) of iron, potassium, calcium, and magnesium content in fortified cookies. This made cookies compared with the control cookies (T0). It has been observed that ajwa date, rice bran, and wheat bran can be incorporated in the preparation of fortified cookies and has been well accepted in organoleptic and physical characteristics.

Keywords: Ajwa date, fortified cookies, rice bran, wheat bran, antioxidant

1. Introduction

"Cookie" refers to a baked good with key ingredients like sugar, flour, and fat and low water content [1-5]. Other components, such as leavening agents, salt, dough formula, emulsifiers, and syrups, are more ingredients used in cookies. Proteins can be added to cookies to boost their nutritional value by partially substituting protein-rich refined wheat flour up to an adequate amount [1, 2]. Cookies are single-serving finger foods that are small, flat, sweet and d y. Cookies are often made using flour, but they can also be produced without flour using egg whites and almonds, as in macaroons, or gluten-free flour, such as rice flour. Soft, chewy, or crunchy cookies are all options. They might be large or small, simple or ornate. They can be as simple as butter and sugar or as complex as a myriad of components, or they can be made into two-layer cookie sandwiches with filling. However, they began their life as an oven regulator, not as a delicacy or comforted me l. Cookies are a convenient, ready-to-eat, and inexpensive source of vibrant energy [1, 2, 3, 4].

1.2 Nutritional benefits of ajwa date

The Ajwa date (*Phoenix dactylifera*) is of the oldest fruit plants in the Arabian Peninsula, having played an essential role in people's everyday lives for the past 6000 years. Dates have high carbohydrate content (80%) but a low protein level (2 - 3 percent). According to the FAO, dates are high in simple sugars, minerals, and vitamins and have a fibre content of about%. The flesh of a fully ripe date comprises two-thirds sugar and one-quarter water, with the remainder primarily composed of cellulose, pectin, ash, and vitamin s. FAO, As a result, the date is thought to be a healthful fruit [3]. Fruit length, fruit diameter and total number of fruits. L2 days to first flowering, for total yield per plant in order of merit. Similarly L7 for internodal for total yield per plant in order of merit. Similarly length at 95 DAS, number of nodes at 95 DAS, number of branches at 45 DAS were the good general combiners.

1.3 Rice bran and its nutritional value: Rice bran is a byproduct of white rice obtained during milling from the outer layer of the brown (husked) rice kern l.

It is high in antioxidants, amino acids, vitamins, and minerals such potassium, iron, calcium, chlorine, magnesium, and manage e. Adding rice bran to cookies can boost their nutritious value [4, 5, 6]. The use of wheat, rice, and other cereal bran to manufacture various food products is becoming more popular. Wheat bran contains a high concentration of protein (14%), carbs (27%), minerals (5%), lipids (6%), and B vitamin s. It is inexpensive and straightforward to you e. Several attempts have been made to include bran from diverse sources as a high protein and fibre source into cereal products. The inclusion of wheat bran in cookies can boost their nutritional value [4, 5].

1.4 Wheat bran and nutritional composition

Wheat Bran is a type of cereal that is made from when t. The amount of bran is a milling byproduct used for food and non-food purposes. Wheat bran (WB) use for human consumption has gradually increased over. All are related to healing h better. WB investigated the approach to determining functional component. As a consequence of client feedback and a desire for healthier options, Natural-source ingredients were researched and used in food products n. Bakeries and cereals came first and second, accounting for around 60% of all bran-containing food groups test d. Wheat bran has gained popularity in current years for baked meals and fried cereal dish [6].



Fig 1: Experimental cookies using Ajwa dates, rice bran, and wheat bran

Objective

- Preparation of cookies by the of Ajwa Dates (*Phoenix dactylifera*) Rice bran and wheat bran in different ratios
- Comparison and evaluation of nutritional analysis of cookies.

2. Materials and Method

2.1 Materials

- Ingredient Used:** To prepare Wheat bran, Rice bran, and Ajwa Dates cookies following elements will be used: Date fruit Rice bran.
- Date fruit** -Date fruits (Ajwa date variety) were obtained from amazon n. (About 22% moisture).
- Rice Bran** -Rice bran was procured from Riddhi Siddhi rice mill, Allahabad.
- Wheat Bran**-Wheat bran was procured from Riddhi Siddhi wheat mill, Allahabad.
- Wheat flour** -Wheat flour was procured from the local market of Allahabad.

