

Preparation and characterization of cookies prepared from wheat flour fortified with mushroom (*PleurotusSajorcaju*) and spiced with cardamom

Prof. Deepti N. Chaudhari¹, Sangram S. Wandhekar², Amir A. Shaikh³,
Prof.(Dr.)Anupama N. Devkatte⁴

MIT College of Food Technology, MIT ADT University, LoniKalbhor, Pune.

Received: September 04, 2018

Accepted: October 17, 2018

ABSTRACT

The art of making cookies is that of turning simple ingredients into wonderful things. A cookie is a crisped baked product also known as a flat cake. Cookies making is a conventional activity in many parts of the country. Cookies are a food for all sections of the people across the broad varieties and shape. This research work aimed at preparation and characterization of cookies produced from wheat flour fortified with mushroom (*PleurotusSajorcaju*) and spiced with cardamom. Mushrooms are high in protein, carbohydrate, vitamins and fibre but low in fat, rich in vitamins. Sajorcaju variety is known to possess antitumorigenic and hypocholesterolaemic activity. Wheat flour and mushroom powder taken in the ratio of 90:10, 80:20, 70:30 and spiced with cardamom with concentration range from 1gm, 1.5gm, 2gm respectively. Sensory evaluation carried out by semi trained panel to find consumer acceptability for the product. Chemical and microbial analysis carried out to determine nutritional content and shelf life of the prepared cookies sample. After analysis it has been found that mushroom fortified cookies have high protein content, low fat content, high fibre, minerals and vitamin content which will be useful to overcome malnutrition problems in lower community children.

Keywords: Mushroom, Antitumorigenic, Hypocholesterolemia, Fortification, Malnutrition

Introduction A cookie is a crisped baked product also known as a flat cake. Cookies making is a conventional activity in many part of the country. Cookies are a food for all sections of the people across the broad varieties and shape. This research work aimed to study the fortification of regular cookies by addition of mushroom powder (*Sajorcaju*).

A mushroom is the fleshy, spore bearing fruiting body of a fungus. Mushrooms are saprophytes. They include members of the Basidiomycota and some members of the Ascomycota (Oluwamodupe Emmanuel Giwa and Tesleem A 2012). Mushrooms have been a food supplement in various cultures and they are cultivated and eaten for their edibility and delicacy. There are approximately 1.5 million species of fungi in the world of those 2327 are used for edible or microbial purpose. Mushrooms are considered as source of proteins, vitamins, fats, carbohydrates, amino acids and minerals (Jiskani, M.M., (2001)). Mushroom are good sources of vitamins like riboflavin, biotin and thiamine. (Chang, S.T and Buswell 1996) It is dedicated in the earlier studies those edible mushrooms were highly nutritional and compared favourably with meat, egg, and milk. Some of the mushrooms are known to possess antitumorigenic and hypocholesterolaemic agents who imply that mushrooms could hold special attraction for and may be recommended for people with cholesterol-related ailments (Chihara, G 1993).

Nutritional composition of mushroom (*PleurotusSajorcaju*)

Table No: 1

Nutrient value (dry weight basis)	g/100g
Carbohydrate	63.4
Dietary fibre	48.6
Protein	19.23
Fat	2.7
Vitamin D (IU/100G)	178
Niacin B3 (mg/100g)	23.3
Iron (mg/100g)	6.5
Energy K Cal	355

(M.W.& Lee, T.S. 2008)

Small cardamom (*Elettariacardamomum*) often referred to as the queen of spices is a very important spice crop. (International Journal of Plant Breeding and Genetics, 2: 42-46). The cardamom is used for seasoning

and flavouring purpose. It is a good source of minerals like potassium, calcium, and magnesium. It is most effective remedies again halitosis.

