



DEVELOPMENT AND EVALUATION OF LYOPHILIZED PURSLANE CHAPATHI

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Abstract: A study was conducted to developed lyophilized purslane powder from fresh purslane plant and utilized the lyophilized purslane powder for the development of purslane chapathi. Today, foods are not intended only to satisfy hunger but also to provide necessary nutrients to human and prevent nutritional-related problems and improve physical and mental well-being of the consumers. In this regard, few functional foods play an outstanding role. Purslane is globally used as vegetable and also as an herb for medical and therapeutic purposes. Purslane powder is prepared by using Lyophilization method (freeze drying). Purslane is ground and kept for freeze drying at $-20\text{ }^{\circ}\text{C}$ for 22 hours. Prepared Lyophilized Purslane powder was evaluated for nutritional composition, chemical analysis and quality analysis. Lyophilized purslane powder was added in chapathi were formulated 1, 2, 3, 4gm respectively. Purslane processed products has anti-diabetic activity and rise in omega-3-fatty acid and minerals. The experimental result revealed that the lyophilized purslane powder added chapathi contains significant amount of protein, antioxidant, total phenols, total flavonoids and anti-diabetic activity with potential health benefits and nutritional characteristics. Sensory evaluation of chapathi was carried out and it was observed that 2gm lyophilized purslane powder formulation was acceptable. Therefore, 2gm lyophilized purslane powder in chapathi enhanced nutritional properties, physicochemical characteristics and organoleptic properties. Storage stability of the products was evaluated in two different conditions viz., room temperature (RT) ($25\pm 2\text{ }^{\circ}\text{C}$) and accelerated temperature (AT) ($35\pm 2\text{ }^{\circ}\text{C}$) and the stability of the products decreases.

Index Terms- Fresh purslane leaves, lyophilization chapathi, lyophilized purslane powder, nutritional composition, functional components, storage stability.

INTRODUCTION

Purslane (*Portulaca oleracea*) is a common herb used as vegetable which is also called as kurfa or hog weed [1]. The plant belongs to division Magnoliophyta, class magnoliopsida, subclass Caryophyllidae, order Caryophyllales. Its family, genus and species are portulacaceae, potulaca and oleracea [2]. Purslane is a well-known edible plant widespread in temperate and tropical regions of the world. It is an herbaceous and annually plant with a fleshy stem and thick, green, succulent leaves and small black seeds that has medicinal properties [3].

Common purslane and annual succulent plant, is native to India and middle east and grows in United states, Europe, Australia. It has been ranked as the eighth most common plant in the world [4]. Purslane used as an ordinary dish eaten and cooked by the people of Middle East [5].

Purslane provides a good source of compounds with a positive impact in human health and nutrition [6]. It is rich in omega-3-fatty acids and β -carotene and also shows high amount of vitamins and essential amino-acids, α -tocopherols, ascorbic acid and glutathione as well as phenols, vitamins are B₁, vitamin C, vitamin A, dopamine, organic acids, comarins, flavonoids and phenolic alkaloidsase is also present [7] rich source of antioxidants [8]. In fatty acids, the most abundant was linolenic acids, palmitic and oleic acids, citric, acotinic, fumaric, citric, malic were organic acids that were found in purslane plant [9].

Purslane is effective as an antioxidant agent and also providing nourishment for the liver, kidneys and testes of rats. The leaves are rich source of omega-3-fatty acids which prevents heart attacks by decreasing LDL and strengthening the immune system and has served biological properties are antiseptic, antispasmodic, diuretic, anti-bacterial, wound healing, anti-inflammatory activities, skeletal muscle relaxant, anti-ascorbic, anti-asthma effect [10] used for the treatment of burns, headache, shortness of breath, arthritis [11].

Purslane is listed by the world Health organization as one of the most used medicinal plants and it has been given the term “Global Panacea” and described as “power food” of the future [3].

Chapathi, an unleavened flat bread of Indian origin is popular in majority of the households. Basically, chapathi is prepared using whole wheat flour [12]. The study was planned and developed chapathi by incorporating lyophilized purslane powder to wheat flour. It was evaluated for physico-chemical, microbial, and organoleptic properties of the developed product. It was also studied to evaluate invitro antidiabetic activity and to establish. The shelf stability of the developed lyophilized chapathi. The findings of this study benefit the consumers in many ways.

MATERIALS AND METHODS

Materials

Purslane was collected in harvested private field in Penjahalli, Hunsur, Karnataka.

Chemicals

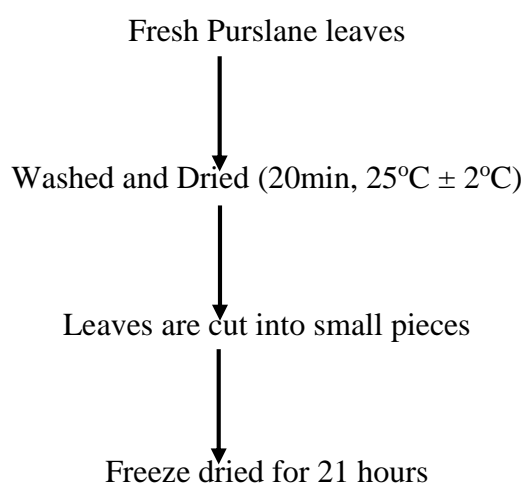
All chemicals and media used in the study was of analytical grade and were purchased from S.D. fine chemicals limited, Mumbai-30 and Sigma chemicals.

Methods

Preparation of Purslane Powder

The fresh purslane was washed with water followed by draining. Then, the leaves were subjected to drying at room temperature ($25^{\circ}\text{C} \pm 2^{\circ}\text{C}$). the plant is used for both in qualitative and quantitative screening and leaves are cut into smaller parts freeze-dried for 21 hours and finely powdered.