- Fat** –Hydrogenated fat was obtained with the brand name Raag of Hindustan lever ltd and used as shortening for baking purposes.
- Vanillin essence**

Formulation of Cookies: The mix will be formulated by using the different ingredients in the following proportion

Table 1: preparation of cookies using ajwa dates, rice bran, and wheat bran

Formulation Cookies		
Ingredients	Source	Quantity (%)
Flour mix	Amazon online market	55
Powder Sugar	Local market	15
Butter	Local market	30
Vanillin flavor	Local market	0.4
Total		100

2.2 Preparation of cookies using ajwa dates, rice bran, and wheat bran

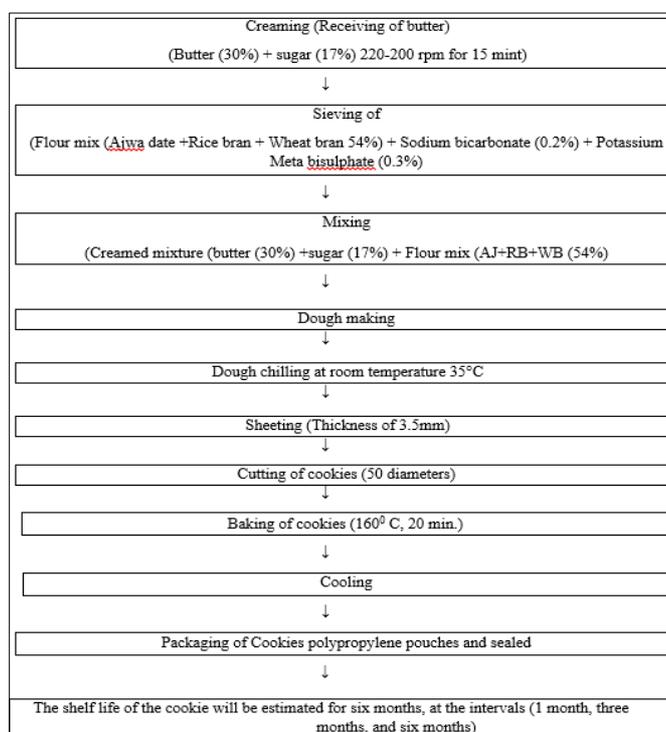


Fig 2: Flow chart of final preparation of cookies

2.3 Sensory evaluation of Ajwa date, rice bran, wheat bran cookies

- Developed Cookies was the sensory analysis was conducted in a dark, well-lit space free of odors. For color assessment, panel cubicles were uniformly illuminated with unique daytime but. The samples was stored in sealed containers with four-digit different numbers on them. For each treatment, each panelist judged three pieces. The panelists received the necessary training during the sampling process. In a sensory laboratory, panelists evaluate the sample. The sensory evaluation was completed at a temperature of 25 C. Color and appearance, taste, texture, sweetness, and standard acceptability are all given a hedonic ranking (9-point scale; 1 = dislike, 9 = like).

2.4 Storage study for six month

Optimize product was stored under ambient te p. (37 °C) for 0 days and 120 days in polypropylene packaging, keeping it room temperature; the optimized effect was analyzed after an interval of

one month to six months physico- chemical, sensory and microbial studies.

2.5 Statistical analysis

The data was collected on various aspects was statistically using the analysis of variance collection, followed by the F-test and critical difference (C). The significant and non-significant differences found were examined for essential differences within and within treatment combinations.

3. Result and Discussion

3.1 Evaluation of physico chemical analysis of ajwa date, rice bran, wheat bran cookies

In physico chemical test of ajwa date, rice bran and wheat bran cookies, high dietary fibre content and iron content of ajwa date, rice bran wheat bran is obtained results, calcium content Table 1. cookies when incorporated 26% ajwa date, 9% rice bran, and 10% wheat bran, treatment composition contained moisture (3.33%), ash (1.34%), fat (12.49%), protein (9.74%) crude fiber (2.16%), carbohydrates (72.16%) antioxidant properties of (10.15). And higher value of minerals contents, iron (3.50%) copper (0.56%), sodium 4.11% zinc 2.50% calcium 33.52mg/100g, potassium 391.50%, phosphorus 324.41%. magnesium 33.5%. These studies have been found that the treatments composition of fortified cookies is comparatively the best cookies in all the treatments.

