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Nutritional and sensory evaluation of herbal cookies

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Abstract
Stress and fast life is major cause of many diseases. *Withania somnifera* is herb rich in micronutrient which reduce stress and depression. The Aim of present study is to formulate cookies enrich with *wethania somnifera* herb. The value added cookies samples were prepared in four different ratio and combination. W0, WC1, WC2 and WC3. Each experiment was replicated five times. The sensory value was determined by 9-point hedonic scale of 10 panel judge's expert in food technology. Nutritional and proximate value were determined by AOAC method (2010) all data were statistical analyzed using standard deviation techniques. The sensory value of different cookies reflects.

Keywords: cookies, *withania somnifera*, crude fiber, refined wheat flour, antioxidant, minerals

Introduction
Increased stress and fast lifestyle reduce the quality of human life. Competitive lifestyle of young generation create stress and stress induced disorder which create many diseases. Eat nutritious and healthy food for healthy living is one of the essential requirements for long healthy life. In this fast moving modern world, pace of life is increasing day by day so Quick meal is becoming regular food. Foods are highly processed and have large amount of calorie but have less nutritive value. High calories with low essential nutrients causes various deficiency [1]. Lifestyle changes has enforced us so much that one has so no time to think what they are eating is right. Quick and quality food is the requirement in modern lifestyle. Processed food has great shelf life and easy to carry in travelling, office and house [4].

Working families have alternate option of readymade food to fulfill their nutritional requirement. Generally, bakery food is high in starch calories. Herbs based cookies has alternate option to replace conventional cookies. Cookies has great shelf life bakery product. The economic importance of cookies is higher in all areas. Conventional processed foods have been replaced by functional processed food. The availability of street low cost food and adapted by manufacturers of such foods has triggered an evolution wherein, consumption of foods that require neither the structure nor the preparation of a formal meal very race and the newest entrants on stage are children [2]. Weight related disease is an emerging major public health problem throughout the world among adolescents. Junk food is especially high in fat content, and studies have found associations between fast food intake and increased body mass index (BMI) and weight gain [3]. Diabetes the high levels of sugar in junk food which puts metabolism under stress; when refined sugar is taken, the pancreas secretes high amounts of insulin to prevent a dangerous spike in blood sugar levels. Dental cavities and type 2 diabetes mellitus are caused by dense sugar content present in junk foods. Heart disease high fat content and sugar content level in junk food are unhealthy and causes heart problem in children. High blood pressure the high level of sodium content in fast foods is the main cause of increase in blood pressure [7].

A cookie is small sweet, usually containing Refined flour, sugar, and either butter or fat. It may include other ingredients such as raisins, oats, chocolate chips or nuts. Cookies were first made after sugar became available as a baking ingredient about 1400 years ago (Richard Olney *et al.*, 1982). They are also called biscuits. There are minor differences between cookies and biscuits in the percentage of raw materials, methods and the external and internal qualities. The biscuits or cookies are prepared either by machine or manually [8].

Mostly kids and young generations (Adolescents) are attracted to fast foods. Physical growth and development on higher side in adolescent period. High calories, protein is on rapid demand during this period. Adolescence can be divided into three stages. Poor nutrition during adolescent stages can have lasting consequences on an adolescent's cognitive development, resulting in decreased learning ability, poor concentration, and impaired school performance [9].

Major rural population of India is malnourished and live below poverty line. The food intake by such people is of substandard with respect to nutritive value and often leads to some disorder.

