

Original Research Article

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Utilization of Sweet Potato Peels and Potato Peels for the Department of Value Added Food Products

Nida Taiyeba*, Alka Gupta and Tripti Verma

Department of Food Nutrition and Public Health, Ethelind College of Home Science, SHUATS, PRAYAGRAJ, India

*Corresponding author

ABSTRACT

The present study entitled “Utilization of Potato Peels Powder and Sweet Potato Peels Powder for the Preparation of the Value-Added Food Products” was carried out with the Objective to determine the Nutritional Composition of mix Powder. The dehydration of Potato peel and Sweet potato peel was done through tray drying at 60-65°C for 10 hours. The products prepared were Cookies and Muffins by incorporation of dehydrated potato peel powder and sweet potato peel powder mix in different proportions and served as Treatments T1, T2, and T3 respectively T0 without incorporation of dehydrated potato peel powder and sweet potato peel powder served as control. Three replications of control and treatments for all three products were carried out and mean values were obtained. Sensory evaluation was carried out using the nine point Hedonic scales. Data obtained were statistically analyzed by using analysis of variance (ANOVA), (t) test and critical difference (CD) techniques. On the basis of findings, it was observed that in case of Cookies and Muffins value addition at 5% incorporation level with the potato peel powder and sweet potato peel powder the best product with regard to sensory attributes and overall acceptability. Sensory evaluation showed that the treatment T1 was the most acceptable in Cookies and in Muffins showed that the treatment T3 was found most highly acceptable. Nutritional composition was determined by using the food composition tables (Gopalan et al., 2007). Cookies and Muffins were rich in Carbohydrates, starch, fat, fiber, vitamin C, energy. The cost of the two products ranged between Rs.5.3 for Cookies and Rs.7.1 for Muffins per 100g of dry ingredients. These products can also be helpful for providing variety in the daily dietary in addition to their nutritional benefits.

Keywords

Value added food products, Sensory evaluation, Cookies, Muffins, Nutritional composition

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Introduction

Potato popularly known as “the king of vegetables” because it grows in more than 100 countries (Bhajantri, 2008). Many people do not realize the health value of Potato peels. There are many vitamins, nutrients, fiber and antitoxins in the potato skin that people tend

to peel and throw away. Peels are helpful to enhance the immune activity. They are quite cheap to grow and rich in nutrients. In developing countries, potato production has increased at an average rate of five percent per year. One of the main focuses is by-product recycling of food processing industries. Various evidence based review

papers and research papers are summarized the importance of Potato peel and Sweet potato peel powder for the improvement of sustainability the Food Processing sector. Potato peel is a zero value by- product, which occurs in huge amounts after processing. Utilization of potato peel obtained during processing of potato is important to the industry due to the presence of high dietary fiber. Selvendran *et al.*, (1994) suggested that healthy adults should eat between 20-35 g of dietary fiber each day as shown by potato peels which provide up to the daily requirement. Potato is rich in starch, dietary fiber, amino acids, minerals, vitamins, and phenolics. Potato peels represent the major waste from the potato processing industry, and they can be revalorized as a source of functional and bioactive compounds with particular attention to phenolic acids. Thus, potato waste represents promising cheap resources and its recovery and recycling within the food chain could be a sustainable strategy to address the present challenges of the industrialized world.

Sweet potatoes are good sources of vitamins C and E as well as dietary fiber, potassium, and iron, and they are low in fat and cholesterol. It serves as an important protein source for many world populations and is an important source of starch and other carbohydrates the human body needs. A Muffin is a small cake designed to serve one person, which may be baked in a small thin paper or aluminum cup. As with larger cakes, icing and other cake decorations such as fruit and candy may be applied.

Sweet baked products in general, and muffins in particular, are highly appreciated by consumers because of their soft texture and characteristic taste. The principal ingredients of muffins-flour, sugar, fat and coco powders play an important role in the structure, appearance, and eating quality of the final

product (Karaoglu and Kotancilar, 2009; Martinez-Cervera *et al.*, 2012). The baking process itself is a decisive factor in producing high-quality baked goods. Consumption of Muffins and baked products is on the increase in India as a result of urbanization (Adeyeye and Akingbala, 2015). Now people are becoming more conscious about their health and nutrition. They require foods that are convenient with good taste, reasonable price, and carry favorable nutritional image. Sweet potato peel and potato peel is a cheap but excellent source of carbohydrate, Vitamin A, calcium and phosphorous. The ingenuity lead to the development of cupcake utilizing sweet potatoes realizing the comparability of sweet potato flour to commercial flour used in making cupcakes.

