



PHYSICO-CHEMICAL, NUTRITIONAL AND ANTIOXIDANT PROPERTIES OF COOKIES INCORPORATED WITH PRUNUS AVIUM L.

Shivangi Sharma*

Research Scholar Department of home science, Banasthali Vidyapith, Tonk, Rajasthan-304022. *Corresponding Author

Gita Bisla

Associate Professor Department of home science, Banasthali Vidyapith, Tonk, Rajasthan-304022.

ABSTRACT

Cherries in particular sweet cherries are a nutritionally dense fruit which contain good taste, attractive appearance, small in size and limestone fruit. Firstly, the proximate composition, some vitamin and minerals, non-nutrient compounds and antioxidant compounds were assessed in dry red sweet cherry powder. In the present study, a product was prepared by incorporation of cherry powder. The cookies were prepared in four variants- variant A, variant B, variant C, variant D and they were examined for sensory acceptability. The most acceptable variant of cookies found was variant C. The proximate composition, mineral and vitamin content, physical evaluations were performed on all the variants. In proximate analysis, cherry powder was found to be rich in protein, carbohydrate, calcium and vitamin C. The cherry powder was low in ash, fiber, fat, iron. In non-nutrients compounds cherry powder was rich in alkaloids and saponins and the powder was low in polyphenol, tannins and flavonoids. The DPPH was rich in cherry powder and metal chelating activity was found low in cherry powder. Then incorporate product cookies was found to be rich in moisture, fat, fiber, protein, iron, calcium, total soluble solid, water activity, pH, breaking strength and viscosity.

KEYWORDS : Antioxidant, Phytochemical, Red sweet cherry, Cookies

INTRODUCTION-

Scientific classification-

Botanical name- *Prunus avium L.*

Common name- Red sweet cherry

Family-*Rosacea (rose)*

Genes-*Prunus*¹

The fruit are edible, good texture, delicious taste and nutritional qualities because of these qualities cherries called super food also. The cherries are eaten by fresh form and processed form like jam, marmalade, pie, fruit juice or canned items². Cherries are a prosperous resource of positive antioxidants, flavonoid with anthocyanins and kaempferol³ and phytonutrients pigments⁴. *Rosacea* are good source of water, sugar, protein, fiber, potassium, iron, calcium, magnesium, phosphorus, pro-vitamin A, B1, B6, E, vitamin C, vitamin K, antioxidants⁵. Phytonutrients of fruit help to overcome some diseases like gout, arthritis, heart disease, antiaging properties, cardiovascular disease, prevent hypertension, headaches, migraines⁶, maintaining the human weight, reduce the total body fat specially belly fat⁷.

MATERIAL AND METHODS-

Nutritional composition of red cherry powder-

Moisture content, Mineral ash, Crude fat⁸, Crude fiber, Crude protein⁹, Carbohydrate by difference method. Iron content by Wong's method¹⁰, Calcium titrametric method⁹, Vitamin C by dye titration method⁹. Total polyphenol¹¹, alkaloids¹², tannins¹³, total flavonoids¹⁴, saponins¹⁵ were determined also. DPPH¹⁶ and metal chelating activity¹⁷ was also determined.

Preparation of Cookies-

The red cherry powder variants were prepared by incorporating powder (5%, 10%, 20%, 30%). In a medium bowl all the ingredients- Flour (250 gm), salt (3.5 gm), baking soda (12.2 gm), butter (100 gm), egg (110 gm) and vanilla extract (2 gm) were taken. All the ingredients were beat together and prepared dough. Then dough was shaped as a round form and put the dough on the baking sheets and baked till the edges were golden brown. Then cool it slightly and stored in airtight container.

Nutritional composition of Cookies-

In proximate compounds moisture, mineral ash, crude fat, crude fiber, protein and carbohydrate, iron and calcium content and vitamin C was also analyzed in all the variants.

Physical parameters-Total soluble solids¹⁸, Water activity¹⁹ and pH²⁰, Texture profile analysis- Breaking strength²¹, Viscosity²².

Sensory Evaluation of cookies-

Twenty panel members were selected by triangle test and directed to judge each samples on the basis of appearance, colour, flavour, odour, texture, mouth feel, over all acceptability and indicate their degree of liking on a nine point of hedonic scale²³.

Statistical Analysis-

Data was analyzed with means and standard deviation. Three replications were used for all the analysis.

