

Study on the preparation of multigrain spicy cream rolls incorporated with wheat, rice, oat and maize flour and peanut butter with schejwan taste

^[1]A. D. Todmal, ^[2]R. D. Tilekar, ^[3]M. S. Tathe
^[1] Assitt. Professor, ^{[2][3]} Research Scholar
MIT College of Food Technology, Pune

Abstract— Bakery is a traditional activity and occupies an important place in food processing industry. Bakery products are an item of mass consumption in view of its low price and with rapid growth and changing eating habits of people; bakery products have gained popularity among masses. Bread, biscuits are popular bakery products available in the market. Along with this products cream roll is also famous bakery product traditionally available in the market. Maida or refined wheat flour is the “heart” of the ingredients in preparation of the various baked goods globally. Similarly hydrogenated vegetable fat is also the primary raw material used in the preparation of a variety of Indian baked goods. As per the study refined wheat flour and hydrogenated vegetable fat are harmful for our health so that development of food products using composite flour has increased and is attracting much attention from researchers, especially in the production of bakery products and pastries. This article focuses on the use of composite flour for reduction of refined wheat flour in cream rolls along with introducing the new spicy flavour by replacing hydrogenated vegetable fat with peanut butter and schejwan flavour to the consumer. Main motto of the research is to reduce maida and hydrogenated vegetable fat which causes increased blood sugar level, coronary heart disease etc..It was found that composite flour and peanut butter along with schejwan flavour used to produce spicy cream rolls is still able to maintain similar characteristics and acceptance to products made from refined wheat flour and margarine. Along with composite flour spinach powder is also added for improving the nutritional quality and attractiveness of the spicy cream rolls. The feasibility of partially replacing Refined wheat flour (Maida) with Wheat, Rice, Oat and Maize flour in spicy Cream roll making was evaluated in several formulations, aiming to find a formulation of Wheat, Rice, Oat and Maize flour for production of cream roll with better texture, nutritional quality and consumer acceptance. Similarly hydrogenated vegetable fat for preparation of inner sweet cream is completely replaced by spicy peanut butter for improving the taste and nutritional value. Results of the sensory (appearance, color, flavor, texture and taste) evaluation revealed that no significant difference was observed in acceptability of the product with substitution levels of Wheat, Rice, Oat and Maize flour at 20, 5, 5, 5 Per Cent respectively along with 65% maida and 100 % spicy peanut butter cream from that of market sweet samples. The nutritional value of the spicy cream rolls (protein, fat, carbohydrate, ash and iron) was also increased significantly than the market sweet cream rolls..

Key words: Refined wheat flour, multigrain, schejwan etc.,

INTRODUCTION

In India, the bakery industry has grown tremendously over recent years. Bakery products consumption has increased continuously in many developing countries due to changing eating habits, a steadily growing population and because a large proportion of the overall increased incomes can now be spent on foods (Seibel, 2011). Now a day's ready to eat products have great demand because of busy schedule of daily work. Multigrain nutria spicy cream roll is also one of the ready to eat innovated product with increased nutritional quality. Sweet cream rolls with various flavoures are presently available in the market. Spicy cream roll with the schezwan taste is one of the innovations for the health conscious consumer who are looking for new tastes than the traditional one. Use of composite flour and spicy peanut butter cream are the specialties of multigrain spicy cream rolls. Milligan et al. (1981) defined composite flour as a mixture of flours,

starches and other ingredients intended to replace wheat flour totally or partially in bakery and pastry products. Shittuet al. (2007) also agreed with that as the composite flours used were either binary or ternary mixtures of flours from some other crops with or without wheat flour. The use of composite flours had a few advantages for developing countries such as India in terms of:

- i) Reduces importation of wheat
- ii) Better supply of protein for human nutrition;
- iii) Promotion of high-yielding, native plant species;
- iv) Encourages the use of locally grown crops as flour (Hugo *et al.*, 2000; Hasmadi *et al.*, 2014).

Wheat flour is an essential component in much composite flour. The percentage of wheat flour

required to achieve a certain effect in composite flours depends heavily on the quality and quantity of wheat gluten and the nature of the product involved.

