Review Article

The Significance of Carrot and Drumstick leaves as a Functional Food

Abstract

In the past few years, we have seen many people rejudge their attitude to health, diet and wellbeing and increased awareness among people. More than ever before, consumers are relating their dietary habits with their health. As such, the need for functional foods – foods with improved nutritional properties that provide health benefits such as reduced fatigue and enhanced immunity – continues to grow. This shift to more health-conscious food and drink represents a significant step towards good health.

Keywords

Carrots, Drumstick leaves, Functional food, Health benefits.

INTRODUCTION

The key role of diet is to provide adequate nutrients to meet metabolic requirements while giving the consumer a feeling of satisfaction and well-being. Recent knowledge, however, supports the hypothesis that, on the other side of meeting nutrition needs, diet may modulate various functions in the body and may play detrimental or beneficial roles in some diseases. We stand today at the threshold of a new rim in nutrition sciences. Indeed, at least in the western world, concepts in nutrition are flourishing from the past emphasis on survival, hunger satisfaction and preventing adverse effects to an emphasis on the use of foods to encourage a state of well-being and better health and to help diminish the risk of diseases. These concepts are particularly vital in light of the increasing cost of health care, the steady enhancement in life expectancy and the desire of older people for improved quality of their later years [1].

THE SIGNIFICANCE OF FUNCTIONAL FOOD

The significance of functional food has been addressed in modern perceptions of nutrition. Such foods offer countless physiological advantages and lower the risk of chronic illnesses in addition to their elementary nutritional purposes [2]. As a working definition, a food can be said to be functional if it contains a component (whether or not a nutrient) that aids one or a limited number of functions in the body in a targeted way that is applicable to either the state of well-being and health or the depletion of the risk of diseases [3], or if it has physiologic or psychologic effect beyond the conventional nutritional effects [4].

A food can be regarded as functional if it is adequately demonstrated to affect beneficially one or more target functions in the body, beyond sufficient nutritional effects in a way which is related to either the state of well-being and health or the reduction of the risk of a disease [5]. The evolution of functional foods provides a unique opportunity to contribute to improvement of the quality of the food offered to consumers who want to benefit their health and well-being [1].

FUNCTIONAL APPLICATION OF CARROT AND ITS HEALTH BENEFITS

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Carrot (*Daucus carota*) is one of the most vital seasonal root vegetables belonging to family Apiaceae (Umbelliferae) and is grown largely in India during winter season for its edible tap root. Prime centre of origin of carrot is Afghanistan from where it was diffused to Asia, Europe, North Africa and the Mediterranean region [6,7]. Although, it has been extensively cultivated for many centuries, the use of carrot as a food precedes only from the early 20th century. In accordance with the botanical classification of carrot seeds, they are divided into two groups *viz.*, the carotene group (*Daucus carota* ssp. var. *Sativus*) and anthocyanin group (*Daucus carota* ssp. *Sativus* var. *Atrorubens Alef.*). Though, orange coloured carrot varieties are more usual, utilization of black or purple carrots is currently increasing worldwide due to its health benefits. Black carrot has grabbed the attention of the scientific community due to their higher total phenolics and anthocyanin content, which are importantly related to its antioxidant capacity [8,9].

Nutritionally, carrot is ample in both antioxidants i.e. lipophilic (xanthophylls, carotenoids) and hydrophilic (phenols), vitamin A, B1, B2, C, E, folic acid, flavonoids, phosphorus and extraordinary pectin fibers [10,11]. Carotenes is the important pigment present in carrot and is a well-known precursor of vitamin A, have long been identified for their role in vision, cataract prevention but more latterly claims have been made for its anti-cancer properties along with its role in prevention of cardiovascular diseases [12].

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Carrot extracts, which serve as pedigree of antioxidants, have important functions in preventing many diseases. The biosynthesis, metabolism, and medicinal properties of carotenoids in carrots have been studied far and wide. Research on hormone regulation in the growth and development of carrots has also been extensively performed. Recently, with the enhancement of high-throughput sequencing technology, several efficient tools have been adopted in carrot research. A large amount of sequence data has been produced and applied to ameliorate carrot breeding [13].

Carrots are in general consumed as raw (fresh, whole or baby carrots) and/ or processed/ value added form (canned foods, soups, juice and frozen products). Food products are consumed daily by the majority of the population and for years the food industry has focused on increasing the nutritional value of these products [14] because of the arising interest in functional food, especially bioactive substances, food producers look for new sources and carriers for those substances. Among several bioactive substances to be found in food such as antioxidants, plant sterols, probiotics, prebiotics and vitamins, a significant role is played by dietary fibre [15].

