International Journal of Food Science and Nutrition
www.foodsciencejournal.com
ISSN: 2455-4898, Impact Factor: RJIF 5.14
Received: 29-01-2021, Accepted: 03-03-2021, Published: 05-04-2021
Volume 6, Issue 2, 2021, Page No. 103-106

Standardization and storage study of carrot (*Daucus carota*) pickle

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Abstract

In study preparation of Carrot Pickle was successfully done and evaluation, formulation, standardization, proximate analysis and storage study. Carrot pickle prepared by using Carrots, Ginger, Salt, Edible oil, Vinegar and Spices. Carrot is an important vegetable which is rich in pro-vitamin-A and is good for preserving heart attack and cancer. Carrots are rich in beta-carotene, a precursor of vitamin A which has been shown to reduce the chances of cancer in animals by 40 per cent (Richara, 1981) who further adds that "A carrot a day keeps the cancer away". For the preparation of Carrot pickle three trials were taken among the three trials, T2 get highest score on the basis of sensory evaluation. The Carrots were chopped into 2-2.5 cm long and frying with oil. Spices and curry leaves were added for flavoring purpose. The pickle sample were analyzed for different parameter *viz*., pH (4.47±0.02), Acidity (0.795±0.07%), Carbohydrate (48.30±0.09%), Protein (2.24±0.10%), Fat (6.57±0.02%), Moisture (83.4±0.03%), Ash (4.01±0.08%) Vitamin C (0.011mg/100gm) and Energy value (469.92Kcal). The Carrot pickle was rich in Vitamin which gives best energy source. Carrot pickle stored in Glass bottles or jars at room temperature for the period of five months. Carrot pickle can be satisfy the consumer acceptance and quality.

Keywords: carrots, formulation, standardization, sensory evaluation, proximate analysis, glass bottles

Introduction

The preservation of food in common salt or vinegar is known as is known as pickling. It is one of the most ancient method of preserving fruit and vegetable fruits and vegetables. Pickles are good appetizers and add to the palatability of a meal. They simulate the flow of gastric juice and thus help in a digestion. Several kinds of pickles are sold in the Indian market. Mango pickle ranks first followed by cauliflower, onion, turnip and lime pickles these are commonly made in homes as well as commercially manufactured and exported. Fruits are generally preserved in sweeten and spiced vinegar, while vegetable are preserved in salt. (Fruits and Vegetable Preservation, Srivastava and Kumar, 2002) [27].

Carrot is scientifically called as *daucus carota subsp sativus*. It has orange in color. It is root vegetable contain excellent source of calcium. Carrot hybrid breeding in Lithuania was started in 1985.usually it also occurs in red, white and black in color. Carrot is domesticated form of the wild carrot. It found in Europe, south western Asia and Indian tropical region. In general, high quality carrots are firm, straight from "shoulder" to " tip," smooth with little residual "hairiness," sweet with no better or harsh taste, and show no since of cracking or sprouting (cantwell and suslow,1998). Carrot is one of the popular root vegetables grown throughout the world where an area of 559,000 ha yields a production of 12,131,000 MT (FAO, 1985). In Asia carrot occupies an area of 16,000 ha and the production is 3,357,000 MT (FAO, 1985). In India it may be grown in one or the other part of the country throughout the year for its roots which are consumed in various forms as a cooked stews, curries and pickles. Nutritional value of carrot was Moisture content (84-88%), carbohydrate (10-12%), Fiber (1-1.5%), Carotene (1800-2000µg), Vitamin B_1 (0.04-0.06mg), Niacin (0.6-0.8mg), Vitamin C (5-8mg/100g), Minerals (1-1.5%), Calcium (75-85%), Iron (2-3mg), Caloric value (45-50/100g). Energy value of prepared carrot pickle was 173KJ (41Kcal.) [Narola Anichari Programme Assistant (home science) KVK, NU Lumami].

