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# Evaluation of Rice Bran Incorporated Mix Grain Cookies

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**ABSTRACT**

*Rice bran, a by-product of rice milling industry, is composed of pericarp, aleurone and subaleurone layers, parts of the germ and small portion of the starchy endosperm. It is rich in vitamins, minerals, amino acids, dietary fiber, essential fatty acids and plant sterols like gamma-oryzanol, tocopherol and tocotrienol having promising health - related benefits. Increasing the nutritive value and also the fibre content of cookies by addition of rice bran was the main aim of the study. An experimental research design was used for the study. Control cookies were prepared without rice bran and experimental cookies were prepared by incorporating rice bran at two level. The recipes were standardized and coded for sensory evaluation. The data obtained from palatability evaluation was subjected to statistical analysis. It was seen that experimental cookies were well accepted and had more nutritional value.*

**KEYWORDS : Evaluation, Rice bran, Incorporation, cookies**

## INTRODUCATION

Rice bran, a byproduct of rice milling industry, is composed of pericarp, aleurone and subaleurone layers, parts of the germ and small portion of the starchy endosperm. It is rich in vitamins, minerals, amino acids, dietary fibre, essential fatty acids and plant sterols like tocopherol and tocotrieol having promising health related benefits. Besides it's exceptional nutritional profile, it is currently used as animal feed and fuel source. Rice bran does not contain gluten and is hypoallergic. It is rich in nutrient and bio-available vitamins, minerals and antioxidants and combats the free radicals in our bodies which are often linked to degenerative conditions (Shrilakshmi, 2003). Rice bran also contains a high level of dietary fibres, beta-glucan, pectin and gum. (http://en.wikipedia.org/wiki/Bran)

According to Narsinga Rao, B.S., edible grade rice bran (stabilized), defatted rice bran and their fractions have great potential of being used in various foods to upgrade their nutritional and health promoting potential (hypoglycemic, hypocholesterolemic). Food uses of rice bran have been explored in other countries in which both full fat and deoiled rice bran have been used in baby foods, breads, muffins, pancakes, cookies, cakes, pies, coatings and crests for finger foods, confectioneries, deep fried preparations, extruded snacks, soups, breakfast cereals and as spice carriers. Processed bran preparations are recently being marketed for use as additives and as a source of fibre in various foods at home. Rice bran has been used with milk to prepare rice bran milk, a nutritional high protein drink.

Mixed into cereals or baked goods or blended into smoothies, rice bran is a way to add more nutrition to the diet without adding too many calories. (http://www.ricebranproducts.com/rice-bran-nutrition).

The bakery products, cookies and biscuits, are commonly used and very popular. Many types of cookies are available in the market but these cookies are mainly prepared with hydrogenated fat and refined flour which are devoid of necessary nutrients. Increasing the nutrient content of cookies by addition of rice bran was the main aim of the study. Rice bran is known to have no peculiar order or taste and has nutritional importance. Hence, it is selected for incorporation to increase fiber content of cookies.

## MATERIALS AND METHODS

An experimental research design was used for the study. The vari

## RESULTS AND DISCUSSION

The results of the sensory evaluation of control and experimental rice bran incorporated cookies and its statistical significance are given in Table1.

**Table 1. Sensory evaluation, ANOVA and "t" value**

| SN | Sensory Characteristics | Mean Scores ± S.D | | |
|---|---|---|---|---|
| | | MXC | MXE1 | MXE2 |
| 1 | Appearance | 8.93 ± 0.95 | 8.53 ± 0.98 | 8.79 ± 0.98 |
| 2 | Texture | 8.93 ± 0.95 | 8.66 ± 0.62 | 8.79 ± 1.08 |
| 3 | Taste | 8.99 ± 0.84 | 9.03 ± 0.80 | 8.52 ± 0.98 |
| 4 | Flavor | 8.79 ± 0.81 | 8.39 ± 0.78 | 8.39 ± 0.90 |
| 5 | Overall acceptability | 9.33 ± 0.70 | 8.99 ± 0.71 | 8.59 ± 0.85 |
| | ANOVA | 0.04 | 0.09 | 0.02 |
| | 't' Value | | 0.833 | 2.5 |

'F' table value and 't' table value insignificant at 0.05 and 0.01 level

It is observed from table 2 that among all the sensory characteristics of control mix grain cookies, the flavor had the comparatively low scores. For experimental variation MXE1, the low score was for flavor and the high score was for taste. For experimental variation MXE2, flavor had the low score and appearance and texture had the high score. Among all the control and experimental cookies, flavor had the low scores. Addition of rice bran greatly influenced flavor of the cookies. However, MXE1 got highest score for taste and the overall acceptability of this variation got comparatively high score over MXE2. ANOVA revealed no significant difference between sensory characteristics of control and experimental cookies from view point og judges. The 't' value was also found insignificant at 0.05 and 0.01 level hence it can be said that there was no significant difference between the control and experimental variation of mix grain cookies.

The nutritive value of all the control and experimental cookies was calculated by referring food value tables and presented in table 2.

**Table 2 about here**

**Table 2. Nutritive value (per 100g) of control and experimental cookies**

| SN | Cookies | Moisture (%) | Protein (g) | Fat (g) | CHO (g) | Fiber (g) |
|---|---|---|---|---|---|---|
| 1 | MXC | 26.79 | 10.5 | 62.45 | 110.96 | 2.22 |
| 2 | MXE1 | 26.56 | 10.72 | 63.88 | 112.29 | 2.37 |
| 3 | MXE2 | 26.46 | 10.95 | 65.33 | 113.62 | 2.63 |

Table 2 represents that addition of rice bran significantly increases protein, fat and fibre content of the cookies. According to Narsinga Rao, B.S The protein of rice bran has a higher lysine content and a lower glutamic acid content than rice and wheat and it has a better balance of essential amino acids with an amino acid score of 80 per cent with respect to lysine, and 90 per cent with respect to threonine. It is reported to have a Protein Energy Ratio (PER) value of nearly 2.0.

## CONCLUSION

From the study, it can be concluded that addition of rice bran to cookies is well accepted and it also enhances the nutritive value.

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