Bakery products such as biscuits /cookies have high consumer acceptance and are important for delivering bioactive compounds in to human diet.(M Alpaslan, M Hayta 2006)“cookies is chemically leavened products also known as biscuits, they are ideal for nutrient availability, palatability, compactness and convenience.They are in low moisture content as compare to other products and resistant for microbial spoilage and long shelf life product(PI Akubor, MU Ukwuru 2003).Taking into consideration the need and demand of nutritionally enriched food products the studies have been carried out to formulate the cookies enriched with mushroom flour to satisfy the nutritional requirement of growing population.

Objective:

With rapid urbanization, increase in standard of living increase in per capita income and the changing lifestyle and demands of consumers it is observed that consumers are moving towards ready to eat products hence our main objective is to make such innovative product which would be tasty, nutritionally rich and affordable to low income class people as well.

Table showing requirements for formulation of mushroom fortified cookies

Table No : 2

Sr. no.	Materials/ Equipments	Quantity/100g
01)	Wheat flour	Varied
02)	Fresh mushroom dried powder	Varied
03)	Cardamom powder	Varied
04)	Shortening	65
05)	Sugar	45
06)	Baking powder	0.4
07)	Milk powder	8
08)	Water	16ml
09)	Cocca powder	1
10)	Baking oven	

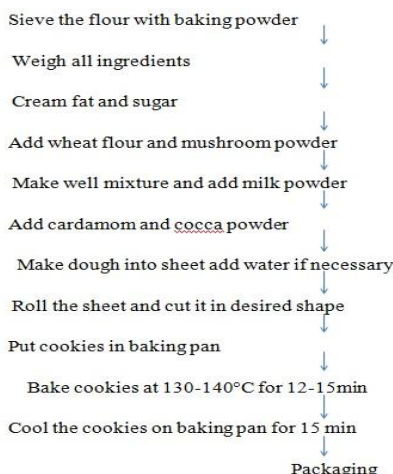
(NeelamKhetarpaul, Raj Bala Grewal , Page No.186,191-193.)

Mushroom fortified cookies are formed with variations as given in the following table

Table No : 3

Sample	Variation	Wheat flour(g)	Mushroom powder (g)	Cardamom powder (g)	Cocca powder(g)	Milk powder (g)
Control	-	100	-	1	1	8
Sample 1	90 :10	90	10	1	1	8
Sample 2	80 : 20	80	20	1.5	1	8
Sample 3	70 : 30	70	30	2	1	8

Methodology



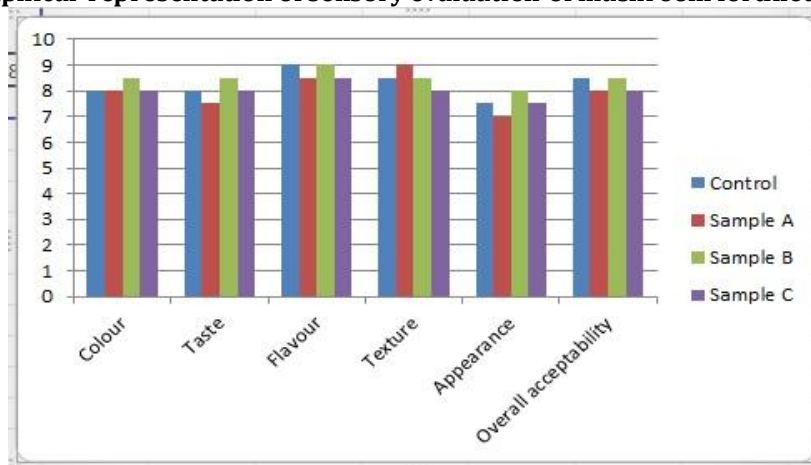
Sensory Evaluation of Mushroom fortified Cookies:-

Sensory evaluation of mushroom cookies for color, taste, flavor, texture, appearance, and overall acceptability were carried out using 9-point hedonic scale with semi-trained panelists. Sensory attributes were rated on a scale of 1 (dislike extremely) – 9 (like extremely). (Kramer. Book of Quality Control)

