



SUPPLEMENT FORMATION THROUGH UTILIZING CITRUS FRUIT PEEL POWDER WITH ANTIOXIDANT RICH SPICES

¹Jyoti, ²Dr.Veena

¹Research Scholar, ²Principal

Institute of Higher Learning, B.P.S.M.V, Sonapat, Haryana, India

ABSTRACT: So many varieties of fruits exist in the world and citrus fruits are one important from them. Citrus are the largest fruit crops grown across the globe which belonging to the family Rutaceae which include fruits such as orange, mandarin, sweet lemon, lemon, sour orange and grapefruit appear as a well known promising source of multiple beneficial nutrients for human beings. It is one of the most profitable crops in terms of economy as well as popular for nutritional benefits from point of health. The most interesting aspect about citrus is the availability of several varieties with attractive colours and taste. Approximately 50 % of citrus remains unconsumed after processing as pith residue, peels and seeds and pulp. Direct disposal of these wastes can cause serious environmental problems in terms of killing natural flora present in the soil because of antibacterial properties of limonene oils. Seepage to underground waters or open water bodies affects water quality and aquatic life. Processing of citrus by-products potentially represents a rich source of phenolic compounds, dietary fiber and antioxidant, owing to the large amount of peel produced by user. These citrus fruit residues as waste, which are generally discarded in the environment that can act as potential nutraceutical resources for human. Citrus waste can reuse to obtain value added-phytochemicals and pectin is one of the popular topics in industrial research now a day. Due to their low cost and easy availability around us, such wastes are capable of offering significant low-cost nutritional dietary supplements. The utilization of these bioactive rich citrus residues can able to provide an efficient, inexpensive, and environment friendly platform for the production of novel nutraceuticals. In This review combination of citrus peels and antioxidant rich spices are used to formulate a supplement, which generally discarded as waste.

IndexTerms - Citrus by product, Nutraceuticals, Phenolic compounds, Dietary fiber, Antioxidant

I. INTRODUCTION

Citrus fruit is one of the most popular fruits of the world. Citrus fruits are most consumable in the world. Citrus fruits belong to the Rutaceae family which comprises 140 genera and 1,300 species. It is one of the main fruit crops grown in tropical and subtropical regions. Citrus crops produced around the world from an important group and it is a major producer of citrus fruits in the India. The main varieties are sweet orange (*Citrus sinensis*), mandarin or mandarin (*Citrus reticulata*), grapefruit (*Citrus vitis*), lime (*Citrus aurentifolia*) and lemon (*Citrus limonum*). The main types of popularly grown citrus. Annual citrus production worldwide currently amounts to more than 70 million tonnes in approximately 140 citrus producing countries. Of the total citrus production, approximately 40-50% is used in the processing and manufacture of commercial products. They are produced in most of the area of India but Maharashtra, Tamil Nadu, Andhra Pradesh, Punjab, and Haryana are the major producer state. Nagpur variety of orange is famous in worldwide due to their size and aroma. Citrus fruit Variety has been cultivated in an ever-widening area since ancient times and the best-known examples are oranges, lemons, kinnow, pomelo. Citrus is one of the most important commercial crops grown in all parts of the world. Citrus importance is attributed to its diversified use with growing world demand near about 102.64 million tones and total world production and probably stands first largest among the produced fruit. Citrus fruits product such as juices are the important source of bioactive compounds including antioxidants such as ascorbic acid, flavonoids phenolic compounds and pectins that are important for human nutrition. Citrus fruits include oranges, lemons, mausambi and sweet oranges, kinnow and pomelo and all these are mostly used for many purpose like squash, juice, sorbet, jam, pickles etc. It's popularity due to flavor. Preserved Food products are found as raw fruit in industry. Such as puree, sorbet, pickle, and jam - jelly etc. The essential oils derived from these fruits are