The FAO reported that the application of composite flour in various food products would be economically advantageous if the imports of wheat could be reduced or even eliminated, and that demand for bread and pastry products could be met by the use of domestically grown products instead of wheat (Jisha et al., 2008).

The spicy cream rolls produced using composite flour were of good quality, with some characteristics similar to refined wheat flour, though the texture and the properties of the composite flour spicy cream roll was different from those made from refined wheat flour, with an increased nutritional value and the appearance.

Flours used in composite flour for preparation of multigrain spicy cream rolls:

Refined wheat flour is major ingredient required in cream roll. Gluten is important to retain gas to obtain the desirable volume and texture in a dough system. It is essential to form a strong protein network required for the desired visco-elasticity. Glutenin and prolamin are the major fraction of gluten. While prolamin provides viscosity and extensibility in a dough system, glutenin is responsible for elastic and cohesive properties of dough (Gujaral and Rosell, 2004). The gluten is important not only for appearance, but also for crumb structure of Cereal-based products. Gluten removal results major problems for bakers and the products are of low quality, exhibiting poor mouth feel and flavor (Gallagher et al., 2003a). Gluten free products can significantly made by using rice, maize, and potato starch.

Apart from being a good source of calories and other nutrients, refined wheat flour (Maida) is bleached with chloride oxide that produces alloxan as a byproduct, leading to toxic effect on Beta cells of the pancreas. This causes an insulin-dependent diabetes mellitus also called as "Alloxan Diabetes". So even though it is an important ingredient in cream roll preparation our research focuses on maximum replacement of maida with composite flour.

Whole wheat flour: It is used to increase b-complex vitamins into the product and impart colour. It contains high fiber, it is rich in carbohydrates.

Rice flour: It is used to provide fast and instant energy. It also stabilizes blood sugar level it also provides vitB1 to the human body. Rice flour is considerably lower protein content compared with wheat flour and does not contain gluten which is helping in forming dough structure.

Oat flour: It is helpful to lower blood cholesterol, glucose

and insulin concentration. Oats are rich source of dietary fiber. Oat grain contains protein with a beneficial amino acid composition, advantageous profile of fatty acids, with high amount of PUFA and large quantity of water soluble β -glucans and anti oxidants. [Hahn et al. 1990, Bartnikowska 2003, Sadiq Butt et al. 2008]. Recent studies suggest that oats can be tolerated by people suffering from celiac disease.

Maize flour: On the other hand, maize flour contains high levels of many important vitamins and minerals, including potassium, phosphorus, zinc, calcium, iron, thiamine, niacin, vitamin B6, and folate (Watson, 1997)

Margarine: Margarine means any refined edible oil or oil subjected to hydrogenation in any form. It gives the richness and tenderness to the product, improves eating qualities of the product and helps to improve texture. It is also used for proper consistency of dough along with emulsification. Margarine also has bad effects on our health. It margarine are made from plant oils that are naturally healthy on their own. However, these oils are turned into unhealthy trans fat during the process of hydrogenation after being subjected to extremely high temperature and then injected with catalyst like nickel, platinum, or aluminum to achieve the semi solid or solid state. Consumption of margarine also increases the blood pressure. More consumption of margarine causes coronary heart disease.

Spinach powder: It is low in calories yet very high in vitamins, minerals and other phytonutrients. This leafy green is an excellent source of vitamin K, vitamin A, magnesium, folate, manganese, iron, calcium, vitamin C, vitamin B2, potassium, and vitamin B6. It's a very good source of protein, phosphorus, vitamin E, zinc, dietary fiber, and copper

Major Ingredients used for spicy peanut butter cream preparation:

Peanut butter: Rich in protein, used for preparation of cream. Peanut butter also has many health benefits like it is beneficial for the people with type 2 diabetes. Peanut butter consumption is also useful for maintaining weight.

Schejwan chutney: It is used to increase taste and flavor.

Along with this red chili powder, cumin, ajwain, chat masala are also used to impart spicy taste and also have medicinal benefits.

MATERIALS AND METHODS

For preparation of multigrain spicy cream rolls various ingredients are used are as follows along with the trials taken for deciding the proportion of maida, composite flour and peanut butter.

