

# Evaluation of Antioxidant And Nutrient Analysis of Incorporated Products with *Fagopyrum Esculentum*

Sudha.Uv<sup>1</sup>, Dr.N. Yasmin<sup>2</sup>, Nabisha Nowfiya S<sup>3</sup>

<sup>1</sup>Research Scholar

<sup>1,2</sup>PG and Research, Department of Zoology, Muslim Arts College, Thiruvithancode, Kanyakumari (Dist.)- 629174, Tamilnadu, India.

<sup>1,2,3</sup>Manonmaniam Sundaranar University, Thirunelveli-627012, Tamilnadu, India.

## ABSTRACT

Buckwheat is grown throughout a large area of Asia and Southeast Asia. Buckwheat has been renewed as an alternative crop for organic cultivation and as a health food. Buckwheat (*Fagopyrum esculentum*) is a pseudocereal which belongs to the Polygonaceae family. Buckwheat is a plant used for many purposes, such as consumed as a food and used in the treatment of diseases. It is a good source of many vitamins and minerals and has balanced nutritional value. Because of its nutrient content and many positive effects on human health, buckwheat has become a functional food, recently. Thus, it is considered an alternative food component in dietary treatment for chronic and metabolic diseases, such as diabetes, hypertension and celiac disease. Also, its rich nutrient content supports daily diet and provides a better eating profile. As a result, buckwheat is accepted as a functional food, suggested to improve human health and is used in the treatment of diseases. The aim of this review is to explain some positive effects of buckwheat on human health. In the present study nutrient analysis of *Fagopyrum esculentum* reveal the present of constituents such as carbohydrate, protein, starch. Total Antioxidant Activity were done to find out the activity in *Fagopyrum esculentum*. Products such as Nuts bar, Dates ball, Health mix, were prepared from *Fagopyrum esculentum* and sensory evolution of the formulated products were done by 25 panel members and evaluated using score card.

**Keywords:** Buckwheat, Nutrient, Antioxidant, Health effect.

## Introduction

Buckwheat (*Fagopyrum Esculentum*) is a pseudocereal which belongs to the Polygonaceae family. Despite the common name and the grain-like use of the crop. Buckwheat is not a cereal or grass. It is ubiquitous almost everywhere, but grows mainly in the northern hemisphere (Morse RA.1969). Buckwheat has its unique nutrient composition that includes lysine rich protein, dietary fiber, mineral and trace elements, antioxidant rich vitamins and bioactive compounds such as rutin, quercetin and other flavonoids. Babu Subhash, et.al. (2018), Ahmad,Mushtaq, et.al (2018), Christa,et.,al (2008), Tomoskozi,et.,al (2015)

Due to the presence of bioactive compounds, buckwheat has engrossed the attention of researchers owing to its healing and functional food properties Nazir et al., (2021). It has significantly proven to be

anti-oxidative, anti-cancer, hepatoprotective, anti-hypertension, antitumor, anti-inflammatory, anti-diabetic, neuro-protection, cholesterol-lowering, and so on. The functional property of buckwheat is its gluten-free characteristics which make it promising diet for patients suffering from celiac disease. Hussain and Kaul, (2018).

Buckwheat is a very nutrient-rich, gluten-free plant source for a wealth of health benefits, including a boost in heart health, reduction in blood pressure, aid in weight loss, prevention of certain cancers, management of diabetes, improved digestion and cholesterol levels, and stronger immune system. Buckwheat gives higher calories and carbohydrates than the widely consumed wheat. It can easily serve as an excellent alternative to the traditional wheat Kevat, D. (2018). Buckwheat is a great source of dietary fibre, with 10g per 100g. It is another gluten-free food source. It is a very good source of the mineral magnesium (231mg per 100g) USDA. (2008).

Antioxidant activity is the fundamental prophylactic property which is important for humans. A variety of biological functions such as antimutagenic, anti-carcinogenic and antiaging originated from an anti-oxidant property Holasova et al. (2002). The condensed catechins and phenolic acids, including hydro benzoic acids, synergic, p-hydroxy-benzoic, vanillic and p-coumaric acids that have antioxidant properties are present in the bran-aleurone layer of buckwheat grains Przybylski et al. (1998). The primary antioxidants in buckwheat are rutin, quercetin and hyperin Morishita et al. (2007). Buckwheat bran and hulls have 2-7 times higher antioxidant activity than barley, triticale and oats. Zielinski & Kozłowska (2000) established the following hierarchy of antioxidant activity for 80% methanolic extracts which originated from different whole grains Holasova et al. (2002); Zdunczyk et al. (2006).

## OBJECTIVE

- To develop ready to eat product of *Fagopyrum Esculentum* flour.
- To carry out the sensory evaluation by the judging members.
- To estimate the nutrient content of the *Fagopyrum Esculentum* flour.
- To find out the keeping quality of the *Fagopyrum Esculentum* flour.

## METHODOLOGY



The sample used in the study was *Fagopyrum esculentum*. The sample was collected from local super market, Nagercoil, Kanya Kumari district. The sample used in the study is given in the Figure 1.

### Processing of the sample:

To get rid of the dust and other foreign materials, the samples were cleaned carefully washed and dried, powdered. For further investigation, the samples were stored in air tight container and kept in room temperature.

### Formulation of product

The *Fagopyrum esculentum* powder was selected for the preparation of the product. The product such as *Fagopyrum esculentum* Bar, *Fagopyrum esculentum* Dates Ball and *Fagopyrum esculentum* Health Mix were prepared.