Table 2: Proximate composition of cookies using ajwa dates, rice bran, and wheat bran

Treatment combination	Moisture (%)	Ash (%)	Fat (%)	Protein (%)	Crude fiber (%)	Carbohydrate (%)	Energy (%)	Sugar (%)	DPPH (%)
T0 (10:1:1) (Ajaw dates: rice bran: wheat bran)	4.11	1.16	12.07	8.93	1.06	73.65	438.96	8.04	9.20
T1 (15:2:2) (Ajaw dates: rice bran: wheat bran)	3.85	1.11	12.01	9.18	1.87	73.85	440.23	8.05	8.32
T2(20:4:4) (Ajaw dates: rice bran: wheat bran)	3.92	1.06	12.02	9.28	2.02	73.80	440.14	8.18	8.59
T3(25:4:4) (Ajaw dates: rice bran: wheat bran)	4.11	1.07	12.05	9.52	2.10	73.27	439.64	8.25	8.71
T4(30:5:5) (Ajaw dates: rice bran: wheat bran)	3.94	1.07	12.09	9.64	2.11	73.31	440.49	8.30	8.88
T5(40:5:5) (Ajaw dates: rice bran: wheat bran)	3.33	1.34	12.49	9.84	2.16	72.16	440.38	8.47	7.01

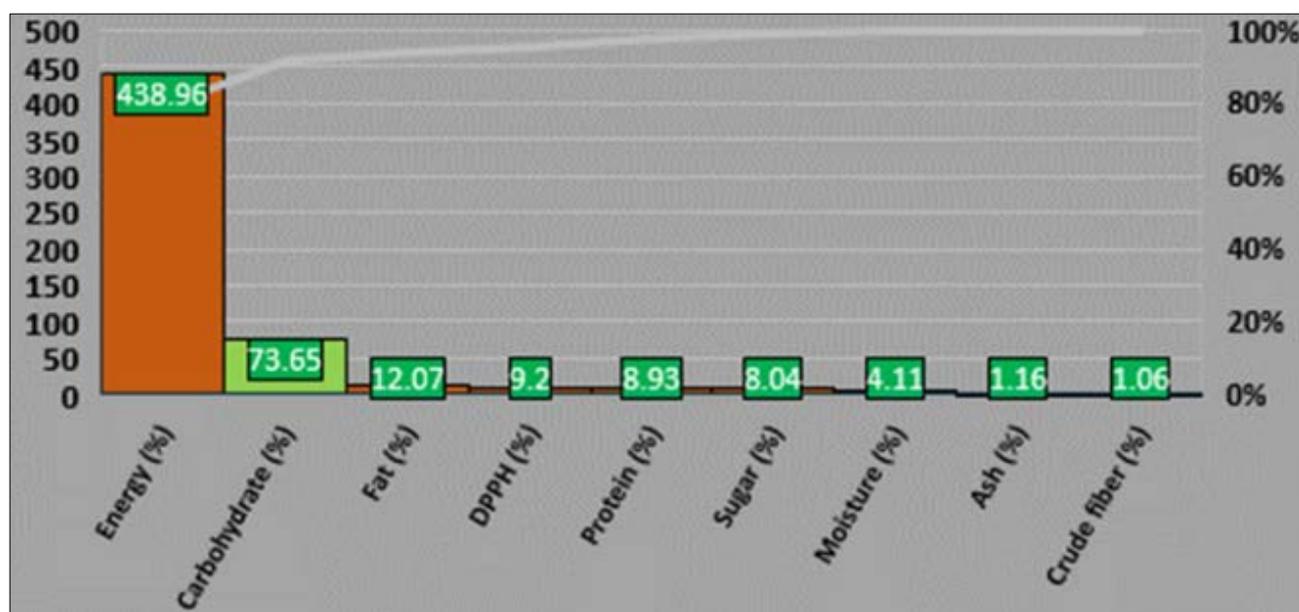


Fig 3: Proximate composition of cookies using ajwa dates, rice bran, and wheat bran

3.2 Chemical Composition of the prepared cookie using ajwa date, rice bran, and wheat bran

Table 1 shows the active ingredients of cookies manufactured using flour mixes that were substituted with a blend of ajwa date, wheat bran, and rice bran at various amounts of 7, 13, 18, 23, 25, and 35 percent t. As the percent of the mixture developed up to 35 percent, the moisture content increased somewhat. The percentage of ajwa date, wheat bran, and rice bran containing protein, ash, and dietary fibre slowly increased. Compared with the control sample cookies, carbohydrate levels changed slightly in all samples. Compared to Abd El-findings, Lateef [7, 8] are acceptable. Table 1 shows that when the combination amounts within the formula increased, the glycemic value of the cookies prepared reduced when the control sample compared all treatment combinations.