Trial 1 for outer rolls preparation by replacing maida with multigrain flour:

Sample No.	Description	Observation
Sample 1	40% maida + 60% multigrain flour	Breaking of rolls, texture not good
Sample 2	50% maida + 50% multigrain flour	Breaking of rolls, texture good than previous one but not up to the mark.
Sample 3	60% maida + 40% multi grain flour	No breaking of rolls, texture good
Sample 4	65% maida + 35% multigrain flour	No breaking, texture up to the mark.

Table No. 1 Proportion of maida and multigrain flour for preparation of outer roll

Materials required for preparation of multigrain spicy cream rolls are as follows:

Ingredients (g)	Sample 1	Sample 2	Sample 3	Sample 4
Maida	200	250	300	325
Whole Wheat flour	100	100	100	100
Oat flour	75	75	50	25
Rice flour	75	50	25	25
Corn flour	50	25	25	25
Margarine	200	200	200	200
Spinach powder	9	9	9	9
Custard powder	5	5	5	5
Salt	9	9	9	9
Ajwain	4	4	4	4
Cumin	4	4	4	4

Table No. 2 Ingredients required for preparation of multigrain outer roll

Trials 2 for spicy cream preparation by replacing hydrogenated vegetable fat with spicy peanut butter cream

Sample No.	Description	Result
Sample 1	30% margarine + 70% spicy peanut butter cream	Taste not good.
Sample 2	20% margarine + 80% spicy peanut butter cream	Taste not good, not acceptable.
Sample 3	10% margarine + 90% spicy peanut butter cream	Taste good but not very much accepted.
Sample 4	0% margarine + 100% spicy peanut butter cream	Taste good, acceptable.

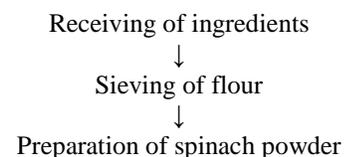
Table No. 3 Indicating proportion of margarine and spicy peanut butter cream for production of spicy cream

Material required for spicy peanut butter cream preparation:

Ingredients(g)	Sample 1	Sample 2	Sample 3	Sample 4
Margarine	30	20	10	0
Peanut butter	36	46	56	66
Schezwan chutney	16	16	16	16
Ajwain	5	5	5	5
Cumin	5	5	5	5
Red chilli powder	3	3	3	3
Chat masala	3	3	3	3
Salt	2	2	2	2

Table No. 4 Ingredients required for formation of spicy peanut butter cream

Flow chart for preparation of spicy cream rolls:





RESULTS AND DISCUSSION

Table No. 1 & 3 indicates that sample No. 4 have proper texture, taste and have more overall acceptability compared to sample No. 1, 2, 3. From the above data it is cleared that we can replace refined wheat flour with 35% of multigrain flour (whole wheat flour, rice flour, oat flour, maize flour). And we can replace 100% margarine from inner cream with spicy peanut butter cream.

Sensory evaluation

After this Cream rolls were evaluated for overall acceptability (texture, color, taste, odor and aroma) and the sensory evaluation was carried out as per 9 point Hedonic scale.

S1 : spicy cream roll with maida: multigrain flour (40:60), and margarine: spicy peanut butter (30:70)

S2 : spicy cream roll with maida: multigrain flour (50:50), and margarine: spicy peanut butter (20:80)

S3 : spicy cream roll with maida: multigrain flour (60:40), and margarine: spicy peanut butter (10:90)

S4 : spicy cream roll with maida: multigrain flour (65:35), and margarine: spicy peanut butter (0:100)

Sample	Moisture content (%)	Total Carbohydrates (%)	Protein (%)	Fat (%)	Ash (%)	Iron (mg)	Fibres (mg)
S1	10.15	16.5	12.5	25.6	1.85	2.5	4
S2	10.12	12.5	9.25	21.2	1.75	-	2

