



Analysis of Phytochemical and Antioxidant Activity of Wheatgrass(*Triticum aestivum*) Incorporated Buns

Abstract: The present study investigates the incorporation of wheatgrass (*Triticum aestivum*) powder into buns and evaluates its impact on phytochemical composition and antioxidant activity. Wheatgrass is recognized for its rich content of bioactive compounds, flavonoids, chlorophyll, and essential micronutrients, which are known to confer various health benefits. Wheatgrass buns were formed by incorporating wheatgrass powder at 2, 4 and 6% level whereas control buns were formed by 100% refined wheat flour. Buns were baked at 180° C for 20 mins. All the samples were analysed for chlorophyll, flavonoids, tannins, beta carotene, ascorbic acid and antioxidant activity. It was found that all these components were increased as the amount of wheatgrass powder incorporation increased in buns. Chlorophyll content was 1.05, 1.17 and 1.27 g per 100g in 2, 4 and 6% WG incorporated buns respectively, whereas in control buns chlorophyll was not detected. Flavonoids were found in the amount of 89.40, 92.42 and 95.64 QE/100g in 2,4 and 6% WG incorporated buns respectively whereas in control buns flavonoid content was 42.77 QE/100g. Tannins were found in the amount of 0.87, 1.26 and 1.6 mg per 100 g in 2,4 and 6% WG incorporated buns respectively whereas in control buns tannin content was 0.56 mg. β carotene content was 3.83, 9.18 and 14.37 μ g per 100 g in 2,4 and 6% WG incorporated buns respectively whereas in control buns β carotene was not detected. Ascorbic acid was also not detected in control buns but in case of WG incorporated buns its amount is very low. Antioxidant activity in WG incorporated was appreciably high, in 2,4 and 6 % WG incorporated buns it was 13.30, 14.30 and 15.49 % respectively.

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Introduction

In recent years, functional foods have garnered significant attention due to their potential to reduce the risk of chronic diseases and promote good health. Now a days, wheatgrass (*Triticum aestivum*) has emerged as a promising functional ingredient due to its rich composition of bioactive compounds such as flavonoids, phenolic acids, chlorophyll, vitamins, and minerals (Eissa *et al.*, 2020). Traditionally, wheatgrass can be consumed as juice or powder. It has been recognized for its antioxidant, anti-inflammatory, and detoxifying properties (Devi *et al.*, 2019). In comparison to wheat grass juice, wheat grass powder has a higher level of dietary fibre and also has long

shelf life as compared to wheatgrass juice. To protect body from degenerative diseases and to increase their intake of minerals, vitamins and antioxidants one can simply incorporate wheat grass powder in their recipes (Rana *et al.*, 2011 and Kulkarni *et al.*, 2006). It has been shown by a study that wheatgrass has a higher nutritive value than broccoli and spinach (Sharma, S. *et al.*, 2013)

With the growing demand of consumer for healthier bakery products, the incorporation of nutraceutical ingredients into foods like buns presents an effective strategy for enhancing dietary quality. Bakery products are widely consumed across various age groups, making them an ideal item for functional ingredient fortification. Fortifying baked goods with wheatgrass could not only improve their nutritional profile but also provide additional health benefits through the introduction of natural antioxidants. However, the impact of wheatgrass incorporation on the phytochemical content and antioxidant activity of such products remains underexplored.

This study aims to evaluate the phytochemical constituents by assessing parameters such as tannins, flavonoids, β carotene, ascorbic acid, chlorophyll content and antioxidant activity of wheatgrass-enriched buns. The study seeks to determine the extent to which wheatgrass enhances the functional

properties of buns. The results may offer insights into the development of bakery products with improved health-promoting attributes, aligning with current trends in functional food innovation and consumer health consciousness.