3.3 Mineral Content made from ajwa date, rice bran, and wheat bran

Table 2 indicates the effects of variable concentrations of ajwa date, rice bran, and wheat bran mixtures on the mineral content of cookies. When the quantities of the combination were expanded, the results showed that the mineral gradually rose. For Iron (percent), Zinc (percent), Copper (percent), Sodium (percent), Calcium (percent), Potassium (percent), Phosphorus (percent), and Magnesium (percent), the controls comprised 1.51, 0.87, 0.15, 3.16, 18.25, 104.33, 113.19, and 26.56 mg/100g, respectively. They climbed to 2.03, 1.27, 0.23, 3.26, 21.08, 254.82, 116.60, and 39.53, respectively, at a level of 30 percent replacement. It was discovered that adding an ajwa date, rice bran, and nutritional composition mixture to cookies increased their mineral quality. The obtained consequences are now being prepared in conjunction with the findings. While ajwa date, wheat bran, and rice bran may increase the absolute mineral content of their respective products, the physiological availability and absorption of minerals may be reduced due to increased phytic acid content. Such issues would involve additional investigation in a study [9].

Table 3: Minerals content (Mg/100g) of cookies using ajwa dates, rice bran, and wheat bran

Treatment Combination	Iron (%)	Zinc (%)	Copper (%)	Sodium (%)	Calcium (%)	Potassium (%)	Phosphorus (%)	Magnesium (%)
T0 (10:1:1) (Ajwa dates: rice bran: wheat bran)	1.51	0.87	0.15	3.16	18.25	104.33	113.19	26.56
T1 (15:2:2) (Ajwa dates: rice bran: wheat bran)	1.61	0.97	0.19	3.18	19.12	117.45	114.17	26.89
T2(20:4:4) (Ajwa dates: rice bran: wheat bran)	1.85	1.03	0.21	3.13	19.26	179.64	115.48	27.76
T3(25:4:4) (Ajwa dates: rice bran: wheat bran)	1.84	1.16	0.22	3.19	20.30	242.79	115.83	28.39
T4(30:5:5) (Ajwa dates: rice bran: wheat bran)	2.03	1.27	0.23	3.26	21.08	254.82	116.60	39.53
T5(40:5:5) (Ajwa dates: rice bran: wheat bran)	2.31	2.12	0.35	3.64	27.58	325.95	120.17	106.8

