

Nutritional Composition of Sunflower Seeds Flour and Nutritive Value of Products Prepared by Incorporating Sunflower Seeds Flour

Srivastava Aishwarya* Verma Anisha**

*Research Scholar, Department of Foods and Nutrition, Ethelind School of Home Science, SHIATS, Allahabad,

**Assistant Professor, Department of Foods and Nutrition, Ethelind School of Home Science, SHIATS, Allahabad,

Email: sr_aishwarya@rediffmail.com

Subject: Health Outcomes Research

Abstract

Sunflower seeds flour were analyzed for proximate constituents using the standard method of AOAC (2005). The moisture content of the sunflower seeds flour was found to be 3.1%, Ash, 4.49g/100g, Carbohydrate, 18.72g/100g, Protein, 19.69g/100g, Fat, 53g/100g. The calcium, phosphorus and iron content was found to be 277mg/100g, 667.66mg/100g and 4.9 mg/100g respectively. Three value added products namely 'Laddoo', 'Biscuit' and 'Missi roti' were made by incorporating sunflower seeds flour at 15 percent, 25 percent and 35 percent level refers as T₁, T₂, T₃ respectively and the control T₀ for all the prepared products was made without the incorporation of sunflower seeds flour. In 'Laddoo' T₃ contain higher amount of energy (683.35kcal), protein (14.79g), fat (40g), calcium (134mg), phosphorus (465.25mg) and iron (5.53mg) as compared to control. In 'Biscuit' T₃ contain higher amount of energy (551.15kcal), protein (17.41g), fat (22.82g), calcium (132.75mg), phosphorus (368.55mg) and iron (4.03mg) as compared to control. In 'Missi roti' T₃ contain higher amount of protein (18.52g), fat(21.32g), calcium(151.8mg), phosphorus(487.47mg) and iron(5.06mg) as compared to control. However all the treatments were found to be acceptable.

Keywords: Sunflower seeds flour, ANOVA, Acceptability, Nine point hedonic scale

Introduction

Sunflower seeds are a good source of plant protein, providing 6 grams or 12 percent of the Daily Value per ounce. Vitamin E is an antioxidant that may protect against heart disease by getting rid of harmful molecules called free radicals that can lead to atherosclerosis. Sunflower seeds are the best whole food source of vitamin E. Sunflower seeds are an excellent source of vitamin E. Just one ounce of sunflower seeds provides 76 percent of the Recommended Dietary Allowance for vitamin E. Selenium works with vitamin E as an antioxidant and protects cells from damage that may lead to cancer, heart disease, and other health problems. Although there is no Daily Value for selenium, nutrition scientists recognize its importance to health and a Recommended Dietary Allowance (RDA) has been established. The

selenium in one ounce of sunflower seeds provides about 24 percent of the RDA for men and 31 percent of the RDA for women. Copper helps your body carries oxygen to red blood cells and produce energy in the cells. Copper is also a vital part of some antioxidant enzymes in the body, thus protecting you from oxidative stress. While a copper deficiency is rare, this trace mineral is essential to an energy-rich life. You'll find about 25 percent of the Daily Value for copper in one ounce of sunflower seeds. Folate, a B vitamin, plays an essential role in making new body cells by helping to form the DNA and RNA that contain each cell's "master plan" for reproduction. This is why folate is so important for pregnant women and the development of babies. Folate also pairs with vitamin B-12 to help form hemoglobin in red

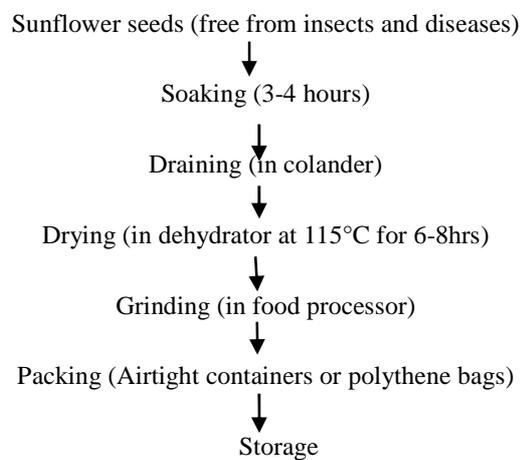
blood cells, which allows them to carry optimal amounts of oxygen. Folate is involved in the removal of homocysteine, an amino acid thought to promote heart disease, from the blood. A large population study from Harvard University shows an association between higher intakes of folate and lower risk of heart disease. Sunflower seeds are a good source of folate, supplying 17 percent of the Daily Value in a one-ounce serving. Other B vitamins are essential for producing energy from food. A one-ounce serving of sunflower seeds contains 20 percent of the Daily Value for pantothenic acid, 11 percent for vitamin B6, 6 percent for thiamin and 6 percent for niacin. Zinc is a mineral that is vital for keeping your immune system strong, fending off infections and healing wounds. A one-ounce serving of sunflower seeds is a good source of zinc, providing 10 percent of the Daily Value. Iron is essential in carrying oxygen from your lungs, through your blood, and to every body cell. Iron deficiency, which can lead to anemia, fatigue and infection, is more common among women who experience regular menstrual loss. One ounce of sunflower seeds is a good source of iron, providing 10 percent of the Daily Value. The indigestible part of plant foods – promotes good health by helping to lower blood cholesterol, manage blood glucose and prevent constipation due to the presence of fibre. While the American Cancer Society recommends consuming 20 to 35 grams daily, most Americans fall short on fiber, averaging only 11 grams per day. Sunflower seeds are fiber-filled foods with 2 grams of fiber per one-ounce serving, putting you well on your way to your daily fiber goal. Phytochemicals, or beneficial plant chemicals, may inhibit cancer growth, protect against heart disease, and offer protection from colon, prostate and breast cancer. Research from Virginia Polytechnic Institute and State University suggests that sunflower seeds are high in many phytochemicals like choline, lignan, phenolic acids, and betaine, as well as the amino acid arginine. Currently there is no set Daily Value for phytochemicals, but nutrition scientists recommend eating more whole foods, like sunflower seeds, that are abundant in these beneficial plant chemicals⁷. 100g sunflower seeds contains moisture-5.5 g, protein-19.8 g, fat- 52.1 g, minerals-3.7 g, fibre- 1.0 g, carbohydrate- 17.9 g, energy- 620 kcal, calcium- 280 mg, phosphorus-670 mg, iron- 5 mg⁴