Materials and Methods

The study entitled was Utilization of the Sweet potato peel and Potato peel powder for the Preparation of value added Food Products conducted in the Nutrition Research Laboratory, Department of Food Nutrition and Public Health, Ethelind College of Home Science, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj-211007, U.P India. The details of materials, equipment, procedure and techniques adopted during the course of present investigation have been elaborated in this chapter under the following headings:

Experimental site

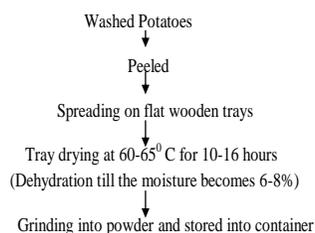
The present investigations were carried out in the Department of Food Nutrition and Public Health, Ethelind College of Home Science, SHUATS, Prayagraj.

Procurement of materials

The raw materials for the development of food products like Potato peel powder, Wheat

flour, Maida, Sweet potato peel powder and other ingredients were purchased from the local markets of Prayagraj.

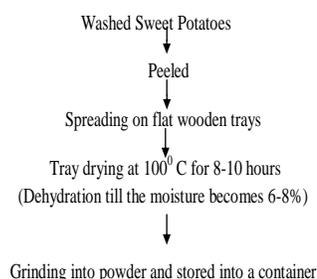
Preparation of potato peels powder



Source: Srivastava and Kumar (2009)

Flow diagram for preparation of potato peels powder

Preparation of sweet potato peels powder:



Source: Srivastava and Kumar (2009)

Flow diagram for preparation of Sweet potato peels powder

Development of the value added products

Value- Added food products were prepared with incorporation of Potato peel powder, Sweet potato peel powder for each product. The basic recipe (controlT0) had three variations T1, T2, T3 respectively, where the amount of one or more ingredients was varied.

Preparation of cookies and muffins

Cookies and Muffins prepared by using different ratios of nutritive value.

Preparation of cookies- Took a bowl and added Butter and powdered sugar and mixed it will take around 10 minutes after that added all-purpose flour, wheat flour, Potato peel powder, Sweet potato peel powder, Baking powder in ghee and sugar mixture. Made small balls of the cookies from this dough and kept the microwave tray in the pre- heated microwave on low rack at 180 degree celsius. Bake it for 20-25 minute.

Preparation of muffins- In a bowl, took Milk, oil, Vanilla Essence and Sugar and beat all well. Mixed all purpose flour, Baking soda, Baking powder and Coco powder in it and folded gently to make a smooth batter. Meanwhile, preheated the oven at 180 degree celsius for 10 min after that arranged muffin in the muffins tray and baked these muffins for 25 minutes or until they passed the toothpick test. (Shown in plate 1.)

Treatments and replications of the products

Preparation of Cookies with incorporation of Potato Peel Powder and Sweet Potato Peel Powder

Control (T0): Cookies prepared from wheat flour, Butter and Sugar in a ratio of 50:30:20

Treatment (T1): Cookies prepared from Wheat flour, Potato peel powder, Sweet potato peel powder, Butter and Sugar in a ratio of 60:5:5:10:20

Treatment (T2): Cookies prepared from Wheat flour, Potato peel powder, Sweet potato peel powder, Butter and Sugar in a ratio of 50:10:10:15:15

Treatment (T3): Cookies prepared from Wheat flour, Potato peel powder, Sweet potato peel powder, Butter and Sugar in a ratio of 50:15:15:10:10

Preparation of muffins with incorporation of potato peel powder and sweet potato peel powder

Muffins:

Control (T0): Muffins prepared from Maida flour, Milk powder, Coco powder and Sugar in a ratio of 50:10:10:30.

Treatment (T1): Muffins prepared from Maida flour, Potato peel powder, Sweet potato peel powder, Milk powder, Coco powder and Sugar in a ratio of 50:5:5:10:10:20.

Treatment (T2): Muffins prepared from Maida flour, Potato peel powder, Sweet potato peel powder, Milk powder, Coco powder and Sugar in a ratio of 50:7:7:10:10:16.

Treatment (T3): Muffins prepared from Maida flour, Potato peel powder, Sweet potato peel powder, Milk powder, Coco powder and Sugar in a ratio of 50:10:10:10:10:10.

