Papitas - The Underutilized Byproduct and the Future Cash Crop - A Review

Priyanka Maheshwari*, Neha Prasad and Ekta Batra
Centre for Food Technology, Jiwaji University, Gwalior, Madhya Pradesh, INDIA

Abstract: Pumpkin seeds possess a good dietary and medicinal qualities but beyond these facts these seeds are underutilized till date. Papitas are a good source of minerals and vitamins like zinc, iron, calcium, phosphorous, potassium, niacin etc, but apart from all these it contains a good amount of essential fatty acids, phytosterols, proteins and dietary fibres. Traditionally those seeds which were discarded by the people but knowing the nutritional aspects pumpkin seeds can be used Waste as a versatile “Nutrition Powerhouse”.

Keywords: Papitas, Phytosterols, Antioxidants, Cucurbitacin, Antihelmenthic, Anti-emetic

I. Introduction

A herbaceous plant – pumpkin belongs to the Cucurbitaceae family and the genus Cucurbita and scientifically called as Cucurbitapepo L. All pumpkin posses different variety according to their species but Cucurbitapepo L. (summer pumpkin); Cucurbita maxima duch (winter pumpkin); Cucurbitamixta pang; and Cucurbitamoshataduch (summer and winter pumpkin) are their only edible species[5,22]. Commonly called as Chilacayote, acorn squash, butternut squash, field pumpkin, fig-leaf gourd, pepo, pumpkin, squash, yellow summer squash and zucchini. In Iran they are popular as Cocurbita pepo or informally “kadu tandal”. Cucurbits mostly grow in tropical, subtropical, arid and temperate climates of the world[16]. Pumpkin plant can be grown in various types of soil but to obtain most successful production light, sandy and loamy soil or the soil with pH greater than 6 must be preferred. Pumpkin are mostly acquired for various purposes, that vary from nutritional to medicinal points[21]. Many nutrients including pumpkin polysaccharides, active protein, essential amino acids, carotenoids, phytoestrogen, selenium, fiber, cucurbitacin E, calcium, zinc and other vitamins and minerals etc. are naturally present in cucurbita moschata and beneficial ion prevention of cancer and other disease.

II. Seed

Pumpkin seed are very nutritious and provides best quality oil and rich source of protein but are generally discarded during the processing of canned pumpkin or pie mix or in other processing treatments. But these agricultural residues like plentiful flat, oval seeds boost up our health and are less expensive therefore can be easily consume by low grade people without compromising with the nutritional aspects. The hulled and gently roasted pumpkin seeds can be called as “papitas”. Papitas contain a compound “Cucurbitacin” which is deworming compound used to displace tapeworms and roundworm in domestic livestock species.

Morphological structure

The central hollow cavity of each pumpkin fruit contain approx. 500 cream white husky seeds. Pumpkin seeds are semi-flat, compact and have conical tip with ovoid shape. Kernels of pumpkin seeds are of olive green color, crunchy and are high in calories (559 calories per 100g).Moisture content of pumpkin seed is significantly quite low (7.73 ± 1.22%) and gamma irradiation can not substantially affect the moisture content.

III. Compositional and Nutritional aspects of Pumpkin Seeds

Pumpkin seed are considered as “Versatile nutritional powerhouse”. Papitas contain good quality protein approx. 100 g of seeds provide 30 g protein that is 50% of recommended daily allowances of protein. Papitas are the richest source of magnesium which is beneficial for blood pressure and help in preventing sudden cardiac arrest, heart attack & stroke and also perform biological and physiological functions such as creation of ATP (adenosine triphosphate, energy molecule for our body), in synthesizing of RNA and DNA, pumping of heart and in maintenance of bone & teeth, in relaxation of blood vessels. Papitas are the fantastic source of zinc. It is beneficial for maintenance of carbohydrate metabolism in the body, immune system, cell growth and multiplication, eye and skin health, insulin regulation and male sexual functions such as sperm generation and its movements and testosterone metabolism[3]. It is also plays an important role to reduce the risk of osteoporosis and provide bone densysupport and reduces the risk of bladder stone problem[32].
These seed also accumulate protein, essential fatty acids, zinc, lignans, and phytosterols such as delta 7-sterols and delta 5-sterols[29] essential amino acid like as tryptophan and glutamate. Papitas accumulate the higher amount of monosaturated oil to interrupt the triggering of prostate cell multiplication by dihydrotestosterone (a product of testosterone conversion) & mono-unsaturated fatty acids (MUFA) like oleic acid (18:1) helps in lowering in bad LDL cholesterol and increasing in good HDL cholesterol. These also help to prevent coronary artery disease & stroke risk by favouring healthy blood lipid profile, in lowering blood’s cholesterol level in human beings and enhancing the immune responses.[23].