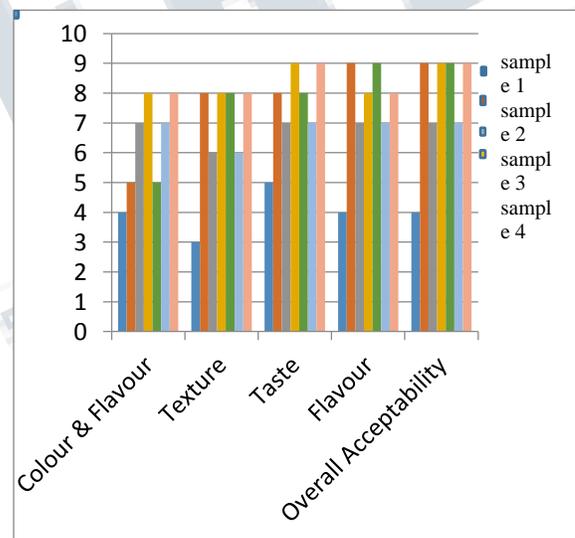


Fig No. 1 Graphical representation of sensory evaluation data of multigrain spicy cream roll

The sensory attributes that were taken into consideration include: texture, color and taste and aroma. The values are the means of ten readings. Among the four samples, the fourth sample recorded the highest acceptability.

sample	Colour	Texture	Taste	Aroma
S1	8.4	8.7	8.5	8.4
S2	8.2	8.5	8.2	8.2
S3	7.9	7.9	8.0	8.0
S4	7.5	7.5	7.9	7.8

Table No. 5 Sensory scores of prepared cream roll using different blends of refined wheat, wheat, rice, maize, oat flour, peanut butter and margarine

From the above data sample S1 have least acceptability followed by S2 and S3 due to decrease in level of refined wheat flour and increase in level of margarine in cream production.

Physical analysis of Composite flour cream rolls

Physical analysis of multigrain spicy cream rolls and market sweet sample was analysed As shown in the table No. 6

Sample 1: multigrain spicy cream roll

Sample 2: market sample if sweet cream rolls

Sample No.	Length(cm)	Diameter(cm)	Weight(g)
Sample 1	12	3	18
Sample 2	11	2.5	20

Table No. 6 Physical analysis of Multigrain spicy and flavoured cream rolls

From above data it is cleared that there is no significant difference in the physical appearance of multigrain spicy cream rolls from that market sample of sweet cream rolls. Multigrain spicy cream roll have 12 cm length, 3 cm diameter and 18 g weight as per the table No. 6.

Chemical analysis of multigrain spicy cream roll:

The Result of chemical analysis of multigrain spicy cream roll is shown in the table No. 7.

Table No. 7 Chemical analysis of multigrain spicy cream roll and market sweet cream roll

From the above data it is cleared that multigrain spicy cream rolls are more nutritionally enriched than the market sweet cream rolls. Nutritional quality of multigrain spicy cream rolls increased due to the use of composite flour (whole wheat flour, rice flour, maize flour, oats flour) and use of peanut butter instead of hydrogenated fat for inner cream preparation. In multigrain nutri spicy cream rolls spinach powder is added in outer rolls so that iron content found in spicy cream rolls which is one of the important nutrient essential for our body. Multigrain nutria spicy cream rolls becomes one of the innovative healthy snack products for the consumers.

CONCLUSION

It is evident from the experiment that multigrain spicy cream rolls are really nutritionally enriched than the market sweet cream rolls as it contain composite flour and peanut

butter with pleasant taste of schejwan flavor. This type of cream rolls are useful in the diets which provides required good nutritional and sensory quality. The blend consisting of rice flour, maize flour, oat flour and whole wheat flour was successfully used for cream roll preparation without adversely affecting the physical and the sensory characteristic of end product. It is good source of protein carbohydrate and iron. From all the studies we conclude that we can replace the maida with multigrain flour (65:35) without affecting the texture and overall acceptability of cream roll. Multigrain spicy cream rolls have 10 days of shelf life at room temperature. Packaging material used for multigrain spicy cream roll are thermoformed plastic trays along with HDPE. Both the packaging materials are good barrier for the moisture and maintain texture and quality of the product.