Sensory evaluation

Sensory evaluation of the food products for their acceptability was done by a panel of 5 judges. The score card based on the 9 point Hedonic Scale was used for sensory evaluation on the basis of evaluation of attributes like Colour and Appearance, Body and Texture, Taste and Flavor and Overall Acceptability (Srilakshami, 2007).

Determination of cost

Costs of the prepared products were calculated taking into account the cost of individual raw ingredients used in the preparation of the food products at the prevailing market price.

Statistical analysis

The data was analyzed by Analysis of variance technique (ANOVA), critical difference and other appropriate statistical analysis methods and interprets the data (Gupta *et al.*, 2002).

Results and Discussion

Organoleptic evaluation of cookies and muffins

Two products were prepared Cookies and Muffins by the incorporation of Potato peel powder and sweet potato peel powder. Cookies and Muffins with the three treatments of each products i.e., T1(Wheat flour + Sweet potato peel powder + potato peel powder + Butter + Sugar in ratio of 60:5:5:10:20), T2(Wheat flour+ Potato peel powder + Sweet potato peel powder + Butter+ Sugar in ratio of 50:10:10:15:15), T3(Wheat flour+ Potato peel powder + Sweet potato peel powder + Butter+ Sugar in ratio of 50:15:15:10:10), The organoleptic evaluation of the products with regard to attributes of color, body and texture, flavor and taste and overall acceptability were done using a nine point hedonic scale. Sensory evaluation showed that the treatment T1 was the most acceptable in Cookies. The findings of the entire study are reported as follows: The observation was recorded, tabulated and results were statistically analyzed by analysis of variance technique, critical difference and t-test (Shown in Graph 1.)

Muffins with the three treatments of each products i.e., T1(Maida flour + Sweet potato peel powder + potato peel powder + Milk powder + Coco powder + Sugar in ratio of 50:5:5:10:10:20), T2(Maida flour+ Potato peel powder + Sweet potato peel powder + Milk powder + Coco powder + Sugar in ratio of 50:7:7:10:10:15), T3(Maida flour+

Potato peel powder + Sweet potato peel powder + Milk powder + Coco powder + Sugar in ratio of 50:10:10:10:10), The organoleptic evaluation of the products with regard to attributes of color, body and texture, flavor and taste and overall acceptability were done using a nine point hedonic scale Muffins

showed that the treatment T3 was found most highly acceptable. The findings of the entire study are reported as follows: The observation was recorded, tabulated and results were statistically analyzed by analysis of variance technique, critical difference and t-test. (shown in Graph 2) (Table 1 and 2).

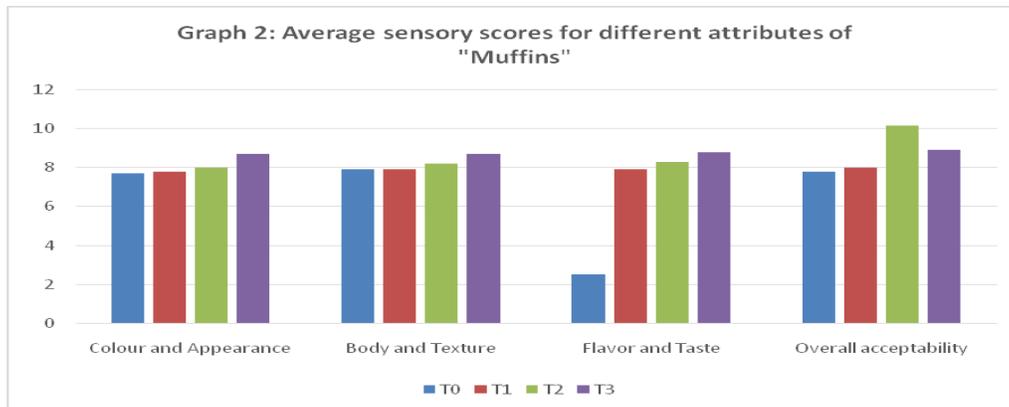
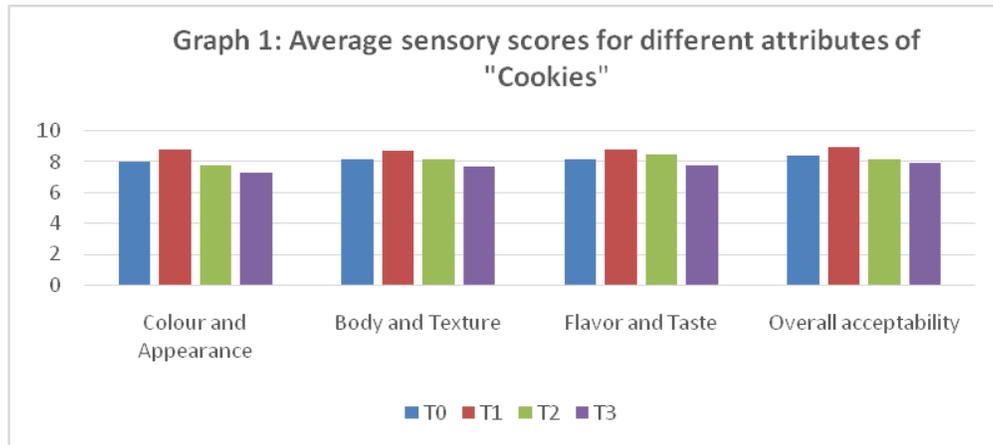
Table.1(A) The average nutritional composition of control and the best treatment samples of “Cookies” per 100g