Carrot has property to reduce the risk of high blood pressure, stroke heart diseases, and some types of cancer also. It also best for night blindness and eye related problems. Phenolic compound and carotenoids are the phytochemicals found in carrots. Phenols are synthesized along acetyl coenzyme A in skimic acids pathway hydroxyl cinnamic acid and its derivatives are the most common phenolic reported in carrot. Carotenoids are a group of isoprenoids molecules present in all photosynthesis plants including carrot. Carrots have function of antioxidant ant carcinogenic and anti-inflammatory property. Carotenoids are powerful anti-oxidant that helps in maintain help, skin and also prevent many diseases like cancer. (Kuma, *et al.*, 2011) [14]. Carrot also be contained Toxicants, *daucus carota* which is toxic to the bioassay organism daphnia magna to mice. Physical and chemical evidence showed this compound. (Yonis, *et al*., 2013) [12].

Generally pickles are prepared form raw mango. Pickles are a traditional product, with increasing awareness of the food value and dietary role of various food constituent. The aim to prepare Carrot pickle as a nutritional point of view and to Provide convenience to the consumer in that we used ingredient like carrots which is rich in carotenoids which are used to make Vitamin A during digestion and vitamin B, C, D and E. They are also high in folic acid, fiber and minerals like Potassium (K) and Sodium (Na). Pickle is an edible product preserved in common salt, vinegar and spices. But we used a Carrots for formulation of Carrot pickle because of its nutritional purpose. And we used ginger because of its importance and nutritional value. That's why we choose Carrot pickle because of its nutritional point of view and

their benefits for further study. Carrot pickle is nutritionally rich as well as wholesome for digestive system.

Materials and Methods

Ingredients, Chemical and Equipments

Raw materials required during present investigation were procured from local market of Saralgaon such as Carrots, Ginger, Spices, oil, Salt, vinegar, etc. Most of the chemicals and equipments used in this investigation were of analytical grade which are obtained from College of Food Technology Saralgaon, Thane.

Physical and Chemical Analysis

Chemical Analysis such as moisture is determined by using hot air oven, fat is determined by Soxhlet apparatus and protein is determined by using Kjeldahls method. Acidity is determined by using titration method and pH is measured by digital pH meter. All quality parameters were determined by AOAC (2000).

Organoleptic Evaluation

Prepared product were evaluated for sensory characteristics in terms of appearance, color, flavor, aftertaste, texture and overall acceptability by 10 semi-trained panel members comprised of academic staff members using 9- point Hedonic scale. Judgments were made through rating the product on a 9 point Hedonic scale with corresponding descriptive terms ranging from 9 ‘like extremely’ to 1 ‘dislike extremely’. The obtained results were recorded in sensory score card.

Statistical Analysis

The analysis of variance of the data obtained was done by using completely randomized design (CRD) for different treatments as per the method given by Panse and Sukhatme (1967). The analysis of variance revealed at significance of $p<0.005$ level S.E and C.D. at 5 percent level is mentioned wherever required.

Formation of Carrots Pickle

Pickles prepared with incorporation varying levels of Carrots was investigated. The formulation was made by varying levels of carrots, ginger, salt, oil, vinegar, curry leaves and spices *viz.* 50:50, 60:40 and 70:30 percent respectively and data given are illustrated in table.

Formulation for preparation of Carrot Pickle

Table 1

Ingredients	Treatments			
	T0	T1	T2	T3
Unripe Mango pieces	70 g	-	-	-
Carrots	-	50 g	60 g	70 g
Ginger	-	5 g	5 g	5 g
Salt	5 g	10 g	5 g	5 g
Mustard seed	5 g	10 g	5 g	5 g
Fenugreek powder	2 g	2 g	2 g	2 g
Red Chilli powder	2 g	2 g	2 g	2 g
Turmeric powder	2 g	2 g	2 g	2 g
Asafoetida powder	2 g	2 g	2 g	2 g
Edible Oil	10 ml	15 ml	15 ml	5 ml
Vinegar	2 g	2 g	2 g	2 g
Curry leaves	-	6-7(in no)	6-7(in no)	6-7(in no)

Where,
T1-50g Carrots + 50g Other Ingredients
T2-60g Carrots + 40g Other Ingredients
T3-60g Carrots + 40g Other Ingredients
Sample T2 of carrots pickle was organoleptically acceptable and used for further study.

