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Research Article

NUTRITIONAL EVALUATION OF SWEET LIME PEEL POWDER AND FORMULATION OF APPLE JAM BY INCORPORATING IT

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ABSTRACT

The objective of this study was the estimation of proximate content, mineral content and antioxidant potential of sweet lime peel powder and preparation of Apple jam by incorporating it at different proportions. Methodology of this work was divided into three phases. In the first phase, sweet lime peel powder was prepared in two forms using shade drying and sun drying techniques. In the second phase, proximate content, mineral content and antioxidant potential were assessed and in the last phase, apple jam and its variants (A, B, C, D, E and F) were prepared for variants A, B, and C shade dried sweet lime peel powder (SPSHU) and for the rest variants D, E, and F sun dried sweet lime peel powder have been used in both forms at 2 percent, 5 percent and 10 percent incorporation respectively. Result showed that retention of nutrients and antioxidant was seen better in shade dried sweet lime peel powder as compared to sun dried peel powder. From the study, we can conclude that sweet lime peel was found to be a good source on nutrient and antioxidant. On the basis of sensory evaluation it can be concluded that upto 5 % incorporation of its peel powder can be used for making acceptable Apple jam.

INTRODUCTION

Citrus fruits are produced and consumed all over the world at large level. Its peel is considered as a waste product as it is not consumed along with its pulp. The fruit peels are the major by-product of any food industry to decompose it. The current disposal of it presents not only an environmental issue, but also the loss of an opportunity to contribute to food security (Mushtaq *et al*., 2014).

It has pectin, cellulose, hemicellulose and lignins (Rimando and Perkins -Veazie, 2005). It is also rich in phenolics, vitamin C, carotenoids and flavonoids (Carmeli and Fogelman, 2009; Abdillahin *et al*., 2011; Asikin *et al*., 2012). The research showed that it reduces the level of serum triglycerides (TG) and cholesterol and blood sugar by improving insulin sensitivity which subsequently decrease the occurance of coronary heart diseases and diabetes mellitus (Calabro *et al*., 2004; Stokes, 2013). It inhibits the activity of xanthine oxidase which is responsible for the production of uric acid thus preventing the occurance of gout (Muthiah *et al*., 2012). It is cost effective and can be used for the development of many value added food products (Kaiser *et al*., 2015). So present study is aimed with the preparation of sweet lime peel powder using shade drying and sun drying techniques and formulation of apple jam to know its acceptability.

MATERIALS AND METHODS

Sweet lime peel was collected from fruit juice shop at Khopcha, SFS mansarovar, Jaipur. The peel was free of decay, mold growth, and was of good quality. Preparation of sweet lime peel powder using household methods and estimation of nutrients content and antioxidant potential as well as formulation of apple jam with its variants have been described in the following heads:

Preparation of sweet lime peel powder using appropriate household processing methods

Sweet lime peel was washed with 2 % salt water for several times to remove extraneous matter. Two forms peel were prepared using the method of sun drying and shade drying techniques. The first form (SPSHD) was prepared by shade drying techniques in which peels were drying in shade for 15 days and other form (SPSUD) was dried under sun light for 7 days. After drying, both the forms of peels were ground to a fine powder separately and stored at room temperature for further use.

Estimation of Proximate content, Mineral content, and Antioxidants potential of SPSHD and SPSUD

Proximate content, calcium content, and antioxidant potential were estimated by following AOAC (2014), IP(2014), and the

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methods given by Xu and Chang (2007) respectively in the laboratory of Food Science and Nutrition, The IIS University, Jaipur.

Preparation of apple jam and its variants

The Apple Jam was prepared by incorporating selected sweet lime peel powder in different proportions i.e. 2 percent, 5percent and 10 percent. The acceptability was assessed using five point rating scale (Table.1). A panel of 15 members was selected after conducting threshold test mean, standard deviation, ANOVA and t test have been applied to analyze the data.

to be 6±0.01 mg CE/g and 8±0.02 mg CE/g respectively (Table 2). Etebu *et al*. (2014) found the calcium content in the peel of sweet orange that 53.2mg/100g. Zawawy *et al*. (2015) and Ghasemi *et al*. (2009) assessed the total phenol and Flavonoid content in sweet lime peel powder and gave the range 131-223 mg GAE/g and 10.43-16.2 mg CE/g respectively in sweet lime.