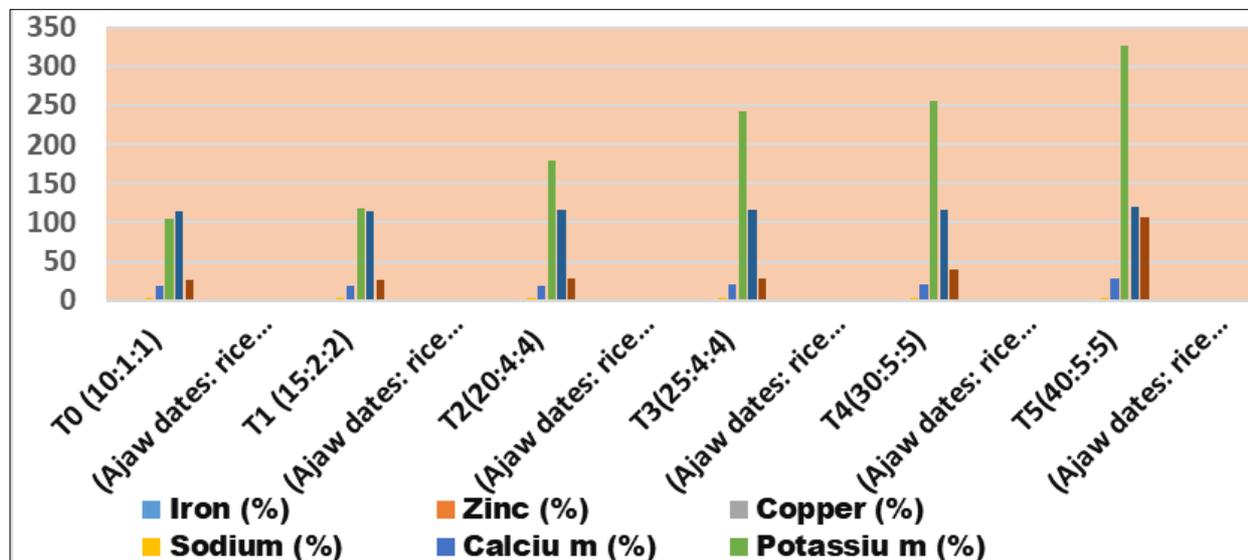


Fig 4: Minerals content (Mg/100g) of cookies using ajwa dates, rice bran, and wheat bran

3.4 Sensory Evaluation of prepared cookies using ajwa date, rice bran, and wheat bran

As demonstrated in Table 3. Affecting the amount of date powder mixture resulted in a reduction score for the colour of cookies. Cookies with more than 30% date powder and wheat bran in the composition had a darker grain coloring and a very tough texture e. The cookies' taste and tongue feel were affected by 40% and 30%, respectively y. At a 40% level,

cookies had a dry mouth sensation n. Meanwhile, the composition of the cookies did not suffer from the effects of the 10% mix g. At 30% combination, the color, surface character, crumb color, taste, texture, and soft mouth feel of the cookies were all good. The findings are consistent with those of Leelavathi and Rao [10] [11] [12]. Who reported that putting 30% ajwa dates and rice bran flour into cookies resulted in highly acceptable cookies?

Table 4: Sensory Evaluations of prepared cookies using ajwa dates, rice bran, and wheat bran

Treatment combinations	Colour	Mouthfeel	Texture	Aroma	Taste and favor	Overall acceptability
T0 (10:1:1) (Ajwa dates: rice bran: wheat bran)	8.43	7.51	7.36	7.54	8.33	6.82
T1 (15:2:2) (Ajwa dates: rice bran: wheat bran)	7.00	6.98	6.56	7.01	7.46	7.22
T2 (15:2:2) (Ajwa dates: rice bran: wheat bran)	7.01	6.65	6.99	6.87	7.99	7.74
T3 (30:5:5) (Ajwa dates: rice bran: wheat bran)	7.84	7.02	6.90	6.89	6.94	7.29
T4 (35:5:5) (Ajwa dates: rice bran: wheat bran)	7.95	6.79	7.00	7.02	7.05	7.21

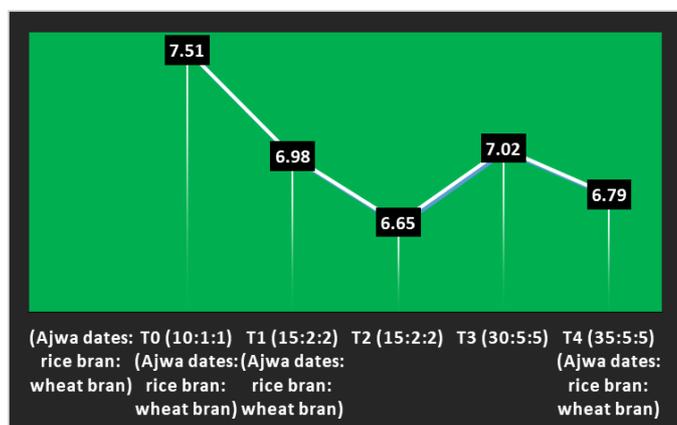


Fig 5: Sensory Evaluation of prepared cookies using ajwa dates, rice bran, and wheat bran

4. Conclusion

According to the findings, ajwa dates are highly nutritious and healthy, and they can play a variety of nutritional roles in human nutrition and health. The addition of wheat bran and Ajwa date, rice bran to wheat flour influenced the rheological properties, quality, physical properties, color, and sensory characteristics of cookies was used in the formulation n. The quality of cookies was acceptable at a level of 42%. The dietary composition of these cookies showed that fibers, which play a vital role, enhanced the nutritious quality in cookies made from RB, wheat bran, more ajwa than s. The study had shown the high of developing fiber-rich cookies to increase the dietary fiber intake in the routine of daily life.

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