used in cosmetics use, and waste materials (peels) separated from fruits in organic form is also used in pharmaceutical industry. The main flavonoids present in citrus species are Hesperidine, Narirutin and Naringin, Eriocitrin. Citrus byproducts are also rich source of naturally occurring flavanoids. The fruits peel which represents almost one half of the fruit mass contains the highest concentration of flavanoids. Peels of Citrus fruit is a rich source of flavanones and many polymethoxylated flavones, which are found very rare in other plants. Citrus fruits have a variety of combination of vitamins, minerals, and antioxidants such as flavonoids, anthocyanins, phenolic acids and carotenoids as well as the presence of other nutrients such as fiber to have a positive effect on health immunity and well being of stomach and digestive system. These properties are responsible for anti-infection, anti-cancer and antibacterial. Among citrus fruits, lemon is an important medicinal plant of the Rutaceae family. The orange tree also (*Citrus sinensis* L.) belonging to the Rutaceae family which is the most cultivated and commercialized citrus species. The orange is composed of an outer layer (peel) formed by flavedo (epicarp or exocarp) and albedo (mesocarp) and an internal material called endocarp that contains vesicles with juice. In addition to sugars, acids and polysaccharides, oranges are an important source of phytochemicals such as phenols, vitamin C, and carotenoids. These compounds are also known as nutraceuticals, provide health benefits due to reduced risk of chronic diseases such as cancer and cardiovascular disease. Citrus fruits are among the most accepted and preferred fruits in the world not only for their taste, but also for their flavor and overall health benefits. They have long been valued for their nutrition and as part of a tasty diet. Citrus fruits and their products are a very good source of vitamins, minerals, and dietary fiber necessary for growth, development and general nutritional well-being. This study aimed to focus on knowledge of waste minimization in the fruit juice product processing in industry. Combined efforts to minimize waste during the production process and recover valuable products substantially reduce the amount of waste, as well as improve the environmental profile. This study investigates the antibacterial activity and antioxidant analysis for the use of citrus fruit peels by determining the chemical constituents and quantifying the percent yield of raw phytochemicals. Citrus fruits have long been known for their health benefits due to their nutrient content and secondary metabolites, such as ascorbic acid, citric acid, phenols, flavonoids, pectin, etc. Ascorbic acid helps to promote healing of the mucosal lining by stimulating the formation of procollagen and its subsequent synthesis. Various parts of citrus have been popularly used in traditional Indian and oriental medicines. Ripe fruits are a good source of vitamin C, vitamin B complex, and have healing properties for sore throats, coughs, asthma, thirst, hiccups, earaches, nausea, and vomiting. They are also powerful antiscorbutics, stomach tonics, poison-expelling stimulants, fetid breath correctors, and pain relievers.

11. RESEARCH METHODOLOGY

Research methodology process depends upon various steps which are shown below.

2.1 STEP 1 Selection of area -: the research on citrus fruits peels was carried out in Bhagat Phool Singh Mahila University at Khanpur Kalan of Sonapat district at Haryana (India).

2.2 STEP 2 Selection of sample -: organic citrus fruits (orange, mandarin, sweet limetta, lemon, pomelo and grapefruit) and organic cinnamon, organic clove oil, organic cumin was selected to prepare sample.

2.3 STEP 3 Purchase of raw materials -: all ingredients were purchased from organic store situated at Sonapat district Haryana.





Organic Orange



Organic Mandarin



Organic Lemon



Organic Sweet Lime



Organic Grapefruit



Organic Pomelo

2.4 STEP 4 Processing of ingredients -:

Collection of all fruits



Washing of fruits with clean water



Dry all fruits and separate them



Pell off every fruits



Dried every fruit



Grind peel to formulate powder

1. Processing of citrus fruit peels shown in figure

Collection of all ingredients



Dried them separately



Grind them in grinder



Formation of powder

2. Processing of spices shown in figure

2.5 STEP 5 Preparation of Sample -: mix all the ingredients entirely to formulate supplement.

111. RESULTS AND DISCUSSION

Data of the study is recorded "citrus fruits peels supplements" prepared from powder utilization of orange, lemon, kinnow, mosambi, pomelo and grapefruit peel on different aspects according to methodology is tabulated and statistically analyzed. Results obtained from analysis is presented and the following discussion is discussed in this chapter

- 1). Phytochemical screening of bio active compound of supplements.
- 2). Analysis chemical composition of the supplements.
- 3). Analysis chemical composition of the supplements.

3.1 STEP 6 -: Phytochemical screening of bio active compound of supplements.

Various tests with different value have been conducted to find out physiochemical properties.

1.	Alkaloids	Mayer's Test	Positive
2.	Carbohydrates	Molisch's Test	Positive
3.	Saponins	Foam's Test	positive
4.	Phytosterols	Salkowski's Test	Positive
5.	Phenols	Ferric Chlorid Test	Positive
6.	Tannins	Gelatin Test	Negative
7.	Flavonoids	Lead acetate Test	Positive
8.	Glycosides	Fehling's Test	Positive
9.	Diterpenes	Copper acetate Test	Positive

3.2 STEP 7 -: To analysis chemical composition of the supplements.

Different parameters were evaluated to find out with various values in both samples.