Acceptability evaluation of score of apple jam and its variants

In term of sensory evaluation, standard was the best one. Among variants, most acceptable variant was variant A followed variants B, C, D, E, and F.

Table 1 Acceptability evaluation scores of Apple jam and its variants

Ingredients	Standard	Variant A	Variant B	Variant C	Variant D	Variant E	Variant F
Apple(g)	200	196	190	180	196	190	180
Sugar(g)	160	160	160	160	160	160	160
Lemon(tsp)	1	1	1	1	1	1	1
Powder(g)	-	4	10	20	4	10	20

RESULTS AND DISCUSSION

Nutrient content and Antioxidant potential of SPSHD and SPSUD

The results have been given in dry weight basis. Moisture content of SPSUD and SPSHD was found to be 7.24±0.12 g/100g and 10.32±0.02 g/100g respectively. It had 6.5±0.1g/100g and 7.8±0.1g/100g protein in SPSUD and SPSHD respectively. Fat content was assessed in SPSUD and SPSHD and found to be 1.9±0.1g/100g and 2.4±0.1g/100g respectively. Fibre content was found to be 15.24± 0.01 g/100g and 18.24±0.01 g/100g in SPSUD and SPSHD respectively. Drying techniques did not influence the ash content of SPSUD and SPSHD (figure 1). In the same line Younis *et al*. (2015) assessed nutrient composition of sweet lime peel powder and found to be 10.70%, 5.39%, 1.58%, 3.39% and 17.58% in moisture, protein, fat, ash and crude fibre respectively. The calcium content in SPSUD and SPSHD was found to be 13.5±0.81 mg/100g and 16.9±0.11mg/100g respectively.

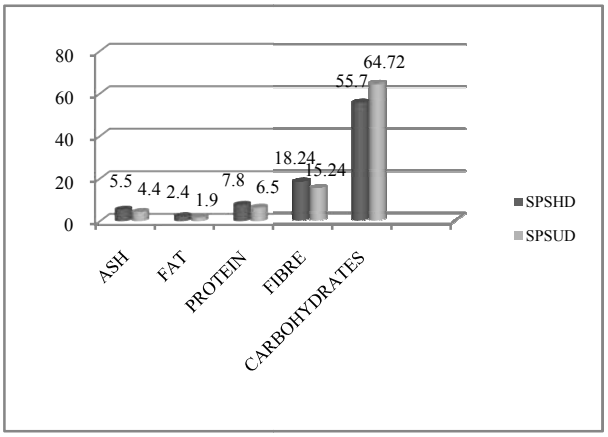

Figure 1 Proximate composition of SPSUD and SPSHD (g/100g) on dry weight basis

Table 2 Antioxidant potential of SPSUD and SPSHD on dry weight basis

Antioxidant Potential	SPUHD	SPSHD
Vitamin C (mg/100g)	9.2±0.25	48±0.76
Total phenol(mg GAE/g)	162±0.15	190±0.02
Flavonoid(mg CE/g)	6±0.01	8±0.02

SPSHD: Sweet lime peel powder shade dried, SPSUD:Sweet lime peel powder sun dried,
Gallic acid Equivalent (GAE), Catechin Equivalent (CE)

On the basis of organoleptic valuation, shade dried w sweet lime peel powder had much more acceptability in *Apple Jam* in comparison to sun dried sweet lime peel powder (Table and Figure 3). Sensory score of papaya jam containing different level of masambi peel powder. The additional of treated mosambi peel powder was found to be acceptable up to 5%level of addition. However, as the level of mosambi peel powder was increased sensory scores decreased significantly as compared to the control.

