

# Development and Quality Evaluation of “Sweet Potato Jam Blended with Carrot”

Ashish Nalinde<sup>1</sup>, Ashish Mhaske<sup>2</sup>, Nikhil Bhagwat<sup>3</sup>, Swapnil Borale<sup>4</sup>, Sachin Jadhav<sup>5</sup>

<sup>1</sup>Prof. AshishNalinde( Dept. of Food Science and Technology), Dr. Ulhas Patil College of Food Technology

<sup>2,3,4,5</sup>Undergraduate Student, Dr. Ulhas Patil College of Food Technology Jalgaon (MS), India

**Abstract:** The present study was carried out with the objective to prepare jam by incorporation of roots and tuber vegetables (Sweet potato and carrot) and to assess the acceptability and nutritive value of the products prepared. Jam is prepared from fruits and vegetable pulp by boiling with sufficient quantity of sugar to a moderately thick consistency. Three different jams were Produced by different concentration (sweet potato, carrot) respectively: T<sub>1</sub> (50%, 50%), T<sub>2</sub> (25%, 75%) and T<sub>3</sub> (75%, 25%). The developed products underwent a sensorial analysis that revealed that (75%, 25%) jam was globally better accepted. However, done the chemical analysis of selected sample. The chemical analysis of sweet potato jam blended with carrot was analyzed and it was found that contains Energy value 278 Kcal/100gm, carbohydrate69.56, total sugar as sucrose 49.88.

**Keywords:** Sweet potato, carrot, nutrition, blended, pulp

## 1. Introduction

Jam is a semi-solid food product, obtained upon cooking of fruits and vegetables pulp with sugar, citric acid and pectin. Jam can be defined as an intermediate moisture food prepared by cooking sugar with fruit pulp, pectin, acid and other ingredients to a sensibly consistency. [16]According to fruit product order the total soluble solid (TSS) content of the jam should be 68.5Brix.[5-10]According to the specification of the Codex Alimentarius Commission the finished jam should contain more than 65% TSS. Sugar constitute more than 40% of total weight and 80% of total solid in jam.[7] Good jam has a soft even consistency without distinct pieces of fruit, a bright colour, good flavor and a semi-jelled texture that is easy to spread but has no free liquid.[9-13] Fruits are important foods with excellent nutritional and functional properties. Populations that consume diet rich in fruits and vegetables have significantly lower rates of many types of cancers.[12]

Sweet potato (*Ipomoea batatas*) is a dicotyledonous plant which belongs to the family of convolvulaceae.[4]Sweet potato or shakarand is not botanically related to the potato; the chief resemblance between the two crops is that both have edible tubers of about the same size. The tubers are formed below the ground and are usually of an elongated shape, but some times more nearly spherical. The outer skin is either white or a shade of red or purple. The inner flesh is usually white, or in some varieties yellow, and it is rich in vitamin A. The nutritive value of the sweet potato is mostly in its starch content. It also contains some free sugar which gives the tuber its sweet taste and a small amount of protein.[11]Orange flesh sweet potato is a potential source of dietary pro-vitamin A as it contains carotenoids. The predominant component of carotenoids is beta-carotene and it possesses the highest vitamin A activity among carotenoids.[1] Sweet potatoes are good sources of vitamins C and E as well as dietary fiber, potassium, and iron, and they are low in fat and cholesterol. It serves as an important protein source for many world populations and is an important source of starch and other carbohydrates the

human body needs[14] Purple sweet potato has a high nutritional value due to its abundance of phytochemicals beneficial to human health.[8]

Carrot is a root vegetable it belongs to *Apiaceae* family and botanical name *Daucuscarota* and Genus *Daucus*. Carrot is globally important vegetable crop that provides essential bioactive constituents such as carotenoids, anthocyanins and other phenolic compounds. Carrot does not supply important sources of calories in human diet but provides significant dietary fiber and nutrients in the form of phytochemicals such as carotenoids, anthocyanins and other phenolic compounds. Carrot supplies significant amount of dietary vitamin A intake through  $\alpha$ - and  $\beta$  carotene. The B vitamins including thiamin, riboflavin, niacin, pantothenic acid, folate and vitamin B6 are found in carrot in appreciable quantities when compared with other commonly consumed vegetables. Due to the presence of these compounds carrot is considered as a functional food with potential health benefits for humans. Carotenoids are well known as important micronutrients for human health due to their antioxidant properties. Frequent consumption of carotenoids is proven to have protective effect against cancer, cardiovascular diseases, cataract formation and age related muscular degeneration.[6]