RESULTS AND DISCUSSION-

Nutritional and chemical compositions of cherry powder-

The nutritional and chemical composition is as follows, carbohydrate content 91.50±1.10gm/100gm, crude fat content 4.50±0.20gm/100gm, protein content 1.30±0.30gm/100gm, moisture content 1.20±0.60 gm/100gm, mineral ash content 0.70±0.20 gm/100gm, crude fiber content 0.50±0.20gm/100gm, vitamin C content 14.20±0.30 mg/100g, calcium content 14.10±0.20 mg/100g, iron content 0.60±0.01mg/100gm. It is reported that 5.91% of proteins, 5.2% fat, 1.80% crude fiber, 4.21% ash contents and moisture content is 81.57%²⁴. Here is the content analysis of powder 1.06 gm protein, 0.2 gm fat, 16.0 gm carbohydrate, 2.1 gm fiber and 10mg/100g ascorbic acid²⁴. In non nutrient composition is as follows, saponins 13.60±0.40 mg/100g, alkaloids 2.50±0.20mg/100g, total polyphenol 0.10±0.01mg/100g, tannins 0.06±0.02mg/100g, total flavonoids 0.04±0.02 mg/100 g is depicted in table 3. The other authors finding that, total polyphenol are 1.79 mg/gm, alkaloids 2-6.7 mg/g and total flavonoids are 3.66 mg/g²⁴. In antioxidant activity, DPPH activity was 7.40±0.30mg/100g. The another author finding that, DPPH was 3.86mg/100g²⁴ and metal chelating activity was Ethylenediamine 0.03±0.01mg/100g, Porphine 0.04±0.00 mg/100g, Heme 0.30±0.10 mg/100g, Dimercap 0.20±0.10 mg/100g.

Nutritional and physical characteristics of incorporated cookies -

The standard cookies were found low in protein as compared to cookies incorporated with red cherries and variant D cookies were found to contain highest protein content. So the

cherry powder helps to increase the amount of cookies protein.

Table 1 Nutritional composition of cookies

Parameters	Standard	Results			
Proximate analysis	Standard	Variants	Variants	Variants	Variants
		A	B	C	D
Moisture (gm)	8.90±0.07	7.30±1.00	7.80±0.01	8.60±0.20	9.04±0.04
Mineral ash (gm)	0.60±0.20	0.30±0.00	0.50±0.10	0.60±0.17	0.50±0.20
Fat (gm)	23.50±3.30	24.13±0.41	25.33±0.57	26.10±0.10	27.36±0.47
Crude fiber (gm)	5.50±1.10	6.20±1.00	5.00±1.00	5.36±0.33	7.40±0.02
Protein (gm)	13.40±1.30	18.30±1.00	19.20±0.10	20.00±0.04	24.20±0.46
Carbohydrate (gm)	48.10±3.30	43.77±13.30	42.17±1.08	39.34±0.37	31.50±1.37
Iron (mg)	2.70±2.00	2.80±0.30	2.90±0.10	2.90±0.69	3.00±0.04
Calcium (mg)	15.00±2.00	19.00±0.00	21.00±0.50	24.50±1.33	26.30±2.00
Vitamin C (mg)	0	0	0	0	0

The moisture content was increased when the powder was increased in the cookies which are very good. The fat content was also increased in variant A, B, C and D as standard sample. The protein is also high in variants as compare to standard sample. The crude fiber and protein was important for human body and the cookies were good option to increase the fiber and protein in body. The carbohydrate was decrease in the incorporated cookies which is very good because the carbohydrate is bad when we eat it in excess amount. The iron content is important for body so the variants were increase the iron amount in the variants. The calcium content was also improved in the variants as compared to standard sample. The incorporated cookies were high in crude fiber the cherry powder increase the crude fiber in all the variant cookies and the standard cookies were low in crude fiber. The variant A cookies were found low in mineral ash and the standard cookies were found rich in mineral ash. The cherry powder was increase the moisture content of all the variant cookies.

In physical activity the total soluble solid was also improved in incorporated cookies as compare to standard sample. The water activity is increased in incorporated cookies as standard sample. The pH was also good in incorporated cookies and standard sample was low in pH. The incorporated cookies were good in breaking strength as raise the powder percentage. The viscosity was also improved the variants A, B, C and D as compare to standard sample.

Sensory acceptability of cookies incorporated with red cherry powder-

Cookies prepared from red sweet cherry powder were rated high in good color of all the cookies. All four variant are good appearance with not lot of significant difference as compared to standard sample. Because as compare to standard sample the other all four variant were also good in color, appearance, texture, taste and overall acceptability. The flavor was also good for all the variants. The overall acceptability of all the cookies was good. Variant C was accepted because of the parameters which include in this study (color, appearance, flavor, texture, taste and overall acceptability). The sensory parameters were help to decide the accepted cookies (variant C).

CONCLUSION-

A successful and innovative cookies formulas production with red sweet cherry powder was developed. The fruit is capable to overcome so many diseases like heart diseases, cancer prevention, help to prevent arthritis and gout, diabetes.

Additionally, the red sweet cherry powder is able to improve the cookies properties either it is physicochemical or physical. But it could be recommended that using of red sweet cherry should be encouraged in food industries to utilize local raw materials economically to produce high functional food products.