REFERENCES

- 1) Alka Gupta¹, Sushila vermal*, Sarita Sheikh¹, Ranu Prasad¹ and Neelam Yadav²
¹Department of Foods and Nutrition, Ethelind School of Home Science, Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad, Uttar Pradesh, India, ²Center of Food Technology, Allahabad University, Allahabad.
- 2) Abdelghafor, R. F., Mustafa, A. I., Ibrahim, A. M. H. And Krishnan, P. G. 2011. Quality of bread from composite flour of sorghum and hard white winter wheat. Advance Journal of Food Science and Technology 3: 9-15.
- 3) Akubor, P. I. And Obiegbuna, J. E. 2014. Effect of processing methods on the quality of flour and bread from african breadfruit kernel flour. International Knowledge Sharing Platform 24.
- 4) Baljeet, S. Y., Ritika, B. Y. And Roshan, L. Y. 2010. Studies on functional properties and incorporation of buckwheat flour for biscuit making. International Food Research Journal 17: 1067-1076.
- 5) Begum, R., Uddin, M. J., Rahman, M. A. And Islam, M. S. 2013. Comparative study on the development of maize flour based Composite bread. Journal of the Bangladesh Agricultural University 11(1): 133-139.
- 6) Bojňanská, T., Frančáková, H., Lišková, M. And Tokár, M. 2012. Legumes – the alternative raw materials for bread production. Journal of Microbiology, Biotechnology and Food Sciences 1:

International Journal of Science, Engineering and Management (IJSEM)
Vol 2, Issue 4, April 2017

876-886.

7) Development of micronutrient rich food product by using indigenous coarse grains and green leafy vegetables

8) Dhingra, S. And Jood, S. 2001. Organoleptic and nutritional evaluation of wheat breads supplemented with soybean and barley flour. *Journal of Food Chemistry* 77: 479-488.

9) Dhingra, S. And Jood, S. 2002. Physico-chemical and nutritional properties of cereal-pulse blends for bread making. *Nutritional Health* 16(3): 183-94.

10) Entrepreneurial Development by Dr. S. S. Khanka

11) Gallagher, F., Gormley, T. R. And Arendt, E. K. 2003. Crust and crumb characteristics of gluten free breads. *Journal of Food Engineering* 56: 153-161.

12) Hugo, L. F., Rooney, L. W. And Taylor, J. R. N. 2000. Malted sorghum as a functional ingredient in composite bread. *Cereal Science* 79(4): 428-432.

13) Khaliduzzaman, M. Shams-Ud-Din and M.N. Islam, 2010. Studies on the preparation of chapatti and biscuit supplemented with potato flour, *J.Bangladesh Agril. Univ.*, 8(1): 153-160.

14) Nazni, P. And S. Pradeepa, 2010. Organoleptic evaluation of biscuits prepared from potato flour, *Beverage and Food World*, pp: 31-34.

15) Noorfarahzilah, M., Lee, J. S., Sharifudin, M. S., Mohd Fadzelly, A. B. And Hasmadi, M. Applications of composite flour in development of food products.

16) Pitchaporn Wanyo, Channarong Chomnawang and Sirithon Siriamornp. Substitution of Wheat Flour with Rice Flour and Rice Bran in Flake Products: Effects on Chemical, Physical and Antioxidant Properties.

17) Sadasivam, S. And A. Manickam, 2008. *Biochemical Methods*, New Age International Publishers, New Delhi.

18) Shakila Banu.M, Sasikala.P Professor and Head Department of Food Processing and Preservation Technology , Faculty Of Engineering , Avinashilingam University For Women, Coimbatore. Alloxan in refined flour: A Diabetic concern.

19) Suresh Chandra^{1*}, Samsher,¹ Pankaj Kumar,² Vaishali³ and Durvesh Kumari. Effect of incorporation of

rice, potato and mung flour on the physical properties of composite flour biscuits.

20) Singh, S., C.S. Riar and D.C. Saxena, 2008. Effect of incorporating sweet potato flour to wheat flour on the quality characteristics of cookies, *African J. Food Sci.*, 2: 065-072.

21) Vasantharuba Seevaratnam, P. Banumathi, M.R. Premalatha, Sundaram and T. Arumugam. Studies on the Preparation of Biscuits Incorporated with Potato Flour.

22) Whitley, P.R., 1970. *Biscuit Manufacture*, Applied Science Publishers Ltd., London