Citric acid is essential to accurate balance, which is required in jam and jellies preparation. For the replacement of citric acid lime and lemon juice can be used in jam preparation because lemon and lime juices have greater amount of citric acid[16] Therefore the sweet potato and carrot jam are enriched in vitamin A, carbohydrate and as well as potassium, and iron, and they are low in fat. So we are justified that our product is also helpful for health beneficial.

## Objective

- 1) To evaluate and improve the quality of product.
- 2) To analyse the chemical and nutritional components of product.
- 3) To assess the acceptability and nutritive value of the product prepared.

## 2. Material and Method

The present investigation on “Development and Quality Evaluation of “sweet potato and carrot jam” was undertaken at the Department of Food Science and Technology, Dr.Ulhas Patil College of Food Technology, Jalgaon. The details of the materials and methods followed were indicated here under

### Preparation of sweet potato pulp

Firstly matured sweet potato were collected from the local market of Jalgaon and washed thoroughly in tap water. And then the sweet potato is cut using knife and blanch for pressure cooker because using the pressure cooking there structure is soft and easily extract the pulp. After cooking remove the outer skin of sweet potato. The obtained fruit pulp was grinded in food processor used for preparation of jam.

### Preparation of Carrot Pulp

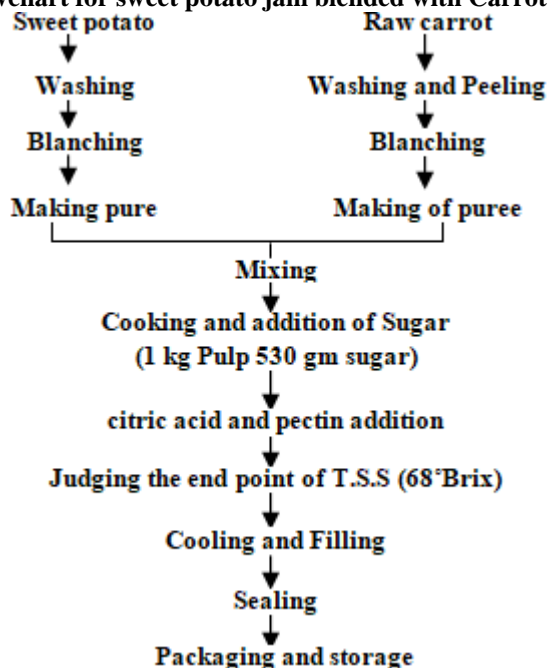
Firstly matured and damaged free carrot were collected from the local market of jalgaon and washed thoroughly in running tap water. Then peel the carrot using hand peeler and after peeling carrot is blanch by using pressure cooker because using the pressure cooker there structure is soft and easily extract the pulp. after the blanching obtained pulp is grinded in food processor used for preparation of jam.

Then both blends is mix properly and cooked on flame and addition of sugar, when sugar dissolved completely, citric acid was added and stirred, after stirring pectin was added . The jam is ready when the TSS is 68Brix. And prepare jam is filled into clean, dry, wide-mouthed jars or bottles and stored are refrigerator temperature.

**Table.1** Various concentration ratio of pulp for making jam

Components	Samples		
	T1	T2	T3
Sweet potato pulp%	50	75	75
Carrot pulp%	50	25	25

### Flowchart for sweet potato jam blended with Carrot



**Table 2:** Standardized incorporated ratio of sweet potato jam blended with carrot, For 1 kg

Sr.No.	Ingredients	Quantity (gm )
1	Sweet potato Pulp	800gm
2	Carrot pulp	200gm
3	Sugar	530gm
4	Citric acid	1gm
5	Pectin	1gm
6	Rose essence	3 to 4 drps

### Chemical Analysis

The chemical analysis was done by using standard procedure. The Estimation of ash content is carried out by using muffle furnace method.[3] The Estimation of moisture content is carried out by using oven drying method[3]. Titrable acidity is carried out by using titration method. Estimation of total sugar as sucrose is determined [15] Energy was calculated by using the formula Energy (Kcal) = (CHOgm%×4)-(total fat%×9)+(protein gm%×4) for factorial method[2]. T.S.S. is determined by using hand refractometer.