Parameters	Sample 1	Sample 2
Moisture %	13.8 ± 0.46	13.96 ± 0.44
Crude protein % (d.b)	1.1 ± 0.12	1.1 ± 0.12
Crude fibre % (d.b)	96.4 ± 0.89	96.4 ± 0.89
Crude fat % (d.b)	24.3 ± 0.23	24.3 ± 0.23
Total ash % (d.b)	9.4 ± 0.49	9.5 ± 0.48
Carbohydrate % (d.b)	92.18 ± 0.89	92.18 ± 0.89
Ascorbic acid (mg/100g)	98.28 ± 0.94	98.28 ± 0.94
Carotenoids (mu g)	19.27 ± 0.34	19.27 ± 0.34
Polyphenol contents (mgGAE/g)	93.4 ± 0.88	93.4 ± 0.88
Antioxidant activity (% RSS)	100	100

3.3 STEP 7 -: To analysis chemical composition of the supplements.

PRODUCT	SHELFLIFE (DAYS)
SAMPLE 1	45
SAMPLE 2	50

IV. REFERENCES

- [1] Akubor, P.V.E. 2019. Phyto-chemical composition Physical and sensory properties of bread Mixing of sweet orange peel powder with fermented flour. I. J.F.S. 7(4) 368-372.
- [2] Anna C Ewa Zarycka, Dmytro Yanovych, 2019. Mineral content of the pulp and peel of various citrus fruit cultivars, B.T.E.R., 555-556.

- [3] Mahalakshmi, K.S.P., Kavya, P.V. 2019. Formation and quality assessment of cookies involving fruit peel powders, I.A.J.R.F.S.N., 6(1), 16-20
- [4] khule G.D., Khupse s.p., 2019).Development and Quality Assessment of Orange Pomace Fortified Biscuits, E.K.I.S.N., 8 (3) 3695-3700.
- [5] Rafiq, S., Kaul R, Sofi, S.A., Bashir, N. Nazir, F. Ahmad, N.G. 2018. Citrus peel as a source of functional Ingredient. A Review, I.S., 351- 358.
- [6] Mohammad A.H., 2018. Study on Product Development and Nutrition Analysis of Oranges, Chittagong University of Veterinary and Animal Sciences, 234-259.
- [7] Zecker, M.A., Sauvet, A.R., 2018. Study to Include Orange Peel Powder in Cookies, I.J.E.R.T. 5(9) 78–82.
- [8] Kumar, R., Bala, K.L., 2015. Study on development of value added product from citrus peel. The Allahabad Farmer, J.A.S.T. 2(1).
- [9] Srivastava, N., Yadav, K.C., 2015. Lemon Peel Powder Objectives Developed and Its Use in the Preparation of Biscuits by Two Recipes, I.J.E.R.D., 3 (8) 709–712. Shukla, R.N. 2015. A Study on Waste Use of Orange Peel, R.G. vol.2, 138-140.
- [10] Younis, K, Islam, R., e.tal., 2015. Evaluation of the effect of mausambi peel powder on jams prepared from papaya. (1) 289-297.
- [11] M.Mohanapriya. Dr. Lalitha Ramaswany and Dr. Rajendran, 2013. Health and medicinal properties of lemon, I.J.A.H.M, 1095-1100.
- [12] Yusuf, H.M.K.E., Moussa, R.M.A. 2012. Nutritional Assessment of Wheat Biscuits and Fortified Biscuits with Citrus Peel Powder, R. J.F.P.H., 2 (1) 55-60.
- [13] Guimaraes, R., Barros, L., Barreira, J.C.M., Sausa, M.J., Carvalho, A.M., Ferreira, I.C.F.R., 2010. Targeting excessive free radicals with peels and juices of citrus fruits, lemon, lime and orange. Food chemistry Toxicology. Vol. 48, 99-106.
- [14] Bakhru, H.K., 2018. Food that heal: the natural way to good health. www.paperback.com., 1st published, 1990. 27th published, 2008. ISBN ID: 81-222-0033- 8, 53-58 and 68-72.
- [15] Gorinstein, S., Cvikrova M., Machackova I., Haruenkit, R., Park, Y.S., Jung, S.T., Yamamoto K., Ayala, A.L.M., Katrich E., And Trakhtenberg, S., 2004.Characterization of antioxidant compounds in Jaffa sweeties and white grapefruits. Food chemistry. Vol. 503-510.