### Organoleptic evaluation of the formulated products

The prepared products were organoleptic evaluated to find out their acceptability. A panel of 25 semi trained panel members from the Department of Nutrition and Dietetics, Muslim Arts College, Thiruvithancode, Kanyakumari District examined the product. A score card for sensory assessment was evaluated on the basis of appearance, texture, taste, flavor, color, and overall acceptability. The sensory evaluation carried out for the product such as Nuts Bar, *Fagopyrum esculentum* Bar, Dates Ball, *Fagopyrum esculentum* Dates Ball, Health Mix, *Fagopyrum esculentum* Health Mix.

### KEEPING QUALITY

The keeping quality was determined by observing the product’s storage behavior. The developed product was kept in a container and stored in room temperature. For evaluation, to know the changes during storage period it takes place of more than 60 days at room temperature.

### Antioxidant and Nutrient analysis

Nutrient analysis Such as Carbohydrate and starch using Anthrone method, protein using enzyme assay and Total antioxidant was determined using standard procedure.

### Statistical analysis

Statistical Analysis of the data obtained for different variables were carried out through Arithmetic mean, Standard deviation and Mean Error.

## RESULT AND DISCUSSION

### SENSORY PARAMETERS OF NUTS BAR AND BUCKWHEAT BAR

Sensory analysis examines the properties such as appearance, texture, taste, flavor, color and overall acceptability were evaluated by the panel members.

Sensory parameters	Standard Nuts bar			Buckwheat bar		
	EB (Mean)	SD	SME	FEEB (Mean)	SD	SME
Appearance	4.3	0.21	0.04	4.8	0.10	0.02
Texture	4.5	0.46	0.08	4.6	0.25	0.05
Taste	4.2	0.46	0.08	4.7	0.20	0.04
Flavor	4.4	0.03	0.006	4.8	0.16	0.03
Colour	4.5	0.24	0.04	4.8	0.20	0.04
Over all acceptability	4.4	0.24	0.04	4.8	0.20	0.04

**SENSORY EVALUATION OF DATES BALL AND BUCKWHEAT DATES BALL**

Sensory parameters	Standard dates ball			Sample date ball		
	DB Mean	SD	SME	FEDB Mean	SD	SME
Appearance	4.4	0.03	0.006	4.8	0.13	0.02
Texture	4.4	0.36	0.07	4.5	0.24	0.04
Taste	4.2	0.29	0.05	4.8	0.20	0.04
Flavour	4.2	0.23	0.04	4.6	0.21	0.04
Colour	4.4	0.32	0.06	4.9	0.07	0.01
Over all acceptability	4.5	0.24	0.04	4.9	0.03	0.006

**SENSORY EVALUATION OF HEALTH MIX AND BUCKWHEAT HEALTHMIX**

Sensory parameters	Standard Health mix			Sample Health mix		
	HM Mean	SD	SME	FEHM Mean	SD	SME
Appearance	4.6	0.24	0.05	4.8	0.13	0.02
Texture	4.4	0.40	0.08	4.5	0.24	0.04
Taste	4.2	0.34	0.06	4.6	0.36	0.06
Flavour	4.4	0.32	0.006	4.6	0.24	0.05
Colour	4.3	0.29	0.05	4.5	0.31	0.06
Over all acceptability	4.4	0.03	0.006	4.7	0.20	0.04

**ANTIOXIDANT ANALYSIS OF FAGOPYRUM ESCULENTUM**

Antioxidant was evaluated using DPPH assay by standard procedure. It was compared with standard ascorbic acid.

Sample	Concentration (µg/ml)	OD at 515nm	% of Inhibition
<b>Control</b>	-	0.9996	
<b>BW</b>	1.56	0.9886	0.82
	3.12	0.9776	1.93
	6.25	0.9665	3.04
	12.5	0.9529	4.41
	25	0.9457	5.13
	50	0.9324	6.46
	100	0.9292	6.79
	200	0.9304	6.66
	400	0.9224	7.46
		800	0.8265
	1000	0.5623	43.59
<b>IC 50</b>	-		

### NUTRIENT ANALYSIS OF FAGOPYRUM ESCULENTUM

The nutrient analysis for *Fagopyrum esculentum* was carried out using standard procedure.

Nutrient	Control
Total Carbohydrate (gm)	72.9±0.010
Starch (gm)	63.00±0.00
Protein (gm)	13.70±0.010

### STORAGE STABILITY OF FORMULATED PRODUCTS

The storage stability of food products depends on the processing and storage capacity. More than 60 days there is no change in room temperature storage.

DAYS	ROOM TEMPERATURE STORAGE
1-15days	No change
15-30 days	No change
30-45 days	No change
45-60days	No change
More than 60 days	No change

### DISCUSSION

In our study (Mandal,Get *al.*, 2017) states that sensory evolution is an essential component of a food research project or product development. It is a scientific discipline used to evoke, measure, analyze and interpret reactive to those characteristics of food and materials as they are perceived by the senses of sight, smell, taste and touch

In the present study, products are formulated using *Passiflora Edulis*, *Fagopyrum esculentum* Nuts bar, *Fagopyrum esculentum* dates ball, *Fagopyrum esculentum* Healthy mix, are the formulated food products. Sensory evolution was done by 25 panel members. Score card was used for evaluating appearance, texture, taste, flavour, colour and over all acceptability of the food products formulated from *Fagopyrum esculentum*.

### CONCLUSION

It is concluded that *Fagopyrum esculentum* are rich in antioxidant and act against certain diseases. This would be attributed to the fact that high amount of carbohydrate, starch and protein were recorded in sample. So, *Fagopyrum esculentum* incorporated products are highly beneficial for our health and can be consumed by all age group.

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