

Herbal fortification and sensory evaluation in bread

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Herbal adaptogens have the ability to combat stress related disorders that are closely associated with oxidation processes in the body. The real benefits of including them in the diet are likely to emerge with a better understanding of health that are best supported by food and in methodological developments addressing the evidence base for their effects. At present, recommendations are warranted to support the consumption of foods rich in bioactive components. Herbal fortification is a new trend to improve nutritional value of the food. Herbs such as *Ocimum sanctum*, *Withania somnifera*, and seaweed, *Kappaphycus* spp. are proven for their unique properties in food preparations. The incorporation of *Ocimum sanctum* in wheat bread has been evaluated in this study showed that the herbal incorporation is acceptable at 3 per cent level. Since the herbal activity was reported unaffected in heat treatment, herbal fortification in bread is a consumer friendly product development approach.

Key Words : Herbal, Fortification, Bread, Acceptance

How to cite this article : Priya, S., Gowri, Mangala A. and Perasiriyan, V (2018). Herbal fortification and sensory evaluation in bread. *Food Sci. Res. J.*, 9(2): 285-288, DOI : 10.15740/HAS/FSRJ/9.2/285-288. Copyright © 2018: Hind Agri-Horticultural Society.

INTRODUCTION

Functional foods are foods that have potentially positive effect on health beyond basic nutrition. The concept of functional foods derives from the observation that certain foods and beverages exert beneficial effects on human health that are not explained by their nutritional content. Herbal adaptogens have the ability to combat stress related disorders that are closely associated with oxidation processes in the body. From a dietary perspective, the functionality of herbs and spices will be exposed through consideration of their properties as foods. As with most foods, the real benefits of including

them in the diet are likely to emerge with a better understanding of health that are best supported by food and in methodological developments addressing the evidence base for their effects. These developments are well underway through evidence-based frameworks for substantiating health claims related to foods. At present, recommendations are warranted to support the consumption of foods rich in bioactive components. Herbal fortification is a new trend to improve nutritional value of the food. Herbs such as *Ocimum sanctum*, *Withania somnifera*, and seaweed, *Kappaphycus* spp. are proven for their unique properties in food preparations.

Herbs and spices have been used in bread manufacture mainly as aroma contributing agents, but presently herbs are being investigated as functional ingredients in bread to impart health attributes (Siro *et al.*, 2008). Spices and herbs and their constituents are generally recognized to be safe, either because of their traditional use without any documented detrimental impact or because of dedicated toxicological studies. Baked products are one of the most widely consumed foods in

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the world and, therefore, have great potential as vehicles for bioactive ingredients delivery (Kadam and Prabhasankar, 2010). Many bread companies enrich their baked products with folic acid (Cridler *et al.*, 2011). Increasing the protein, nutritional and health benefits of bread is one strategy for improving consumer nutrition and is not a novel concept. Johri and Chauhan (2014) developed mishit doi with different types of herbs such as *Tulsi* (*Ocimum sanctum* L.) and Cinnamon (*Cinnamomum verum* L.) Physico-chemical analysis and sensory evaluation of the product showed a highest overall acceptability score for the herbal *Tulsi* and Cinnamon mishtidoi combination by sensory evaluation. Singh *et al.* (2014) studied on the development of functional formulation of bread incorporated with shatavari a medicinal herb. Moreover, bioactive components in the herbs are reported to be heat stable which make the adoptogenic herbs as a recommendable source for developing bread with enhanced functional properties (Lim *et al.*, 2011 and Pawar *et al.*, 2014). Since these herbs are reported to be a potent anti-stressor that these can be recommended to people with hypertension and blood pressure.

METHODOLOGY

Wheat flour, sugar, salt, egg, yeast (Saf yeast company Pvt. Ltd., Mumbai, India), bread improver (Venus Essence Pvt. Ltd., Chennai), water/whole milk, milk solids, soya flour, shortening (oil), ascorbic acid (Vitamin C). The herb *Ocimum sanctum* was obtained from National Institute of Siddha referred pharmacy, Chennai, India.

Standardisation of herbal fortified bread:

The control sample was prepared by straight dough method. (*Ocimum sanctum*, was separately incorporated in the flour. It was sieved using a 50 mesh sieve and were added in the flour at 3, 6 and 9 per cent level in bread preparation. The bread thus, obtained was subjected to physico-chemical and sensory analysis for selecting the optimized level of herbal incorporation.

Preparation of the herbal bread :

Dried ingredients were incorporated in bread. Bread mix was prepared by adding 120g sugar, 12g salt, 25g yeast, 25 g vegetable fat and 25g of dried herbal ingredient were added separately to each dough, improver 1.6g, soya

flour 8g, vegetable oil 40 ml, SMP 25g was taken for 800g of wheat and they were mixed together in a planetary mixer, The dry ingredients, shortening and the activated yeast were added in a bowl along with water and then kneaded until the dough was elastic and the required consistency was reached. After this, the dough was rounded and kept in a bowl for the first proofing at room temperature (30°C) for about 40 min. The bowl was covered with a wet cloth to maintain a relative humidity of 80-90 per cent. After the first proofing, the dough was punched and worked lightly so that the excess gas could escape and the gas cells are redistributed. Dough (450g) was placed in aluminium alloy toast mould set of three (dimensions: 450g 192*110*110mm, three units joined in one set). The dough was then shaped to fit lightly in greased bread moulds. The dough was again kept for the final proofing for about one hour at 40±1°C. After baking, the prepared bread samples were cooled for about one hour at room temperature for further analysis.