REFERENCES-

- Seeram N.P, Momin R.A, Nair M.G, Bourquin L.D. Cyclooxygenase inhibitory and antioxidant cyanidin glycosides in cherries and berries. *Phytomed* 2001;8(5):362-369.
- Wani A.A, Singh P, Gul K, Wani M.H, Langowski H.C. Sweet cherry (*Prunus avium*): Critical factors affecting the composition and shelf life. food packaging and shelflife. 2014; 1:86-99.
- Allecume K. A powerful super fruit story. *The Australian Cherry Report*. 2010. P no. 1-11.
- Kyung MY, Al-Farsi M, Lee H. Antiproliferative effects of cherry juice and wine in Chinese hamster lung fibroblast cells and their phenolic constituents and antioxidant activities. *Food Chemistry*. 2010;123(3):734-740.
- Ferretti G, Bacchetti T, Belleggia A, Neri D. Cherry antioxidants: From farm to table. *Molecules*. 2010;15(10):6993-7005.
- Kuehl KS, Perrier ET, Elliot DL, Chesnut JC. Efficacy of tart cherry juice in reducing muscle pain during running in a randomized controlled trial. *Journal of International Sport Nutrition*. 2010; 7(17):7-17.
- Seymour EM, Lewis SK, Urcufo-Llanes DE. Regular tart cherry intake alters abdominal adiposity, adipose gene transcription and inflammation in obesity prone rats fed a high fat diet. *Journal of Medicine Food*. 2009;12(5):935-942.
- NIN. A Manual of Laboratory Techniques. National Institute of Nutrition, Indian Council of Medical research, Hyderabad. 2003,31-32,35,136,183.
- Sharma S. Experiments and techniques in biochemistry. Galgotia Publication Pvt. Ltd. New Delhi. 2008;97-98.
- Hagerman A, Muller I, Makkor H. Quantification of tannins in tree foliage. A laboratory manual, Vienna: FAO/IAEA, 2000, p. 4-7.
- Kumar A, Karunakaran R. Anti oxidant and free radical scavenging activity of an aqueous extracts of *Coleus aromaticus*. *Food chemistry* 2006; 97: 109-114.
- Harborne J. Phytochemical methods. Chapman and Hall, Ltd London; 1973.p.49-88.
- Van-Burden T, Robinson W. Formation of complexes between protein and Tannin acid. *J. Agric. Food Chem* 1981; 1: 77.
- Obdoni B, Ochuko P. Phytochemical studies and comparative efficacy of the crude extracts of some homostatic plants in Edo and Delta States of Nigeria. *Global J. Pure Appl. Sci* 2001; 8: 203-208.
- Naithani v, singhalak, chaudhary m. comparative evaluation of metal chelating, antioxidant and free radical scavenging activity of TROIS and six products commonly used to control pain and inflammation associated with arthritis. *International journal of drug development & research*. 2011;3(4):208-216.
- Dinis TCP, Madeira VMC, Almeida LM. Action of phenolic derivatives as inhibitors of membrane lipid peroxidation and peroxyradicals scavengers. *Arch Biochemistry Biophysics*. 1994;315(1):161-169.
- IS 13815: 1993 / I.S.O 2173: 1978 Fruit and Vegetable Products Determination of Soluble solid Content - Refractometer method
- Wiebe H.H, Kidambi R.N, Richardson G.H and Ernstrom C.A. A Rapid Psychrometric Procedure for Water Activity Measurement of Foods in the Intermediate Moisture Range. *Journal of Food Protection*. 1981;44(12):892-895.
- Chugh B, Singh G and Kumbhar BK. Optimization of Ingredients for Development of Low-Fat Biscuits Using Response Surface Methodology. *Journal of Food & Industrial Microbiology*;2016;2:11000110-17.
- Bhaduri S. and Mukherjee A.K. Rheology of muffin batters by line spread test and viscosity measurements. *International journal of food science, nutrition and dietetics*. 2016;5(9):325-329.
- Aziah AA, Noor M, YA, L-H. Physicochemical and organoleptic properties of cookies incorporated with legume flour. *International Food Research Journal*. 2012;19(4):1539-1543.
- Wani A A, Singh P Gul K, Muzamil Habib Wani M H, Langowski H C. Sweet cherry (*Prunus avium*): Critical factors affecting the composition and shelf life. *Food Packaging and shelf life-1*. 2014;86-99.
- McCune L M, Kubota C, Stendell-Hollis N Rand Thomson C A. Cherries and Health: A Review. *Critical Reviews in Food Science and Nutrition*. 2011;51:1-12.
- Pissard A, Lateur M, Baeten V, Margein H, Dupont P, Tabart J, Pincemil J and Kevers C. Determination of total phenolic compound content and antioxidant activity in cherry species and cultivars. *Journal of Berry Research*. 2016;6:81-91.