Materials and Methods

The present investigation “Nutritional Composition of Sunflower Seeds Flour and

Nutritive Value of Products Prepared By Incorporating of Sunflower Seeds Flour ” was conducted in the Nutrition Research Laboratory, Department of Foods and Nutrition, Ethelind School of Home science, Sam Higginbottom Institute of Agriculture, Technology & Sciences, (Deemed to be University), (Formerly Allahabad Agricultural Institute) Allahabad.

Preparation of sunflower seeds flour -The standard procedure was slightly modified for the preparation of sunflower seed flour⁶



Proximate analysis- Chemical estimation of moisture, ash, protein, fat and carbohydrate content was done by using standard procedures¹. Minerals - Phosphorous, Calcium and Iron were estimated by AOAC (2005) standard procedures. Sunflower seeds flour were used for the development of value added locally familiar food products namely ‘Laddoo’, ‘Missi roti’ and ‘Biscuit’ at 15 percent, 25 percent, and 35 percent incorporation levels, respectively. The basic recipe was standardized and served as control (T₀). Three value added treatments i.e. incorporation with sunflower seeds flour at 15 percent, 25 percent and 35 percent levels were referred to as T₁, T₂ and T₃ treatments respectively for each of the three products developed. The nutritional value obtained by the chemical analysis of sunflower seeds flour have been computed as well as food composition tables by (Gopalan *et al.*, 2007) was used to determine the nutritive value of the prepared products.

Results and Discussion**Table 1: The average nutrient composition of sunflower seeds flour per 100 g.**

NUTRIENTS	AMOUNT
Moisture %	3.1± 0.057
Ash (g)	4.49±0.015
Protein (g)	19.69± 0.155
Fat (g)	53± 0.573
Fibre (g)	0.96±0.033
Total carbohydrate (g)	18.72± 0.480
Calcium (mg)	277± 1.00
Phosphorus (mg)	667.66± 1.33
Iron (mg)	4.9± 0.201

Table 1. shows that the sunflower seeds flour per 100g, contained 3.1% moisture, 4.49g ash, 19.69g protein, 53g fat, 277mg calcium, 667.66mg phosphorus, 18.72g total carbohydrate, 4.9mg iron.

Comparative values of sunflower seeds flour per 100g as given by Gopalan *et al.*,(2007) are moisture 5.5%, protein 19.8g, fat 52.1g, fibre 1g, carbohydrate 17.9g, energy 620kcal, calcium 280mg, phosphorus 670mg, iron 5 mg.

Table: 2. Average nutrients content in control and treated samples of 'Laddoo'.

Nutrients	Control	Treatments		
	T ₀	T ₁	T ₂	T ₃
Energy(kcal)	680.2	681.55	682.45	683.35
Carbohydrate(g)	109.16	101.43	96.28	91.13
Protein (g)	12.10	13.25	14.02	14.79
Fat(g)	21.7	29.26	34.77	40
Calcium(mg)	52.8	87.6	110.8	134
Phosphorus(mg)	355.4	401.80	433.75	465.25
Iron (mg)	4.9	4.91	5.22	5.53

Table: 3. Average nutrients content in control and treated samples of 'Biscuit'.

Nutrients	Control	Treatments		
	T ₀	T ₁	T ₂	T ₃
Energy(kcal)	550.45	550.75	550.95	551.15
Carbohydrate(g)	113.66	105.26	99.66	94.06
Protein (g)	14.33	15.65	16.53	17.41
Fat(g)	4.23	11.91	17.51	22.82
Calcium(mg)	42.8	81.35	107.05	132.75
Phosphorus(mg)	176.4	258.3	313.65	368.55
Iron (mg)	3.23	3.58	3.80	4.03

Table: 4. Average nutrients content in control and treated samples of 'Missi roti'.

