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Physico-Chemical and organoleptic acceptability of rice bran oil in comparison to other selected oils

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Abstract
Fore different types of oils, Rice bran oil (RBO), soyabean oil(SO),groundnut oil(GO), and mustard oil (MO)were study the physicochemical and organoleptic acceptability of rice bran oil in comparison to other oils. The physicochemical analysis of oils included acid value, Iodine value, saponification value, peroxide value, and percent absorption of oil. The acid value and peroxide value of oils were analyzed before and after frying. Two products namely biscuits and besan *bhujia* were prepared using selected oils. These products were evaluated by panel of using 9 point hedonic scale.
Iodine value (110.04) and saponification value (201.51) of rice bran oil was highest followed by soyabean oil, groundnut oil and mustard oil. The percent absorption of oil in bhujia was least when fried in rice bran oil (8.9) followed by mustard oil, groundnut oiland soyabean oil. Acide value and peroxide value of mustard oil was highest, followed by RBO, GO, and SO. After frying there was significant rise in acid value in all types of oils, however percent increase was lowest for RBO. Organoleptic scores of biscuits.

Keywords: Physico-Chemical, organoleptic acceptability, selected oils

Introduction
Lowest for RBO. Organoleptic scores of biscuits prepared using RBO were significantly higher than the biscuits prepared using in other oils. Flavor and taste *bhujia* fried in RBO was significantly better (p=0.05) than the *bhujia* fried in other oils, however non-significant difference was found in scores of body texture, colour and appearance and overall acceptability.
Therefore rice bran oil is highly recommended for cooking purpose because of its comparatively better sensory, physicochemical and nutritional qualities.
Fat is important ingredient of human diet. The quantity and quality of fats determine the intake of various fatty acids in the total diet. Several studies have indicated that the hypocholesterolemic action of a dietary fat depends on the fatty acid composition and also to some extent on the micronutrients like tocopherol and tocotrienols present in them. According to the American Heart Association (AHA), the optimum intake of fat for an adult is 30 percent of the total caloric intake, to come from fat. It means an adult ingesting 2000 calories of diet should be getting 600 calories30% or 60-65 grams of fat per day. This quantity of fat per day is required in a balanced diet to maintain good health.
Edibles vegetables oils are the major sources of essential fatty acids in the diet. Mustard oil, Soyabean oil, Ground nut oil are the most commonly used vegetable oils in north India. One of the vegetables oils which gained popularity in India in recent times is rice bran oil (RBO). Rice bran oil comes from the thin brown coating between the rice kernel and the protective husk. This coating called 'bran', bran contains valuable nutritious components such as proteins, vitamins, minerals and lecithin, Oil is extracted from this bran. During the extraction process, oils is carefully separated with the highly valued vitamins intact, As a result the oil is naturally fortified with an abundance of vitamin E, gamma oryzanol and the essential fatty acid. In comparison to other edible oils, rice bran oil has high content of squalene which is reported to be a quencher of singlet oxygen and free redical scavenger. Thus, rice bran oils one of the healthiest oil having desirable fatty acid composition with higher oxidative stability along with better cholesterol reducing power than all other edible oils.

Materials and Methods
The present study was undertaken with the objectives to develop suitable technology for preparation of Besan bhujia and Biscuits, using different types of oils.
The materials and methods used for the preparation of products the analytical proceedings and sequences of operation employed.
- Collection of ingredients.
- Preparation of products.
- Plan of work.

Chemical analysis of Different oils
- Iodine value
- Saponification value.
- Acide value.
- Peroxide value.
- Percentage of oil absorption.

Sensory analysis of products.
- Flavour and taste.
- Body and texture.
- Colour and Appearance.
- Overall acceptability.
- Statistical analysis of data

Sensory evaluation of developed Products.

Sensory evaluation of besan bhujia and biscuits was done on the basis of organoleptic tests by panel of eight judges using hedonic score card based on the 9 point hedonic scale, scores were allocated for various parameters like flavor and taste, body and texture, colour and appearance and overall acceptability of products.

- Flavor and taste Scores.
- Body and Texture Scores.
- Colour and Appearance scores.
- Overall Acceptability.

Statistical analysis of data

Statistically analyses using analysis of variance and standard error of mean.

- No. of treatment : 07
- No of Replication : 21
- Total Treatment combinations : 147

The standard error of mean and critical difference at 5 % level of significance will be also used.

Results and Discussion

This chapter deals with the results obtained during the experiments of the research work. The chemical composition and organoleptic parameters of biscuits and besan bhujiya was studied. Various experiments were conducted to obtain optimum values of the different parameters for good quality of products. The finding are also illustrated diagrammatically. The results obtained from the analysis during the course off investigation are presented in this chapter and discussed in detail, in the following sequences:

Chemical evaluation of developed product.

- Iodine value
- Saponification value.
- Acide value.
- Peroxide value.
- Percentage of oil absorption.
- Organoleptic evaluation of Paneer
- Flavour and taste Scores.
- Body and Texture scores.
- Colour and Appearance scores.
- Overall Acceptability.

Iodine value of RBO and other selected oils

The average score of rice bran oil was highest followed by soya bean oil whereas the lowest score was obtained for ground nut oil. A high iodine value of rice bran oil shows greater number of double bonds than other oils.An iodine value of 105 of rice bran oil has been reported by other researcher (Tahira and Tomeo, 2008) which is quite close to the results obtained in the present study.