Lyophilization Process



Development of Chapathi

Known quantity of wheat flour was transferred into the dough kneader. Weighed quantity of salt and added to the dough kneader and mixed for 1-2 min. Hydrogenated fat, 2g of purslane powder was added to the dough and mixed for 5 min. dough was set aside for 10 min. The dough was removed from the mixer and made into small round balls. Each piece of ball was flattened to prepare chapathi with a diameter of about 150-170mm.

Formulation of Chapathi

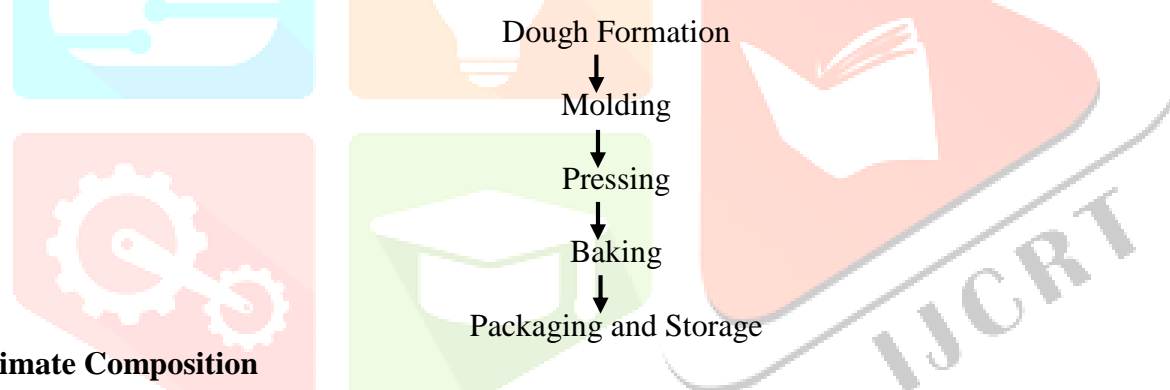
Chapathi sample	Wheat Flour	Water (ml)	Hydrogenated fat (g)	Salt (g)	Purslane powder
Control	100	10	2	1	0
C1	99				1
C2	98				2
C3	97				3

Analysis Method

The fresh purslane and developed purslane chapathi were analyzed nutritional composition by chemical methods like (Moisture, protein, fat, ash and carbohydrates), quality parameters like acidity, sensory analysis, functional components and microbial analysis. Chemical analysis was estimated by standard method (AOAC).

3. RESULT AND DISCUSSIONS

3.1 Standardization and development of Purslane chapathi by Addition of Wheat flour and lyophilized Purslane powder.



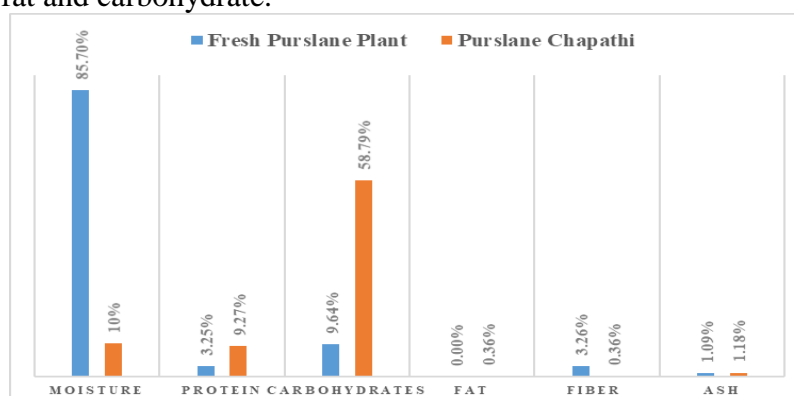
Proximate Composition

Fresh Purslane plant

Fresh purslane plant was analysed for its proximate composition. The fresh purslane plant had 85.7% of moisture, 3.25% of protein, 9.64% of carbohydrates, 0.004% of fat, 3.26% of fibre and 1.09% ash.

Purslane chapathi

The prepared purslane chapathi was analysed for its proximate composition. It showed 10% moisture, 9.27% protein, 20.3% fat, 1.18% ash, 0.36% fibre and 58.79% carbohydrates. The nutritional composition when compared with fresh purslane, the results showed that there are some significant decreases in moisture and increase in protein, fat and carbohydrate.



3.2 Microbial Quality

The purslane chapathi was evaluated for its microbial quality. Purslane chapathi spoiled on 10th day due to microbial growth (mould growth) on the surface of the purslane chapathi.

Sl. No.	Samples	Total Plate count (CFU/g)	Yeast + Moulds (CFU/g)	Coliforms (CFU/g)
1.	Purslane Chapathi	300X10 ³	4X10 ²	2X10 ²

CONCLUSION

The study was conducted to prepare lyophilized purslane powder and to prepare a value-added product by incorporating the powder to increase the nutritional content of the product, chapathi. Lyophilization is a low temperature dehydration process which involves freezing the product, lowering the pressure and then removing the ice by sublimation. This method is preferred over hot oven method because it retains bioactive components and colour. Purslane chapathi prepared exhibited more nutritional and sensory profile than control samples. The sensory evaluation of purslane chapathi established acceptable appearance, taste, texture and flavour as per panel members. It was observed that the prepared purslane chapathi possess antioxidant activity, total phenol content (60mg/100g), flavonoids content (18.37mg/100g). Thus, it can be concluded from above that prepared purslane chapathis are nutritious and could be consumed by all age group people. It will also help in improving the health of the consumers.

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