### Sensory Analysis of sweet Potato jam blended with Carrot

Sensory evaluation is carried out on the Sweet potato jam blended with carrot by semi trained panel with the help of 9 point hedonic scale method. The sweet potato jam blended with carrot is prepared with the incorporation of sweet potato and carrot pulp and other basic ingredients. This sample is prepared because the gaining of highest rating on semi trained panel for this sample. A color, Consistency, taste, flavor and overall acceptability is evaluated by using 9 point hedonic scale method. For the present study is focus on the development of high nutrition value of jam.

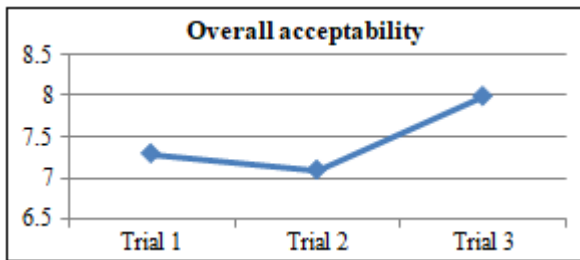
## 3. Result and Discussion

### Sensory evaluation of sweet potato jam blended with carrot

The result is obtained from sensory evaluation of sweet potato jam blended with carrot is incorporated with sweet potato and carrot pulp was influenced by different concentration. All the formulation is done by using recorded sample T3. Because the gaining highest rating of the panel for T3 sample. T3 sample color, taste, flavor, consistency and appearance is respectively 8.1, 7, 9, 8.1 and 8.0, 7.9 this data is indicate the overall acceptability of jam is good.

**Table 3:** Mean of Hedonic scale score

Attributes	Trial 1	Trial 2	Trial 3
Color	7.2	7.4	8.1
Taste	7.6	7.6	7.9
Flavor	7.4	7.3	8.1
Consistency	7.2	5.8	8.0
Appearance	7.4	7.6	7.9
Overall acceptability	7.3	7.1	8.0



Graph 1: Overall acceptability of samples

### Chemical analysis of sweet potato jam blended with carrot

Chemical analysis of sweet potato jam blended with carrot was conducted of sample which is more acceptable in sensory evaluation. i.e. T3 sample is more acceptable for hedonic scale rating. After the gaining highest rating sample is estimate the nutritional value of jam. The carrot is added because increase the nutritional value of jam and also increase the color of the product.

Table 4: Chemical composition of jam

Sr.No	Parameter	Result	Unit
1	Energy	278	Kcal/100 g
2	Carbohydrate	69.56	g/100 g
3	Total Sugar as sucrose	49.88	g/100 g
4	Ash	3	%
5	Moisture	26	%
6	Acidity	0.3	%
7	T.S.S	67	°Brix

### 4. Conclusion

The results of this investigation are in line with previous research on the benefits of fruits and vegetables and their beneficial health effects of lowering risks for chronic conditions such as cardiovascular disease. This study provides some support for the benefits of including fruits and vegetables in the regular diet, including potentially meaningful changes in risk factors. Sweet potato and carrot mixed can successfully be incorporated for the development of Sweet potato and carrot jam to provide health benefit to the consumers. Its sensory quality attributes such as colour, flavour, taste, mouth-feel, consistency and overall acceptability was analysed and its overall is accepted.

### 5. Acknowledgement

I wish to express my sincere gratitude to my research guide Er. Ashish Nalinde for there invaluable guidance and support and also thankful to the Principal of Dr. Ulhas Patil College of Food Technology jalgaon for granting the permission to conduct this project and providing the expert and technical guidance.

### References

[1] Anduaem Afework, Kebede Abegaz and Abadi Gebre Mezgebe *African Journal of Food Science* Vol. 10(6) pp. 79-86, June 2016 DOI: 10.5897/AJFS2015.1403 Article Number: 803D38A58848 ISSN 1996-0794 Copyright © 2016 Author(s) retain the copyright of this article <http://www.academicjournals.org/AJFS>

[2] AOAC Official Methods of Analysis. 14th Edition, Association of Official Analytical Chemists, Washington DC. 1995.