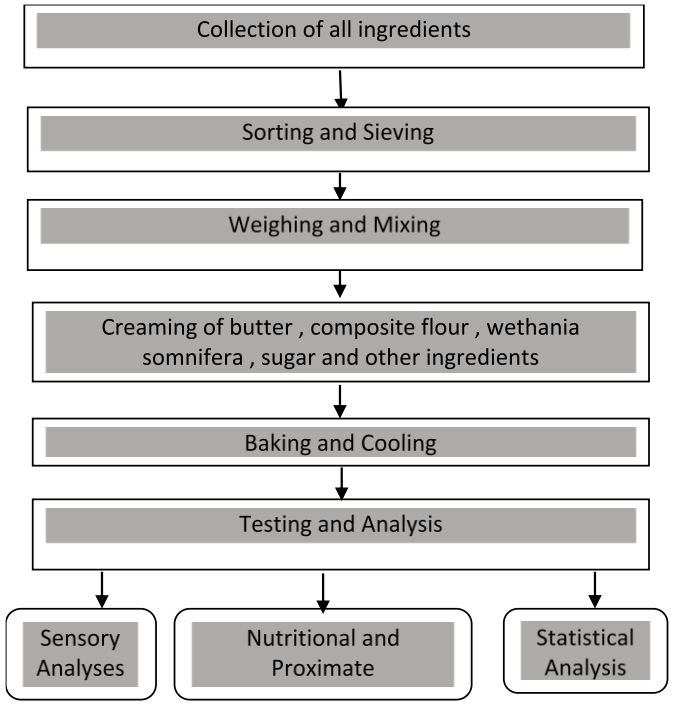

Fig 1

Material and method

The materials used of making cookies are Composite flour (refined wheat flour, semolina and gram flour), *Withania somnifera* root powder, Butter, Sugar, coconut, peanut, almond.

Procurement of raw materials

Refined wheat flour, gram flour, semolina, sugar, butter, baking powder & almond were procured from local market Dehradun. *Withania somniferain* powdered form was purchased from Dabur Pharmaceutical Ltd. Dehradun Uttrakhand India.

Table 1: Total amount of ingredients (in grams) in different samples of cookies C0 control cookies, CW1 80:100, CW2 90:100, CW390:40:100

INGREDIENTS	C0	CW 1	CW 2	CW 3
All Purpose Flour	100	100	90	90
Butter	80	80	80	40
Sugar	100	100	100	100
Wethania Somnifera	-	2	4	6
Gram Flour	-	-	10	-
Semolina	-	-	-	10
Baking Powder (tsp.)	1	1	1	1
Baking Soda (tsp.)	½	½	½	½
Coconut Powder	-	-	5	-
Almond	-	-	-	5

Sensory Evaluation

Sensory evaluation of Fresh WS cookies were determined by trained 20 panelists drawn from Department of food technology, UCALS Uttaranchal University. The faculty were asked to assign appropriate numbers to each samples tested on a 1 to 9-point hedonic scale for characteristic color, flavor, texture and overall acceptability of W.S cookies. The scale is arranged such that 9 = like extremely; 8 = like very much; 7 = like moderately; 6 = like highly; 5 = neither like nor dislike; 4 = dislike slightly; 3 = dislike moderately; 2 = dislike very much; and 1 = dislike extremely. Sensory evaluation was conducted to determine the acceptability of the product

Nutritional evaluation

All nutritional and proximate test of W.S cookies were determined by AOAC (2005) method. Moisture, Ash, Protein, Fat, Crude fiber were determined in proximate analysis. The Carbohydrate determined by differences [5, 6].

Moisture content in samples can be determined by Oven drying method.

$$\text{Moisture \% by weight} = \frac{100(w1-w2)}{w1-w}$$

W1 = weight in gram of the dish with the material before drying.
W2 = weight in grams of the dish with the material after drying to constant weight.
W = weight in grams of the empty dish.
Total ash content was determined by Muffle furnace, maintained at 550±10˚ C.

$$\text{Total ash content (\% by weight)} = \frac{100(w1-w2)}{w1-w}$$

Where,
W2= weight in g of the dish with ash.
W1= weight in gram of dish with the material taken for rest.
W= weight in gram of empty dish.
The crude fiber content in sample was estimated using (AACC, 1996) method. Crude fiber is the organic residue which remains after the food sample has been treated with boiling dilute sulphuric acid, boiling dilute sodium hydroxide solution and alcohol. The crude fiber consists of cellulose together with a little lignin. Crude fiber estimation is of great value in judging the quality of wheat products. High crude fiber is low in nutritional value.
Crude fiber, (% by weight) = 100(W2-W3)/W1-W
Where, W2= weight in g of the dish with oven dried residue.
W3= weight in q of the dish with ash
W1= weight in g of the dish with the material taken for rest.
W= weight in g of the empty dish
Protein content in grains was determined using Bradford method (Bradford, 1976).

$$\text{Protein concentration} = \frac{\text{Amount of sample in } \mu g \times 1000}{V\ (\mu l)}$$

Fat content in food was determined using (AOAC, 1984) Soxhlet extraction method.

$$\text{\% Crude fat} = \frac{\text{Wt. of fat} \times 100}{\text{Wt. of sample}}$$

Carbohydrate determination

The total carbohydrate determined by 100 - (Moisture + protein + fat + ash + fiber)

