

Sensory and Analytical Study of Oats Chocolate Chips Cookies

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Abstract: A study was conducted for sensory analysis and analytical study of oats chocolate chips cookies. The cookies made were nutritious products for all peoples. The product on the whole composed of oats and wheat flour or all purpose flour and other ingredients such as dark chocolate and sugar. The product was made with three different formulations such as 20:80, 30:70, 40:60 (oats: wheat flour) respectively. Sensory evaluation was done for acceptability of the product and analytical study was conducted to analyze chemical composition of product. Result from sensory analysis was shown that product is acceptable.

Keywords: chocolate chips cookies, cereals, B- glucans, amino acids etc.

1. Introduction

Oats (*Avena Sativa* L.) ranks around sixth in the world cereals production statistics following wheat, maize, rice, barley and sorghum. They are good source of proteins, fibre and minerals. The amount of oats used for human consumption has increased progressively, the fact health effects of oats benefits mainly on the total dietary fibre and B- glucan content (Ahmad Mushtaq et al, 2014) [1]. The bran and germ of oats also contain phytochemicals including tocopherols, tocotrienols, phenolic compounds and plant sterols, thought to have a beneficial effect on health (oats for health booklet)[29]. Oats is the only cereal containing a globulin or legume like protein avenalins, as the major (80%) storage proteins. globulins are characterized by water solubility; because of this property(health and drugs: disease, prescription and medication)[7]. Oats is reported as, they used for their antioxidants, anti-inflammatory, moisturizing and even ultraviolet protecting properties. As a grain without gluten, oat flour and bran are used as an alternative food for persons suffering celiac disease. As a health food oats have received extensive attention in recent times for their ability to lower serum cholesterol level (www.truehealthmedicine.com)[30]. Avenanthramides enriched extracts of oats have been shown to inhibit expression of these molecules in the endothelial cells in culture and other tissues by suppressing NF-kB, an important transcription factor in inflammation. In addition oatmeal extract containing avenanthramides suppresses production of prostaglandin which is another mediator in inflammation. In addition to their anti-inflammatory properties, oat avenanthramides have been to suppress proliferation of vascular smooth muscle cells, a process that is known to be a major contributing factor in the development of atherosclerosis. Oats are thought to play a role in glucose and insulin response levels, as the viscosity generated by B-glucan is thought to delay glucose absorption, resulting in a lower glycemic response. Also shown that person having type 2 diabetes, the consumption of whole oats products or B-glucan enriched products resulted in a lower glycemic response and also healthy and hypercholesterolemic individuals, glucose response after eating was lower following consumption of oats products or B-glucan enriched products (pepsico nutrition: health and wellness) [21]. Recent studies show that in phagocytosis stimulation B-

glucans are important agents for the maintenance of some blood biochemical parameters. They are responsible for decreasing total and LDL-cholesterol, the ratio of total to HDL-cholesterol (www.truehealthmedicine.com)[30]

Chocolate is the most commonly craved food in the world. Initially it was thought of as a luxury item, but now it is considered to be a medicine. Cocoa contains large concentration of flavonoids, epicatechin, catechin and procyanidins. The nitrogenous compounds of cocoa include both proteins and the methylxanthinestheobromine and caffeine. They are central nervous system stimulants, diuretics and smooth muscle relaxants. Cocoa also contains minerals such as potassium, phosphorus, copper, iron, zinc and magnesium which potentiate health benefits of chocolate (Latif R., 2013) [13].

Wheat (*Triticumaestivum*-L) constitutes a major source of most of the diet containing moisture; 12.0, protein; 10.0, lipids, (fat); 1.6, carbohydrates; 72.6, fiber; 1.3, and ash; 1.4 g/100g respectively. Whole wheat flour contained 43 mg Ca, 284 mg P and 45 mg iron. Wheat is the major contributor of protein content of daily diet (Wahab Said et al, 2014)[28].