[3] AOAC.(2005). Determination of moisture, ash, protein and fat. *Official Methods of Analysis.18th edn.* Association of Official Analytical Chemists, Washington, DC.

[4] Chhama Devi\*, Laureate Hynniewta and Surajit Mitra Quality Evaluation and Preparation of Jam from Sweet Potato Cultivars *International Journal of Current Microbiology and Applied Sciences* ISSN: 2319-7706 Volume 6 Number 8 (2017) pp. 1485-1492 Journal homepage: <http://www.ijcmas.com>

[5] FPO, 1955.

[6] Ha Hong Vu Nguyen and Loc Thai Nguyen, *handbook of vegetables preservation and technology*

[7] K. Jayabalan and C. Karthikeyan Optimizations Of Ingredients For Sensory Evaluation Of Aloe Vera Jam Preparation Using Response Surface Methodology (RSM) *International Journal of Engineering Research and Applications (IJERA)* ISSN: 2248-9622 [www.ijera.com](http://www.ijera.com) Vol. 3, Issue 1, January -February 2013, pp.1224-1234

[8] Lin wang, Ying Zhao, Qing Zhou, Chun-Li Luo, Ai-Ping Deng, Zi-cheng Zhang, Jiu-Liang Zhang characterization and hepatoprotective activity of anthocynins from purple sweet potato *journal of food and drugs analysis* 25 (2017) 607-618

[9] MahakSaini, Mahak Sharma, and Lakhvinder Kaurs Development of Antioxidant Rich, Low Sugar Jam From Green Tea Extract and Kiwi Pulp *Indian Journal of Nutrition* Volume 3, Issue 1 – 2016© Saini M, et al. 2016 [www.opensciencepublications.com](http://www.opensciencepublications.com)

[10] M. Rahman, M. L. Markad, T. S. Kulkarni, P. V. Meghdambar Sensory Attributes of the Mixed Fruit Jam made from Aloe Vera, Pineapple and Mango *International Journal of Science and Research (IJSR)* ISSN (Online): 2319-7064 Index Copernicus Value (2013): 6.14 | Impact Factor (2014): 5.611

[11] N. Shakuntala Manay M. Shadaksharaswamy foods facts and principles *Third Revised Edition New AGE International (P) Limited Publishers.*

[12] Olugbenga Olufemi Awolu, Grace Oluwaseun Okeede, Modupe Elizabeth Ojewumi, Funmilayo Grace Oseyemi Functional Jam Production from Blends of Banana, Pineapple and Watermelon Pulp *International Journal of Food Science and Biotechnology* 2018; 3(1): 7-14 <http://www.sciencepublishinggroup.com/ijfsbdoi:10.11648/j.ijfsb.20180301.12>

[13] Schafer W, Wolf ID (1990) Making Jams, Marmalades, Preserves and Conserves. *University of Minnesota Extension School.*

[14] Sneha Srivastava, T. R. Genitha\* and Vrijesh Yadav Preparation and Quality Evaluation of Flour and Biscuit from Sweet Potato *Journal of Food Processing & Technology J Food Process Technol* 2012, 3:1

[15] S. Ranganna, handbook of analysis and quality control for fruits and vegetable products, *Tata McGraw hill education private LTD*, 1986.

[16] Ullah N, Ullah S, Khan A, Ullah I and Badshah S Preparation and Evaluation of Carrot and Apple Blended Jam *Journal of Food Processing & Technology*

## Author Profile



Assistant Professor **Ashish Nalinde** (Dr. Ulhas Patil College of Food Technology Jalgaon)



**Ashish Mhaske** student of Dr. Ulhas Patil College of Food Technology Jalgaon



**Nikhil Bhawat** student of Dr. Ulhas Patil College of Food Technology Jalgaon



**Swapnil Borale** student of Dr. Ulhas Patil College of Food Technology Jalgaon



**Sachin Jadhav** student of Dr. Ulhas Patil College of Food Technology Jalgaon