When analysis of variance was applied on the table, it was found that calculated value of F(156.27) was greater than the table value(4.76) of F on 3 and 6 degrees of freedom and at 5 percent probability level. Therefore, it can be concluded that there was significant difference in the iodine value of four types of oil. To compare mean of two treatment at a time, critical difference (CD) between the two treatment means against the CD value indicates that there was significant difference between RBO-GO,RBO-SO,RBO-MO,SO-GO,SO-MO,GO-MO.

Saponification value of RBO and other selected oils

The average score of soyabean oil was highest followed by rice bran oil and ground nut oil whereas the lowest score was obtained for mustard oil.

When analysis of variance was applied on the table, it was found that calculated value of F(321.51) was greater than the table value(4.76) of F on 3 and 6 degrees of freedom and at 5 percent probability level. Therefore, it can be concluded that there was significant difference between four types of oil. To compare mean of two treatment at a time, critical difference(CD) between the two treatment means against the CD value indicates that there was significant difference between (p = 0.05)RBO-MO,RBO-SO,SO-GO,SO-MObut the difference between RBO-SO andGO-MO was found non significant.

Percent absorption RBO and other selected oils

The percent absorption was highest in the product fried in mustard oil followed by soya bean oil, ground nut oil and rice bran oil respectively. When analysis of variance was applied on the table, it was found that calculated value of F(9.41) was greater than the table value(4.76) of F on 3 and 6 degrees of freedom and at 5 percent probability level. Therefore, it can be concluded that there was significant difference in the percent absorption of different types of oil. To compare mean of two treatment at a time, critical difference(CD) between the two treatment means against the CD value indicates that there was significant difference between RBO-GO,RBO-SO,RBO-MO,SO-MO,GO-MO but the difference between SO-GO was found non-significant.

Effect of different types of oil on flavor and taste of *Bhujia.*

Bhujia fried in rice bran oil had highest score for flavor and taste followed by soya bean oil, ground nut oil and mustard oil respectively. When analysis of variance was applied on the table, it was found that calculated value of F(3.53) was greater than the table value(3.07) of F on 3 and 21 degrees of freedom and at 5 percent probability level. Therefore, it can be concluded that flavor and taste of rice bran oil was significantly better then other oils.

Effect of different types of oil on Body and texture of *Bhujia*

Bhujia fried in rice bran oil had highest score for body and texture followed by soya bean oil, ground nut oil and mustard oil respectively. However, the analysis of variance was applied on the table, it was found that non-significant difference between the products prepared by using different types of oil.

Effect of different types of oil on colour and appearance of *Bhujia*

Acceptability of bhujia for colour and appearance prepared by using four different types of oils. Result shows that the Bhujia fried in rice bran oil had highest score for colour and appearance followed by soya bean oil, ground nut oil and mustard oil respectively. However, the analysis of variance

was applied on the table, it was found that non-significant difference between the products prepared by using different types of oil.

Effect of different types of oil on overall acceptability of *Bhujia*

Acceptability of bhujia for overall acceptability prepared by using four different types of oils. Result shows that the Bhujia fried in rice bran oil had highest score for overall acceptability followed by soya bean oil, ground nut oil and mustard oil respectively. However, the analysis of variance was applied on the table, it was found that non-significant difference between the products prepared by using different types of oil.

Effect of different types of oil on flavor and taste of *Biscuits.*

Biscuits baked in rice bran oil had highest score for flavor and taste followed by soya bean oil, ground nut oil where average score were same. When analysis of variance was applied on the table, it was found that calculated value of F(8.09) was greater than the table value(3.07) of F on 2 and 14 degrees of freedom and at 5 percent probability level. Therefore, it can be concluded that flavor and taste of rice bran oil was significantly better than other oils.

Difference between the two treatment means against the CD value indicates that there was significant difference between RBO-GO,RBO-SO, but the difference between SO-GO was found non-significant.

Effect of different types of oil on Body and Texture of *Biscuits.*

Biscuits baked in rice bran oil had highest score for flavor and taste followed by soya bean oil, ground nut oil where average score were same. When analysis of variance was applied on the table, it was found that calculated value of F(10.48) was greater than the table value(3.07) of F on 2 and 14 degrees of freedom and at 5 percent probability level. Therefore, it can be concluded that flavor and taste of rice bran oil was significantly better then the biscuits prepared in other oils. Difference between the two treatment means against the CD value indicates that there was significant difference between RBO-GO,RBO-SO, but the difference between SO-GO was found non-significant.

Effect of different types of oil on colour and appearance of *Biscuits.*

Biscuits baked in rice bran oil had highest score for colour and appearance followed by soya bean oil, ground nut oil where average score were same. When analysis of variance was applied on the table, it was found that calculated value of F(8.50) was greater than the table value(3.07) of F on 2 and 14 degrees of freedom and at 5 percent probability level. Therefore, it can be concluded that colour and appearance of rice bran oil was significantly better than the other oils.

Difference between the two treatment means against the CD value indicates that there was significant difference between RBO-GO,RBO-SOandSO-GO but the difference between RBO-SO was found non-significant.

Effect of different types of oil on overall acceptability of *Biscuits.*

Biscuits baked in rice bran oil had highest score for overall acceptability followed by soya bean oil, ground nut oil where average score were same. When analysis of variance was applied on the table, it was found that calculated value of F(8.43) was greater than the table value(3.07) of F on 2 and 14 degrees of freedom and at 5 percent probability level. Therefore, it can be concluded that the overall acceptability of rice bran oil was significantly better than the other oils.

Difference between the two treatment means against the CD value indicates that there was significant difference between RBO-GO and SO-GO but the difference between RBO-SO was found non-significant.

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