Determination of Energy

Energy (Kcal) = Fat×4+ Protein×9+ Carbohydrates×4

Result and discussion

In present study, four formulation of samples were estimated (C0 control cookies, CW1 80:100, CW2 90:100, CW390:40:100) for Moisture, Ash, Protein, Fat, Protein, Carbohydrate and energy. All tests analyzed and presented in table 2. It shows that the moisture content of CW1 is 4.04%, CW2 is 2.36 and CW3 is 1.4%. It is because of ingredients concentration and amount. The present study shows that the ash content in CW1 is 1.4%, CW2 2 is 1.2% and CW3 3 is 0.8%. It is because of wethania somnifera concentration. Cookies taste and flavor directly associated with amount and quality of fat. The present study revealed that the fat content in sample 1 is 16%, sample 2 is 15.9% and sample 3 is 10.6%. The fat content of CW3 is lower as compared to CW1 and CW2 because total butter in CW3 is low. In a same the crude fiber content in CW 1 is 2.5%, CW 2 is 2% and CW 3 is 5%. The increase in crude fiber level associated with the presence of fiber content in withania somnifera. The present study shows that the pH of CW1 is 7.3, CW 2 is 7.2 and CW 3 is 6.90. The decrease in pH level because of lactic acid production and sucrose hydrolysis. The total ash content in CW 1, 2 and 3 were observed 1.4%, 1.2% and 0.8% respectively the pH of CW 1 was 7.3, CW 2 was 7.2 and CW was 6.9.

CW1 CW2 CW3

Fig 1: Fat content extracted from the samples.

CW1 CW2 CW3

Fig 2: Crude Fiber Extracted from samples

CW1 CW2 CW3

Fig 3: Prepared cookies

Sensory Evaluation

The points scored in Overall acceptability by sample 1 is 7 'Like moderately', CW 2 and CW 3 is 8 'like very much'.

Discussion

"The term baking applies on the food products on which heating is applied either directly or by radiation from the walls of heating appliances and in which flour is the basic ingredient. Baking includes the production of food items like cakes, cookies, bread, biscuits and pastries etc. where the basic ingredient is flour for making base of the product. For the finishing of the baked product, baking also includes fillings, frosting and toppings and so on. Cookies are made in a wide variety of styles, using an array of ingredients including sugars, spices, chocolate, butter, peanut butter, nuts, or dried fruits. The softness of the cookie may depend on how long it is baked. The earliest cookie recipe made use of sweet cake ingredients such as Flour, sugar, eggs, fat and nuts" [13, 14, 15]

simple cookies that the moisture content is 2.44±0.30%, ash content observed was 0.82±0.01%, fat content is 24.43±0.09%, protein content is 5.65±0.10%, crude fiber is

1.95±0.04%, carbohydrates is 66.66±0.13% and calorie (Kcal/100g) is 509.11%.

The increase and decrease in moisture content is due to the increase and decrease in fat content or sugar content. The present study shows that the moisture content of sample 1 is 4.04%, Sample 2 is 2.36 and Sample 3 is 1.4%. The moisture content of samples is decreasing as shown in graph 4.1.

Decrease in ash content shows that as quantity of *withania somnifera* root powder increases the ash content in sample decreases. As shown in graph 4.2.The present study shows that the ash content in sample 1 is 1.4%, Sample 2 is 1.2% and sample 3 is 0.8%.

Cookies taste and flavor directly associated with amount and quality of fat. The present study shows that the fat content in sample 1 is 16%, sample 2 is 15.9% and sample 3 is 10.6%. The fat content of sample 3 is lower as compared to sample 1 and 2 because the quantity of fat is low in sample 3 as shown in graph 4.5 [10]

As shown in graph 4.7, the protein content in sample 2 is maximum because of the presence of gram flour in it and gram flour is rich in protein content. The present study shows that the protein content in sample 1 is 0.07g, sample 2 is 0.19g and sample 3 is 0.11g.

The present study shows that the crude fiber content in sample 1 is 2.5%, sample 2 is 2% and sample 3 is 5%. The increase in crude fiber level may be associated with the presence of greater fiber content in *withania somnifera* root powder as the level of root powder is increasing. As shown in graph 4.6

As shown in graph 4.8 The present study shows that the Carbohydrates in sample 1 is 98.226g, sample 2 is 98.145g and sample 3 is 98.704g. The carbohydrate in sample 3 is maximum because of the ingredients present in it and the quantity of *withania somnifera* is highest.

The Present study shows that the energy in sample 1 is 407.584Kcal, sample 2 is 407.65Kcal and sample 3 is 404.796Kcal. The energy in sample 2 is highest because of the presence of coconut powder and gram flour and high quantity of fat present in it as shown in graph 4.9

As shown in graph 4.3.The present study shows that the pH of sample 1 is 7.3, Sample 2 is 7.2 and sample 3 is 6.90. The decrease in pH level may be because of lactic acid production and sucrose hydrolysis.