Table 3 Mean sensory evaluation scores of apple jam and its variants

Variants	Appearance	Colour	Taste	After taste	Overall acceptability	Overall mean score
Standard	5.00±0.00	5.00±0.00	5.00±0.00	5.00±0.00	5.00±0.00	5.00±0.00
Variant A	4.70±0.44	4.70±0.44	4.70±0.44	4.70±0.44	4.70±0.44	4.70±6.20
Variant B	4.40±0.54^{S}	4.40±0.54	4.40±0.54^{S}	4.40±0.54	4.40±0.54^{S}	4.40±0.00
Variant C	3.10±0.74^{S}	3.00±0.70^{S}	2.80±0.83^{S}	2.80±0.83	2.80±0.83^{S}	2.9±0.06
Variant D	4.10±0.74^{S}	4.10±0.74^{S}	4.10±0.74^{S}	4.10±0.74	4.10±0.74^{S}	4.10±0.00
Variant E	3.70±0.97^{S}	3.70±0.9^{S}	3.70±1.20	3.70±1.20	3.70±1.20^{S}	3.70±0.12
Variant F	3.00±0.70	2.80±0.44	2.20±0.83	2.20±0.83	2.20±0.83	2.48± 0.16

S= Significant difference (P<0.05)

Vitamin C content of SPSUD and SPSHD was found to be 9.2±0.25mg/100g and 48±0.76mg/100g respectively. Total phenol content was assessed on SPSUD and SPSHD and found to be 162±0.15mg GAE/g and 190±0.02 mg CE/g respectively. Flavonoid content was assessed on SPSUD and SPSHU found

Lower score were noticed in untreated mosambi peel powder incorporated jam as compared to the other types of jam due to bitterness resulted from untreated mosambi peel powder.

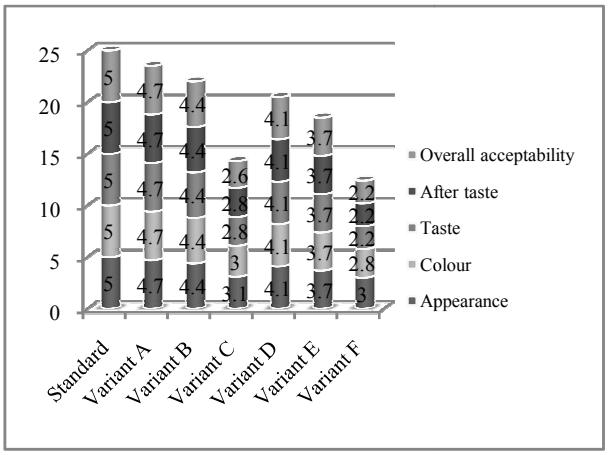

Figure 3 Mean sensory evaluation scores of apple jam and its variants

Acknowledgement

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CONCLUSION

This study showed the feasibility of using sweet lime peel powder as food ingredients. Result showed that SPSHU had high nutrients and antioxidants values in comparison to SPSUD. Moreover, both the forms are a good source of antioxidants properties which makes it is a useful ingredients in the preparation of various value added food products. On the basis of sensory evaluation, It can be concluded that up to 5 percent incorporation of sweet lime peel powder is acceptability.

References

1. Calabro M.L, Galtieri V, Cutroneo P, Tommasini S, Ficarra P, Ficarra, R. Study of the extraction procedure by experimental design and validation of a LC method for determination of flavonoids in *Citrus bergamia* juice. J Pharm and Biomed Anal 2004; *35: 349-363*.
2. Mushtaq M, Sultana B, Batti H.N, and Asgher M. Optimization of enzyme- assisted revalorization of sweet lime (*Citrus Limetta Risso*) peel into phenolic antioxidants. Department of the Chemistry, University of Agriculture, Faisalabad-38040, Pakisthan; 2014; 9(4): 6153-6165.
3. Muthiah PL. 2012. In vitro xanthine oxidase inhibitory activity of leaves, fruits and peel extracts of *citrus aurantium*, *citrus limetta* and *citrus lemon.* Department of pharmacology, Dr MGR medical University, Tamilnadu, India.vol. 2(3, pp. 77-80).
4. Stokes A, http:/*www.livestrong.com.* Benefits of citrus peel. Accessed on 1-12- 2015.
5. Younis K, Islam R, Jahan k, Yousuf B, & Ray A. Effect of addition of masambi(citrus limetta) peel powder on texture and sensory properties of papaya jam. Cogent food & Agriculture 2015 doi.org/10.1080/23311932.1023675,1-8.

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