OBSERVATIONS AND ASSESSMENT

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Sensory evaluation of food preparation:

Overall acceptability analysis for the herbs were evaluated using 9 point hedonic scale (Fig. 1) showed that *Ocimum sanctum* at 3 per cent was found to be accepted whereas the other herbal incorporation showed comparatively minimum acceptance (Fig. 2).

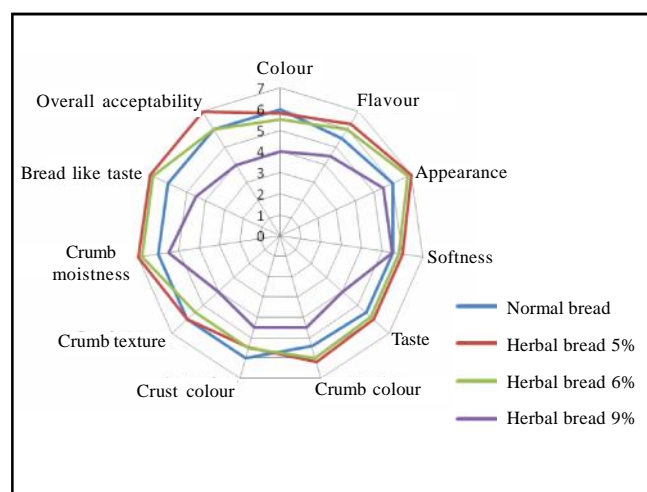


Fig. 1 : Sensory evaluation of bread



Fig. 2 : Cross-sections of the bread prepared with (a) *Ocimum sanctum* with 3 per cent herbal incorporation level in wheat flour

Storage study of the herbal bread:

The organoleptically accepted herbal fortified bread samples stored at ambient condition were examined for the presence of microbial load during the storage period of zero to five days and the evaluated total plate count and yeast and mould. During the analysed interval of 0th, 1st, 2nd, 3rd, 4th and 5th day of storage period, it was observed that there was no microbial load from 0th to 3rd day for herbal fortified samples.

Statistical analysis:

The data obtained were analyzed statistically using analysis of variance (ANOVA) to find if the differences were significant or not. In case of physical characteristics of wheat flour and sensory parameters of bread, average of replications were determined, as mean with critical difference at 5 per cent level.

Herbs can be fortified in milk and *Ghee* (clarified butter) and they are the most important carriers of herbal nutraceuticals, particularly *Ghee* has the characteristics to absorb all the medicinal properties of the herbs with which it is fortified, without losing its own qualities. Herbs have also found their applications in cheese making and herbal cheeses are produced with different names in many countries worldwide. Likewise, herbs can be fortified in baked products such as bread, cookies and biscuits. Singh *et al.* (2014) studied on the development of functional bread incorporated with shatavari. Bread incorporated with 3.5 per cent of shatavari powder was accepted and the finding supports present study on herbal incorporation acceptance in bread. Herbs are rich in

minerals and natural antioxidants. Studies have been carried out to find potential sources of natural antioxidants in wheat breads. Fan *et al.* (2008) found that the buckwheat incorporated wheat bread had improved antioxidant properties. However, due to limitation on the use of synthetic antioxidants there is an increasing need for health-promoting natural antioxidants in foods, such as bakery products. The research findings revealed that bread incorporated with *Ocimum sanctum* which was known to have antioxidant activity significantly increased the antioxidant activity of the product developed correlated with the reports of Lim *et al.* (2011). Authors reported that the antioxidant activities of the herbs increased significantly with increase in turmeric powder substitution which makes turmeric as recommendable source for developing bread with enhanced functional properties.

Das *et al.* (2013) developed a herbal bread fortified with fennel seed powder. Bread with fennel seed content between 5.0 and 7.0 per cent showed the highest acceptability among the fortified bread samples. Dhillon and Amarjeet (2013) developed a herbal bread fortified with cinnamon powder. Results suggested that among the studied samples, bread with two percent of cinnamon powder showed improved baking and textural properties with maximum overall acceptability which supports our results obtained for the sensory analysis. Husain *et al.* (2015) investigated the chemical properties and nutritive value of herbal sandesh by incorporating ashwaghandha and *Tulsi* extract. The sample incorporated with one per cent showed promising results in the chemical properties and had good nutritive value which supported our findings. Wheat and potato flour blended bread was accepted due to its sensory and nutritional properties (Ijah *et al.*, 2014). In the herbal fortified bread, microbial growth did not occur during the first few days of storage may be attributed to the antimicrobial activities of the herbs (Muhammad *et al.*, 2014). Since these herbs have high antioxidative and antimicrobial effects they are effective in preventing the oxidative shelf-life in bread. As breads are lower in fat, the addition of the adaptogenic herbs is expected to have profound effects on the shelf-life of the bread. Similar findings were made by Ijah *et al.* (2014) with wheat and potato flour blends for microbiological analysis.

Conclusion:

The present research showed acceptability of herbal

fortification and the organoleptically accepted herbal fortified bread samples stored at ambient condition showed no microbial load from 0th to 3rd day for herbal fortified samples. Hence, it supports the incorporation of herbs in food preparations that facilitates consumption of foods rich in bioactive components to combat stress related disorders that are closely associated with oxidation processes in the body.

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Received : 28.04.2018; Revised: 26.07.2018; Accepted : 27.08.2018