As shown in graph 4.4 The Present study shows that the softness of sample 1 is 1.4mm, sample 2 is 1.8mm and sample 3 is 2.2mm. This may be due to the baking time and baking temp. And the level of baking soda and powder in cookies. Because over baking cause the hardening of cookies. By addition of baking powder and baking soda the softening occurs.

As shown in graph 4.10.The present study shows that the sample 1 was liked moderately (7 points), Sample 2 was liked very much (8 points) and sample 3 was like very much (8 points). In sample 2 additional ingredient i.e., coconut powder and gram flour was added which enhanced its taste. In sample 3 almonds and semolina were added hence taste was enhanced.

Table 2: Observation

Test Applied	Result		
	CW1 (%)	CW2 (%)	CW3 (%)
Moisture Content	4.04	2.36	1.4
Ash Content	1.4	1.2	0.8
Fat	16	15.9	10.6
Crude Fibre	2.5%	2%	5%
Protein	0.07g	0.19g	0.11g
Carbohydrate	98.226g	98.145g	98.704g
Energy (Kcal)	407.584	407.65	404.796
pH	7.3	7.2	6.9
Penetration(mm)	1.4	1.8	2.2
Overall Acceptability (Hedonic point)	7	8	8

Conclusion

Cookies is popular for morning and evening tea time snacks. Low cost nutritive biscuits made of herbal components wethania somnifera powder is alternative option to rejuvenate immunity. Cookies is rich in carbohydrate, energy, protein and fat increase its importance for undernourished population. The fast paced life with less time for fresh food preparation has also created place for ready to eat food.

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References

1. Ashakiran & Deepthi R; Fast food and their impact on health JKIMSU, 2012; 1(2).ISSN:2231-4261.
2. Srilakshmi B. New Age International Pvt. Ltd., Dietetics Revised fifth edition, 2008, 79-81.
3. Srilakshmi B. New Age International Pvt. Ltd., Nutrition Science-Third edition, 2008, 306-320.
4. Bhattacharya SK, Kumar A, Ghosal S. Effects of glycowithanolides from Withania somnifera on an animal model of Alzheimer's disease and perturbed central cholinergic markers of cognition in ra ts. Phytother. Res, 1995; 9:110-113.
5. Jayaprakasam B, Nair MG. Cyclooxygenase-2 inhibitory withanolides from Withania somnifera leaves, 2003.
6. Kumar S *et al.* Effects of Conventional and Microwave Heating Pasteurization on Physiochemical Properties of Pomelo Citrus maxima Juice Journal of Food Processing & Technology, 2017, 8:7.
7. Miller RA, Hoseney RC. Factors in hard wheat flour responsible for reduced cookie spread. Cereal Chemistry, 1997; 74:330-336.
8. Nanditha BR, Jena BS, Prabhasankar P. Influence of natural antioxidants and their carry-through property in

biscuit processing. Journal of the Science of Food and Agriculture, 2009; 8:288-298.
9. Rosli WIW, Nurhanan AR, Aishah MS. Effect of partial replacement of wheat flour with oyster mushroom Pleurotus sajor-caju powder on Nutritional Composition and sensory properties of butter biscuit. Sains Malaysiana. 2012; 41(12):1565-1570.
10. Sai Manohar R, Haridas Rao P. Effect of emulsifiers, fat level and type on the rheological characteristics of biscuit dough and quality of biscuits. Journal of Science of Food and Agriculture, 1999; 79:1223-1231.
11. Sanjay kumar *et al*. Effects of Refrigeration Storage on the Ascorbic Acid VIT C, 2017.
12. Steel RGD, Torrie JH. Principles and Procedures of Statistics. Mc. Graw Hill Pub. Co. Inc. New York. 1997.
13. Tyagi SK, Manikantan MR, Harinder OS, Gurlen K. Effect of mustard flour incorporation on nutritional, textural and organoleptic characteristics of biscuits. J. of Food Engi. 2007, 1043-1050.
14. Warner PKW, Nambiar VPK, Remankutty C. Indian medicinal plants. Orient Longman. Chennai, India, 1995, 773.
15. Yogambal Ashokkumar. PHI learning Pvt. ltd. Textbook of Bakery and Confectionary second edition. 2015, 112. Vieira MA, Tramonte KC, Podestá R, Avancini SRP, Amboni RDMC, Amante ER. Physicochemical and sensory characteristics of cookies containing residue from king palm Archontophoenix alexandrae processing. Int. J Food Sci. Tech., 2007; 43:1534-1540.