How to process carrots is very important so that they become foods that have a high selling value while maintaining the content of antioxidant compounds contained therein. One way to optimize is to prepare carrot flour that can reprocess into food products. Defining the quality of carrots flour included water and ash content assays. A qualitative assay with the help of colour reaction assays, quantitative analysis, and antioxidant activity using UV-Visible Spectrophotometry [16]. Carrots (the main source of carotenoids) have numerous nutritional and health benefits [17]. The carotenoid content suggests the processing quality of carrot powder. The carotenoid content of carrot powder is examined using digital image processing technology and colour analysis technology, and an estimation model between the carotenoid content and colour characteristics are confirmed. The carrot is dried with the help of different drying methods [18].

FUNCTIONAL APPLICATION OF DRUMSTICK LEAVES AND ITS HEALTH BENEFITS

Drumstick plant (*Moringa oleifera*) indigenous to India grow well in the tropical and subtropical regions of the world. Their local name is Drumstick tree or Murungai tree. This miracle tree had notable health properties; it is widely cultivated because of its nutritional values. The leaves of this tree are used to cure malnutrition and it also helps for secretions of breast milk in lactating mothers. The use of moringa leaves as a treatment for type II diabetes as well as for cancer is very vital because of its photochemical and antioxidants presence. It is possible to develop a ready-to-eat convenience food item with high quality functional and nutritional properties using pre-treated moringa leaf. Moringa is rich in nutrition owing to the existence of numerous essential phytochemicals present in its leaves, pods and seeds. In fact, moringa is said to bestow 7 times more vitamin C than oranges, 10 times more vitamin A than carrots, 17 times more calcium than milk, 9 times more protein than yoghurt, 15 times more potassium than bananas and 25 times more iron than spinach. Moringa refines the body metabolism. The nutrient benefits in Moringa provide a gentle push over time to improve the body's metabolic processes due to critical nutrients. The Moringa plant imparts the nutrient benefits that so many diets stand in need of. Moringa leaves have numerous health benefits. For example, the moringa leaf can uplift your immunity, strengthen your bones, treat erectile dysfunction, treat Alzheimer's disease, decrease liver damage, prevent constipation, relieve menstrual pain, and boost libido [19].

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Drumstick leaves have vast potential for benefiting humanity. India's ancient tradition of Ayurveda says the leaves of moringa tree avert 300 diseases. The leaves are affordable, abundantly available still are under exploited and are mostly tossed out or

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go waste. The leaves of *moringa oleifera* are shadow dried and converted into a homogeneous powder referred to as moringa leaf powder (MLP). The leaf powder was examined for proximate, mineral (Ca, P, Fe), Vitamin (beta carotene and vitamin C) composition and anti-nutritional factors (oxalate and phenol). In total 10 separate recipes with different levels (0%, 5%, 10%, 15%,20%) of the leaf powder amalgamation were prepared and assessed for quality on the basis of sensory attributes. The leaf powder holds 23.66% of protein, 28.47% carbohydrate, 7.03% fat, 12.1% fiber 24 mg/ 100g iron, 3405 mg /100g calcium and 218mg /100g phosphorus, 39600 microgram/100g beta carotene and 140 mg/ 100g vitamin c. The products prepared by amalgamating the leaf powders were well accepted to the level of 10%. The protein, iron, calcium and beta carotene content were importantly higher in the value-added recipes. The abundantly available affordable leaves of moringa are exceptionally nutritious but one of the most underutilized tropical crops. Dehydration of the leaves will make it a condensed source of nutrients which could be used in the value addition of various products [20].

Moringa can hold out against both severe drought and mild frost conditions and hence widely cultivated across the world. With its high nutritive values, every part of the tree is fit for either nutritional or commercial purposes. The leaves are high in minerals, vitamins and other essential phytochemicals. Extracts from the leaves are helpful in treating malnutrition, augment breast milk in lactating mothers. It is used as antioxidant, anticancer, anti-inflammatory, antidiabetic and antimicrobial agent. *M. oleifera* seed, a natural coagulant is largely used in water treatment. The scientific effort of this research provides glimpse on the use of moringa as a cure for diabetes and cancer and fortification of moringa in commercial products. The moringa is used across disciplines for its medicinal value and deals with cultivation, nutrition, commercial and prominent pharmacological properties of this “Miracle Tree” [21].

CONCLUSION

Modern concepts of nutrition include the great significance of functional food because functional food products, apart from their basic nutritional functions, provide many physiological benefits and reduce the risk of several chronic diseases. These food products either contain or add a component with a positive health effect or remove a component with a negative one [2]. Incorporation of carrot and moringa leaves powder can enhance the functionality and also increase the acceptability of moringa leaves and carrot. The largely available inexpensive leaves of moringa are not only exceptionally nutritious but also one of the most underutilized tropical plants [20]. Dehydration of underutilized moringa leaves and carrot can enhance their nutritive value remarkably and the value addition in different products will be helpful in tapping and exploiting their amazing nutritional potential.

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