Materials and Methods

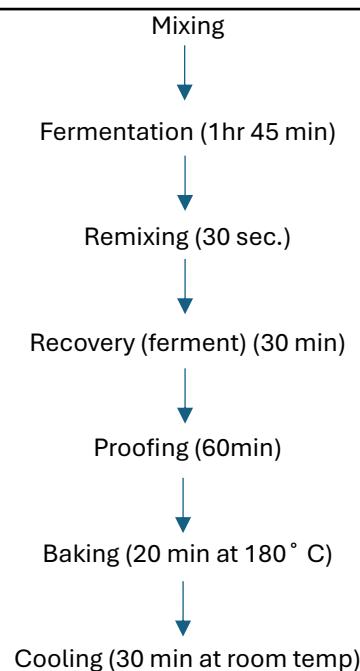
Wheatgrass powder was prepared by researcher earlier and it was incorporated in the buns at 2,4 and 6% level so that buns formula included refined wheat flour and wheatgrass powder in the ratio of 98:2, 96:4 and 94:6 respectively. While control buns were made by refined wheat flour only in addition to sugar, dry yeast, fat etc. Control buns were named B0, wheatgrass powder incorporated buns were named B1, B2 and B3 for 2,4 and 6% incorporated buns respectively. All materials have been explained in Table 1.

Table 1: Ingredients used in the preparation of buns (in g)

Sl.no	Ingredients	B0	B1	B2	B3
1.	Refined wheat flour (g)	100	98	96	94
2.	Wheatgrass powder (g)	00	2	4	6
3.	Shortening (g)	5	5	5	5
4.	Dry Yeast (g)	4	4	4	4
5.	Salt (g)	2	2	2	2
6.	Sugar (g)	10	10	10	10
7.	Milk Powder(g)	10	10	10	10
8.	Water (ml)	±60	±60	±60	±60

Preparation of buns

The dough was mixed in a bowl anually and dough was of desirable consistency. The baking schedule was as follows:



Nutrient analysis

Buns were analyzed for phytochemicals like chlorophyll, flavonoids, tannins, beta carotene and vitamin C as well as for antioxidant activity. Chlorophyll analysis was done by the method of [Thimmaiah \(1999\)](#), antioxidant activity was determined by using the DPPH assay ([Dehshahri et al. 2012](#)). tannins were determined by using Folin–Denis reagent [[Tamilselvi et al. \(2012\)](#)]. To determine the flavonoids method of [Woisky and Salatino \(1998\)](#) was used. Beta carotene and ascorbic acid were determined by the method of AOAC (2000).

Results and Discussion

Data presented in Fig 1, indicate that the control buns (B0) exhibited lower nutritional value as compared to the wheatgrass-incorporated variants (B1, B2, and B3). Ascorbic acid was not detected in the control sample, whereas B1, B2, and B3 contained 0.08 mg, 0.14 mg, and 0.20 mg per 100g respectively. Similarly, β-carotene was absent in B0 but was present in appreciable quantities in the wheatgrass buns: 3.83 µg in B1, 9.18 µg in B2, and 14.37 µg in B3 per 100 g.

Tannin content in the control buns was 0.56 mg (per 100g) increasing to 0.87 mg, 1.26 mg, and 1.6 mg in B1, B2, and B3, respectively. Although these values are relatively low, they demonstrate a consistent increase with the increase in wheatgrass powder incorporation. The flavonoid content showed a substantial

enhancement, rising from 42.77 QE/100g in B0 to 89.40 QE/100g, 92.42 QE/100g, and 95.64 QE/100g in B1, B2, and B3, respectively.

Chlorophyll was undetectable in the control buns but was found in significant quantities in the wheatgrass samples, with concentrations of 1.05 mg in B1, 1.17 mg in B2, and 1.27 mg in B3 per 100g. Antioxidant activity was also markedly improved in the wheatgrass buns, increasing from 11.61% in B0 to 13.3%, 14.3%, and 15.49% in B1, B2, and B3, respectively per 100g.