Nutrients	Treatments			
	T ₀	T ₁	T ₂	T ₃
Energy(kcal)	386	385.03	384.38	383.73
Carbohydrate(g)	70.9	63.89	59.24	54.55
Protein (g)	16.99	17.85	18.19	18.52
Fat(g)	3.7	10.96	16.29	21.32
Calcium(mg)	72	106.2	129	151.8
Phosphorus(mg)	373	421.61	454.76	487.47
Iron (mg)	5.1	5.08	5.08	5.06

Nutritive value of the products increased with the incorporation of sunflower seeds flour protein content in 'Laddoo' was found to be between 12.10-14.79g, Fat ranged between 21.7-40g, Carbohydrate ranged between 109-91.13g, Energy 680.2-683.35kcal, Iron 4.9-5.22mg, phosphorus ranged between 355.4-465.25mg and calcium ranged between 52.88-134mg per 100g. The result is supported by the similar findings of Skrbic and Cvejanov, (2011) prepared cookies prepared with white or wholegrain wheat flours and substituted with high-oleic sunflower seed (10 g/100 g and 30 g/100 g supplementation levels) and hull-less barley flour (30 g/100 g and 50 g/100 g levels). Sunflower seed significantly increased the contents of Se, Zn, Mg, and Ca, as well as the contents of α -tocopherol and fat in cookies.

In 'Biscuit' ranges of nutrients for protein were between 14.33-17.41g, Fat ranged between 4.23-22.82g, Carbohydrate ranged between 113.66g-94.06, Energy 550.45-551.15kcal, Iron 3.23-4.03mg, phosphorus ranged between 176.4-368.55mg and calcium ranged between 42.8-132.75mg per 100g. The result is supported by the finding of Ghosh *et al.*, (2012) the utilization of protein concentrates from protein rich seed materials like Soy, Sesame and Sunflower to make protein rich 'Biscuit'. The Protein Rich 'Biscuits' made in this investigation, display composition that shows higher protein content (15-20 %) compared to the control market product (7%). The lower amount of carbohydrate along with increased amounts of fibre and ash content provided by the Protein Rich 'Biscuits' plays an important role to increase its health beneficial effect.

In 'Missi roti' ranges of nutrients for protein were between 16.99-18.52g, Carbohydrate ranged between 70.9-54.55g, Energy 383.73-386kcal, Iron 5.1-5.08mg, phosphorus ranged between 373-

487.47 and calcium ranged between 72-151.8mg per 100g respectively. The result is supported by the similar findings of Eman *et al.*, (2012) prepared formulated cake samples with the addition of high-oleic sunflower seeds, at various levels (5, 10 and 15 percent of flour basis) in order to produce high linolenic (n-6) and alpha linolenic cake products. The nutritive value of cake was determined by measuring the chemical composition, including the mineral content and the fatty acid composition (saturated, monounsaturated, polyunsaturated, linolenic (n-6) and alpha linolenic).

Acknowledgement

I would like to express my heartiest and profound gratitude towards my advisor Dr. (Mrs.) Sarita Sheikh, Professor and Dean, for her valuable suggestions and affectionate encouragement throughout this thesis work.

"Cite this article"

S. Aishwarya V. Anisha "Nutritional Composition of Sunflower Seeds Flour and Nutritive Value of Products Prepared By Incorporating Sunflower Seeds Flour" Int. J. of Pharm. Res. & All. Sci. 2014;3(3):45-49

Conclusion

Result obtained from the present study revealed that the sunflower seeds flour can be successfully dehydrated in a dehydrator. Three products were prepared by incorporation with sunflower seeds flour, namely- 'Laddoo', 'Missi roti' and 'Biscuit'. Nutritive value of the prepared products indicate that protein, fat, calcium and phosphorus content increased in enriched 'Laddoo', 'Biscuit' and 'Missi roti' as compared to control. All food products were well accepted.

References

1. AOAC, (2005) "Official Methods of Analysis of the Association of Official Analytical chemists".18th Ed.
 2. Eman, M.S., Najlaa A., Hamed, and Ohaad, F.A.A. (2012) Implementation of the sunflower seeds in enhancing the nutritional values of cake. *Journal of Applied Sciences Research* ,vol. 8(5): 2626-2631.
 3. Ghosh, M., Kar, S., Roy, P., and Bhattacharyya, D. K.(2012) Utilization of Seed Protein Concentrates in making Protein Rich Biscuits. *Indian Journal of Information Science and Applications (IJISA)* 2(1):7-14.
 4. Gopalan, C. J., Balasubramanian, C. S., and Sastri Rama, V. B. (2007) "Nutritive Value of India Foods". IVth edition, printed by National Institute of Nutrition (NIN), ICAR .51.
 5. Skrbic, B., and Cvejanov, J., (2011) enrichment of wheat cookies with high-oleic sunflower seed and hull-less barley flour: Impact on nutritional composition, content of heavy elements and physical properties. Vol. 124(4):1416–1422.
(<http://www.sciencedirect.com/science/article/pii/S0308814610009696>)
 6. <http://nouveauraw.com/raw-techniques/sunflower-sunflower-seed-flour/>
 7. www.sunflowernsa.com
-