Preparation Process of Carrots Pickle

Carrots were purchased from the market. Firstly chopped the carrots in a bowl. Then all pieces of carrots frying in pan with addition of small amount of edible oil and cool it. All spices and curry leaves mixed with different variation as per above table then frying in with addition of oil and salt. After that frying mixture for 5 minutes then cool it and adding carrot pieces with addition of vinegar. After heat cool and add remaining oil. Filling into jars and keeping in sun for a week (optional) store at room temperature.
Flow sheet for preparation of Carrots pickle (Srivastava and Kumar, 3rd ed. 2002) [27]

Carrots
↓
Washing
↓
Peeling of carrot root
↓
Cutting into 2-2.5 cm pieces
↓
Frying all pieces of carrot in a little oil
↓
Cooling (at room temp)
↓
Frying all the spices curry leaves in oil
↓
Mixing pieces with fried spices
↓
Frying mixture for 5 minutes
↓
Cooling
↓
Adding into carrot pieces
↓
Addition of remaining oil after heating and cooling it
↓
Adding vinegar
↓
Filling in jar
↓
Keeping in sun for a week (optional)
↓
Storage

Results and Discussion

Physical Properties of Carrots Pickle

Table 2

Parameter	Observation
Color	Orange
Length	2.5
Width	0.8

It concludes that Color of Carrot pickle was orange and the length of carrot pickle was 2.5 cm and width of carrot pickle was 0.8 cm which was determined using vernier caliper.

Chemical Properties of Carrot Pickle

Table 3

Parameters	Sample (T2)
pH	4.47±0.02
Acidity	0.795±0.07
Ash	4.01±0.08
Moisture	83.4±0.03
Fat	6.57±0.02
Protein	2.24±0.10
Carbohydrates	48.30±0.09
Energy value	469.92

It concludes that pH value of Carrot Pickle was found to be 4.47±0.02 and

Acidity 0.795±0.07, Ash value of Carrot Pickle was found to be 4.01±0.08, Moisture content 83.4±0.03, Fat content 6.57±0.02, Protein content 2.24±010, Carbohydrate content 48.30±0.09 and Energy value 469.92Kcal.respectively.

Storage study

Storage study of Carrot Pickle

Table 4

Sample periods (month)	Sample	Color	Flavour	Texture	Visual Fungal Growth	Remarks
0	Carrot pickle	No change	No off Flavour	Firm	No Growth	Good
1	Carrot pickle	No change	No off Flavour	Slightly Soft	No Growth	Good
2	Carrot pickle	No change	No off Flavour	Soft	No Growth	Good
3	Carrot pickle	No change	No off Flavour	Soft	Slightly Growth	Good
4	Carrot pickle	No change	No off Flavour	Extremely Soft	Slightly Growth	Good
5	Carrot pickle	No change	No off Flavour	Extremely Soft	Slightly Growth	Good

Carrot sample was used for storage studies at room temperature (27°C-33°C) for 0-5 months. The effect of storage time (0, 1, 2, 3, 4 and 5 month) on physical properties such as colour, Flavour & texture of the pickles were studied and represented. Carrot pickle would be assessed after Six months storage in Jars for keeping quality, taste & flavor. The pickle became soft after three month & slightly visual fungal growth after three month but otherwise remained satisfactory upto 6 month of storage.

Sensory evaluation

Sensory evaluation of Carrot pickle

Table 5

Sample	Color	Flavour	Appearance	Texture	Taste	Overall Acceptability
Control	8	8	8	8	8	8
T1	7.1	7.5	6.5	6	7	6.82
T2	8	7.9	7.5	8	8	7.88
T3	6	5.5	7.5	6.5	7	6.5

As evident in sensory evaluation the color score were higher for the Sample T2.

The Texture and taste score were 8 higher than T1 and T3 sample. Overall acceptability of T2 sample is more acceptable than sample T1 and T3.

Conclusion

Conclusively, it emerges that the studies on Preparation & standardization of recipe for Carrot pickle was carried out successfully prepared by using Carrots and other ingredient. The health benefit of Carrots and other ingredient are well known so the product is having some enrichment. As regards the organoleptic qualities and Carrot pickles processed was excellent followed by Nutritional quality particularly carbohydrate, protein, fat and energy content increased in Carrots pickle. This type of value addition by way of nutrient enrichment does certainly help to provide good source of energy. So, the product can be satisfy the consumer in accepts & quality.

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