Nutrients	(T0)	(T1)	Difference (T1-T0 =D)	T(calculated)	T(tabulated value at 5%)	Result
Moisture(%)	17.08	21.5	17.16	0.0238	4.303	NS
Ash(g)	4.85	5.6	0.75	7.91	4.303	S
Protein(g)	10.3	11.5	1.14	6.29	4.303	S
Fat(g)	26.69	10.65	256.4	0.0015	4.303	NS
Crude fiber(g)	1.84	2.06	0.682	1.209	4.303	NS
Carbohydrates(g)	47.24	55.9	67.63	0.0057	4.303	NS
Iron(mg)	0.79	1.01	0.22	21.84	4.303	S
Calcium(mg)	63.3	13.13	51	36.27	4.303	S
Vitamin C(mg)	3.7	4.16	0.46	1.73	4.303	NS
Energy(kcal)	437.6	332.73	10586.8	3.640	4.303	NS

Table.1(B) The average nutritional composition of control and the best treatment samples of “Muffins” per 100g

Nutrients	(T0)	(T3)	Difference (T1-T0 =D)	T(calculated)	T(tabulated value at 5%)	Result
Moisture(%)	15.39	24.43	81.24	0.0048	4.303	S
Ash(g)	4.85	5.6	0.75	7.91	4.303	S
Protein(g)	15.02	11.06	15.89	0.0258	4.303	S
Fat(g)	6.57	5.07	1.416	0.9274	4.303	S
Crude fiber(g)	1.68	0.92	0.3592	0.60130	4.303	NS
Carbohydrates(g)	66.22	58.76	61.21	0.0063	4.303	S
Iron(mg)	0.79	1.01	0.22	21.84	4.303	NS
Calcium(mg)	63.3	13.13	51	36.27	4.303	S
Vitamin C(mg)	3.7	4.16	0.46	1.73	4.303	NS
Energy(kcal)	336.03	309.33	414.09	0.00093	4.303	S

Plate.1 Cookies and muffins prepared by incorporation of Potato peel powder and Sweet potato peel powder



The result is supported by the finding of Divender Dhingra *et al.*, (2012) that the incorporation of dehydrated Potato peel powder from the result can be shows that the treatment T1 was most acceptability. The

mean scores of Cookies in relation to overall acceptability indicate that the T1 scored maximum followed by Treatment T0, T2 and T3 respectively.

Nutritional composition of developed product “Cookies” and “Muffins”

Cost of the prepared product

The cost of the Cookies per 100g of dry ingredients at the prevailing cost of the raw materials shows that the incorporation levels of the cost also increased but it is cheaper than the control comparatively even though it was marginal. The cost of the Muffins per 100g of dry ingredients at the prevailing cost of the raw materials shows that the incorporation levels of the cost also increased but it is cheaper than the control comparatively even though it was marginal.

On the basis of findings, it is concluded that potato peel powder, Sweet potato peel powder was successfully incorporated in the preparation of the products like Cookies and Muffins. Sensory evaluation showed that the treatment T1 was the most acceptable in Cookies and in Muffins showed that the treatment T3 was found most highly acceptable. The incorporation levels of potato peel powder and Sweet potato peel powder increased the cost but it is comparatively cheaper than the control even though it was marginal. Incorporation of different Peels which are kitchen and Food processing Industrial waste but have a wealth of nutritional content can be successfully utilized to address nutritional needs of the population. To improve the intake of protein, calcium, carbohydrate, fiber these products can also be helpful for providing variety in the daily dietaries in addition to Nutritional beneficial.

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