Composition of oats:

Table 1: Composition of oats

Energy	1, 628 KJ
Carbohydrates	66.3g
Dietary fibre	10.6g
Fats	6.9g
Proteins	16.9g
Vitamins	
Thiamine (B ₁)	0.763 mg
Riboflavin (B ₂)	0.139 mg
Niacin (B ₃)	0.961 mg
Pantothenic acid (B ₅)	1.349 mg
Folate(B ₉)	56 µg
Trace minerals	
Calcium	54 mg
Iron	5 mg
Magnesium	177 mg
Manganese	4.9 mg
Phosphorus	523 mg
Potassium	429 mg
Zinc	4 mg
Other constituents	
β-glucan (soluble fibre)	4 g

Reference - USDA national nutrient database

Composition of Dark Chocolate

Table 2: Composition of Dark Chocolate

Calories	605 kJ/100g
Total fat	43 g/100g
Cholesterol	2mg/100g
Total carbohydrates	46g/100g
Dietary fiber	11g/100g
Sugar	24g/100g
Proteins	8g/100g
Minerals	
Sodium	20mg/100g
Calcium	7%
Iron	67%
Vitamins A	1%

Reference - USDA national nutrient database

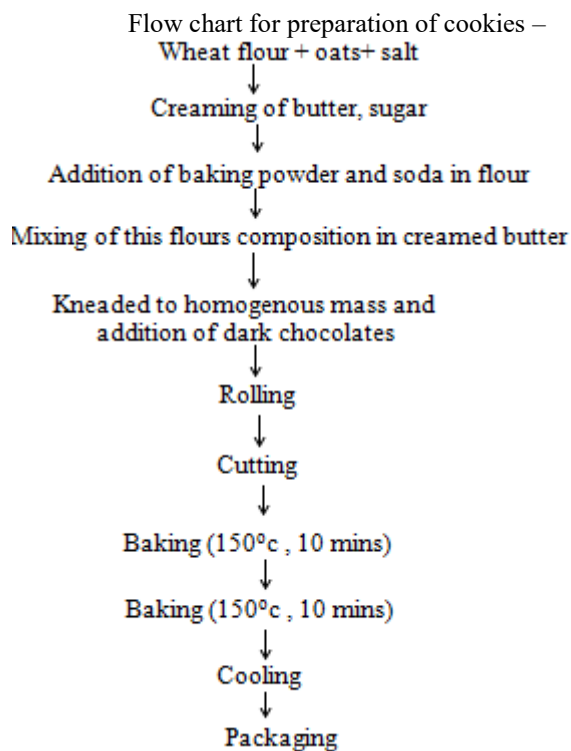
Material and Methods:

1. Preparation of composite flour

Three different samples were prepared with combination of oat flour and wheat flour in it. Wheat flour or All-purpose flour was also added in cookies and some artificial flavoring agents like vanilla added. All cookies were baked in a pre-warmed oven at 150^o c.

Material

- a) Oats
- b) Wheat flour or All-purpose flour
- c) Sugar
- d) Butter
- e) Dark chocolate
- f) Milk



Analytical Methods:

A. Determination of moisture content -Moisture was estimated by weighing a10g of ground sample and subjected to hot air oven at 110 for 4 hrs at 1 hr interval to check weight of sample. It was again weighed after cooling in

desiccators until the constant weight was obtained. The resultant loss in weight was calculated as moisture content.

$$\text{Moisture content} = \frac{W_2 - W_1 \times 100}{w_2 - W}$$

Where, w= weight of empty petridish
 W₁= weight of petridish with sample before drying
 W₂= weight of petridish with sample after drying to constant weight

B. Determination of fats

10g of ground sample was weighed accurately to thimble and defatted with the petroleum ether in soxhlet apparatus for 6-8hrs at 80degree. The resultant ether was evaporated and lipid content was calculated

$$\% \text{fats} = \frac{W_2 - W_1 \times 100}{W}$$

Where, W₂- weight of flask with oil (g)
 W₁- weight of empty flask
 W – weight of initial sample

C. Determination of proteins

Proteins were determined by micro-kjeldhal method using 10 g of ground sample by digesting the same with concentrated H₂SO₄ containing catalyst mixture 3-4 hours at 100 degree. It was then distilled with 40% of NaOH and liberated ammonia was trapped in per cent of boric acid and then it was titrated with 0.1 N HCL using mixed indicator .the percentage was estimated in the sample sung multiplying factor 6.25.

$$\text{Nitrogen \%} = \frac{\text{sample titre} - \text{blank titre} \times \text{normality of HCl} \times 14 \times 100}{\text{weight of sample} \times 100}$$

Protein % = Nitrogen % x 6.25

D. Determination of carbohydrates

100 mg of sample was weighed accurately in the test tube and kept in hot water bath for 3 hours for hydrolysis followed by the centrifugation by addition of distilled water to make volume 100ml. Now take 0.5 and 1ml and addition of anthrone reagent to it and heat for 20 mins of hot water bath.The optical density was measured at 480 nm using colorimeter.

$$\text{Amount of carbohydrate in 100mg of sample} = \frac{\text{mg of sample} \times 100}{\text{volume of test sample}}$$

E. Determination of ash content

10g of sample was weighted into crucible which was heated at low flame till all the material was completely charred and cooled. Then it was kept in muffle furnace for about 5 hrs at 600 degree. It was again cooled in desiccator and weighed and repeated until two consecutive weights were constant. The percent ash was calculated by knowing the difference between initial and final weight.