Table No. : 4

Sensory attributes of samples	Colour	Taste	Flavour	Texture	Appearance	Overall acceptability
Control	8.0	8.0	9.0	8.5	7.5	8.5
Sample A	8.0	7.5	8.5	9.0	7.0	8.0
Sample B	8.5	8.5	9.0	8.5	8.0	8.5
Sample C	8.0	8.0	8.5	8.0	7.5	8.0
GM	8.07	8.05	8.50	8.33	7.61	8.19
SE	0.0544	0.0732	0.1146	0.1045	0.0892	0.0720
CD @ 5%	0.1677	0.2258	0.3533	0.3220	0.2749	0.2218
CD @ 1%	0.2351	0.3165	0.4953	0.4515	0.3854	0.3110
CV%	1.1687	1.5767	2.3365	2.1747	2.0314	1.5225

Fig.: Graphical representation of sensory evaluation of mushroom fortified cookies:



Nutritional analysis of the mushroom fortified cookies in g/100gm

Sr. No.	Nutritional Value	Method	Result	Unit
01.	Moisture	Dry oven	3	%
02.	Protein	IS 7219	16.11	%
03.	Fat	Soxtron	15.16	%
04.	Fibre	Fibrotron	11.30	%
05.	Carbohydrate	SOP/C/F/04(f)	51.63	%
06.	Ash	Muffle furnace	1.8	%
07.	Vitamin B3	FHHL/SOP/C/F/24	5.33	Mg/100g
08.	Vitamin D	FHHL/SOP/C/F/25	42	IU/100g
09.	Iron	AOAC-999.10	1.72	Mg/100g
10.	Energy Value	Formula method	407.4	K Cal

(S. Ranganna Mc Graw Hill Education)

Result and Discussion:

In the formulation of mushroom fortified cookies for 100g, it is interesting to see that protein, fibre, vitamin content is increased and fat content is lowered as compare to control, having the health benefits. Consumption of these cookies will useful to overcome malnutrition in lower community children.

References:

1. Alam, N., Amin, R., Khan, A., Ara, I., Lee, M.W. & Lee, T.S. 2008. Nutritional analysis of cultivated mushrooms in Bangladesh – Pleurotusostreatus, Pleurotussajorcaju, Pleurotusflorida and Calocybeindica. Mycobiology 36(4):228-232

2. A Study of Character Association in Small Cardamom (*ElettariacardamomumMaton*). International Journal of Plant Breeding and Genetics, 2: 42-46
3. A Kramer. Book of Quality Control for the Food Industry: Fundamentals
4. Bakery science and Cereals Technology , NeelamKhetarpaul, Raj Bala Grewal ,Astral Publication, Page No.186,191-193
5. Chang, S.T and Buswell, J.A. Mushroom nutritional. World Journal of Microbiology,Biotechnology. 1996; 12:473-76
6. Chihara, G (1993). Medicinal aspects of lentian isolated from lentinusedodes (Break). Hong Kong,Chinese University Press pp.261-66
7. Handbook of analysis and Quality control for Fruit and Vegetable products, Second Edition, S. Ranganna Mc Graw Hill Education
8. Jiskani, M.M., (2001). Energy potential of mushrooms. The DAWN Economic and BusinessReview, oct.15-21, 2001. P.I.V
9. M Alpaslan, M Hayta. The effect of flaxseed,soy&cornflours on the textural and sensory properties of bakery product. J Food Quality, 29, 2006, 617-627
10. PI Akubor, MU Ukwuru. Functional properties and biscuit making potential of soybean andcassava flour blends.plant foods HumFoods HumNutr,58(3), 2003, 1-12
11. Oluwamodupe Emmanuel Giwa and Tesleem A. Ibrahim, Microbial, physical and sensory attribute of Cookies produced from Wheat flour Fortified with *Termitomycesrobustus* and spiced with Alum sativum,Journal of Pharmaceutical and Biomedical science, ISSN No-2230-7885 CODEN JPBSCT 2012
12. www. Bakery science and technology (Wikipedia)