For the manufacturing of high quality protein product they can be used as basic raw materials which are nutrition supplement and functional agents for food formulation [13,15,19,18,20]. By the hydrolysis of pumpkin seed, antioxidative peptides can be synthesized. A special type of amino acid is present in seed which is known as Cucurbitacin [(−)-3-amino-3-carboxyppyrrolidine] specially beneficial for anti-helminthic action [34] and for eliminating worms and action of this seed is against tapeworms, roundworms and intestinal parasites [27,8]. Papitas are examined as wealth of minerals such as niacin, calcium, and potassium and phosphorous. Phytosterols & Cytosterols are the main component of papitas having anticancer property. Prostate cancer, breast cancer [4,35] and colon cancer also can be cured by consuming this seed due to presence of these phytosterols in seed[7]. Approx. 37.5 μg/g alpha tocopherol and 383 μg/g gamma tocopherol is present in fresh dried papitas[28]. Antioxidant like vitamin E and vitamin A can prevent cancer, especially prostate cancer by inhibiting the action of free radicals. Papitas also acts as anti-helminthic, galactogogue, and anti-emetic[25], mildly diuretic, vermifuge[30], antidiabetic[6], antifungal, antibacterial and anti-inflammatory[2,1].

IV. Medicinal values of Papitas

Nature’s sleeping pill or boosting component:
Papitas are source of amino acid tryptophan[36] and glutamate. Tryptophan is converted into serotonin which is worthwhile neuro-chemical and can be labelled as nature’s sleeping pills. On the other hand glutamate is essential in synthesis of gamma-amino butyric acid (GABA) which is an anti-stress neurochemical in the brain and helps reducing anxiety, nervous irritability& other neurotic conditions.

Vehicle for Promoting Prostate health: Cucurbitacinsa chemical substance present in these seeds prevent conversion of testosterone into dihydrotestosterone in the body. Production of the prostate cells cannot occur without dihydrotesteronethus preventing enlargement of prostate[31,26]. The risk of prostate cancer can also be reduce by phytosterols[7] that are also present in seed[17,12,10,11].

Gynaecological effect: Papitas are responsible for curing osteoporosis, heart disease, breast cancer and menopausal symptoms due to the presence of phytoestrogens which are plant metabolites and show structural and functional similarity with 17β-estradiol[35].

V. Pumpkin seed utilization

Pumpkin seed can be consumed in two different forms one is raw and in other roasted forms. Roasting does not affect on the amount of fiber, protein and minerals. In both form of seed these nutrients present in roughly equal amounts but roasting can reduces the amount of vitamin E and vitamin K. They can be serves as snack.
In food preparation and in medicines the oil extract from pumpkin seed can be used as raw material [24,14]. In bread, pumpkin seed flour acts as a protein supplement [9].
VI. Future prospects

In this world of globalization consumers are more conscious about their diet and prefer eating healthy foods. Now what if this food get derived from waste? Yes it is not only possible but worthwhile also. As pumpkin seeds contain certain phytochemical and sterols which cures diseases like cancer, arthritis, inflammation etc. Presently seeds are used in roasted form as snacks or in some other preparations but considering nutritional aspects it can also be used to prepare curd or shrikhand because though milk is regarded as complete food, it is deficient in iron. Thus by fortifying such minerals from underutilized waste can be a source for the treatment of several deficiency diseases like anemia, prostate cancer, depression, learning problem etc.

VII. Conclusion

This study brings down at certain conclusion that pumpkin seed are excellent nutrient source filled with minerals mainly zinc, phosphorous, magnesium, potassium and selenium responsible for fighting diseases and acts as weapon for fighting diseases such as arthritis, inflammation, prostate cancer etc. Due to presence of these minerals. In ancient time it have been used as “folk remedy” to maintain prostate health. It is the only seed which is alkalinein nature. This study also shows that these papitas can be used as additives in food industry for food formulation. In earlier they were regarded as a waste but now they can play important role in food by nutritional aspects. They can be consumed regularly without causing any side effects on human health.

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