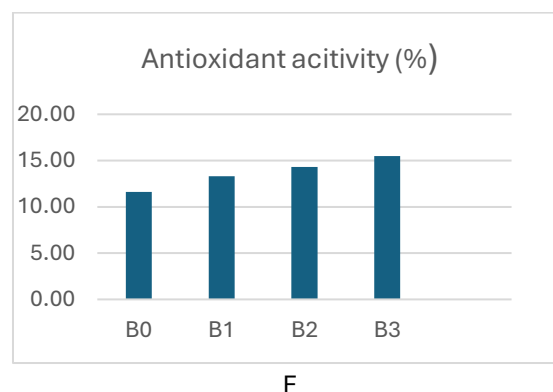
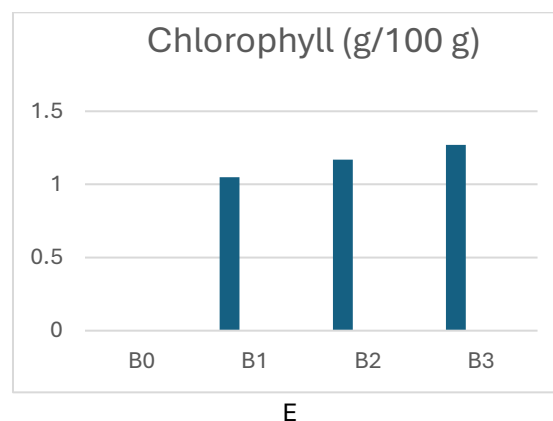
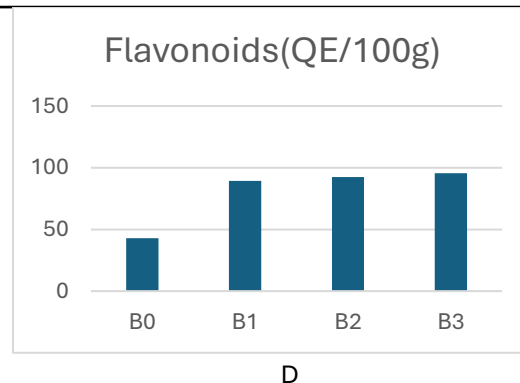
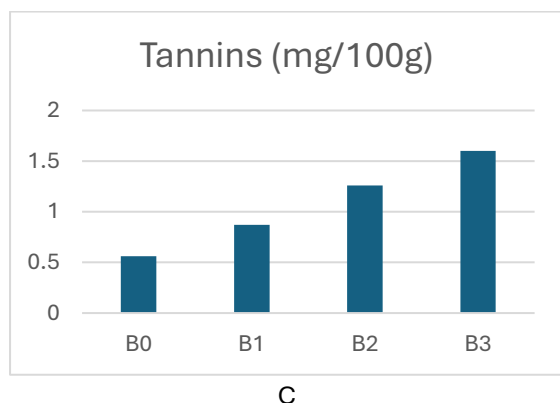
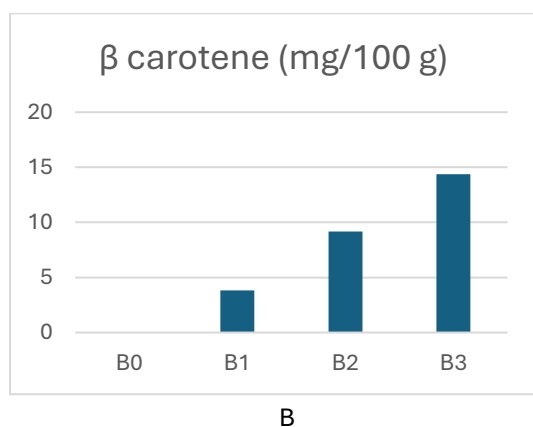
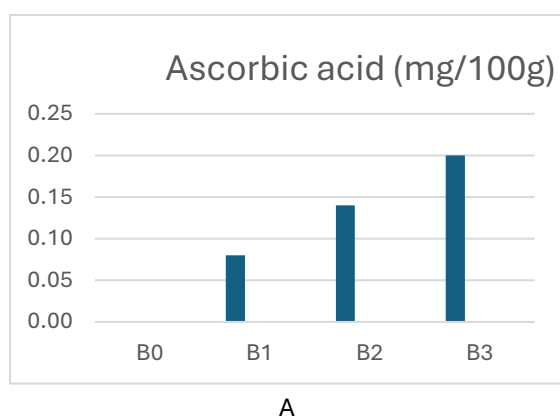


Fig 1: Ascorbic acid content (A), β-carotene content (B), Tannin content (C), Flavonoid content (D), Chlorophyll content (E), antioxidant activity (F)

Conclusion

The incorporation of wheatgrass into buns significantly enhanced their phytochemical and antioxidant properties. The analysis revealed a marked increase in tannin content, flavonoid, β-carotene, ascorbic acid, chlorophyll levels and antioxidant activity in the wheatgrass-enriched buns compared to the control. These improvements are attributed to the rich bioactive compounds present in wheatgrass. Overall, wheatgrass incorporation presents a promising



functional approach to enhance the nutritional value and health benefits of bakery products.

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