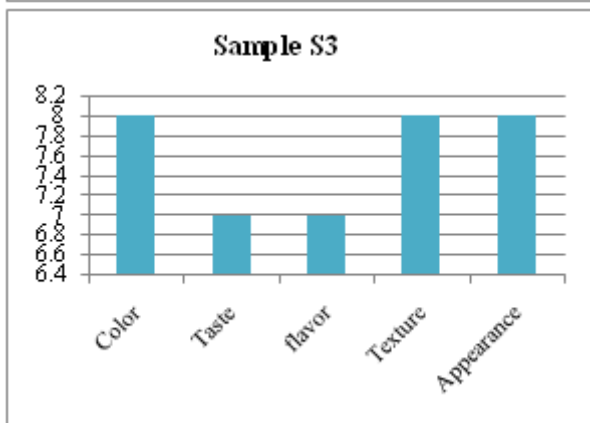
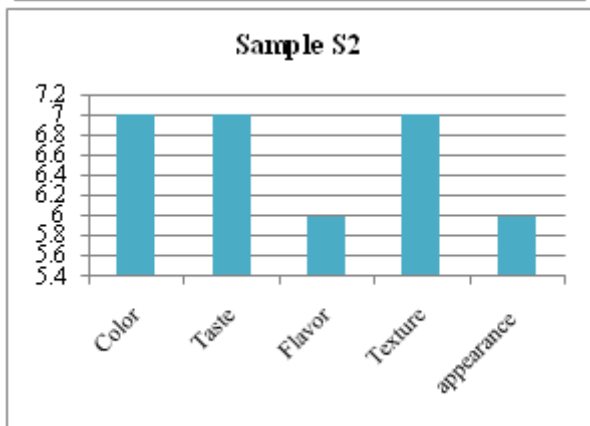
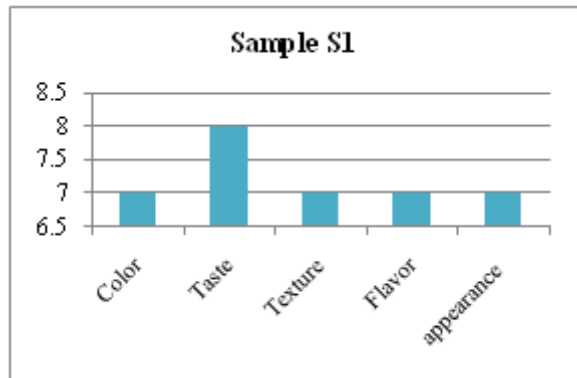
$$\text{Total ash} = \frac{(w_2 - w) \times 100}{W_1 - w}$$

Where, w= weight of empty dish
 W₁= weight of dish with sample
 W₂= weight of dish with ash

Result of Sensory Analysis:

Hedonic rating scale was use for the overall acceptability, results as follow:

Sample	Organoleptic scoring (overall acceptability)				
	Color	Texture	Taste	Flavor	Appearance
-S1	7	7	8	7	7
S2	7	6	7	7	7
S3	8	8	7	7	8



Health benefits of Oats:

1. Antioxidant properties of oats
2. Cholesterol lowering property
3. Anti inflammatory and anti proliferation
4. Lowering glycaemic response or ability to reducing post prandial glucose level

Health benefits of dark chocolate:

- Lower blood pressure
- Improved cardiovascular health
- Better brain performance
- Reduced risk of stroke

- Better renal (kidney) functions
- Lower Body Mass Index (BMI)

Sr. No.	Parameters	Results	Units
1	Energy value	551	Kcal/100g
2	Proteins	5.5	g/100g
3	Carbohydrates	62.1	g/100g
4	Fats	24.3	g/100g
5	Crude fibre	12	g/100g
6	Ash content	5.3	g/100g

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