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Nutritional and Nutraceutical Properties of Pumpkin

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Introduction

Originally from Central to South America, the trailing plant Cucurbita, also known as "pumpkin," is grown anywhere from sea level to high altitudes (Yadav *et al.* 2010). It is considered an indigenous vegetable in many other nations, including Africa. India, China, Mexico, and the United States are the major producers of pumpkin on the international market. Pumpkin is a member of the Cucurbitaceae family and the genus Cucurbita. There are five different varieties of pumpkin, but the three most prevalent are *Cucurbita pepo, Cucurbita maxima, and Cucurbita moschata* (Saeleaw and Schleining, 2011).There are several dietary benefits and food uses for pumpkin. Due to its high concentration of β-carotene and moderate number of carbohydrates, as well as its vitamins B6, K, thiamine, and riboflavin and minerals potassium, phosphorus, magnesium, iron, and selenium, it can be used as a food additive in the production of juice, pomade, pickles, and dried goods (Rakcejeva *et al.* 2011). Because they are so rich in micro and macro nutrients like phosphorous, calcium, magnesium, manganese, copper, and zinc, pumpkin seeds are frequently utilised as dietary supplements. The medical benefits of pumpkin include anti-inflammatory, antioxidant, anticarcinogenic, anti-angiogenesis, anti-lipogenic, glucose-lowering, and anti-cancer characteristics.The presence of many phytochemicals, including tocopherol (α and γ-tocopherol), carotenoid (lutein, zeaxanthin,β-carotene), triterpenes, and secondary metabolites such β-sitosterol, dehydrodiconiferyl alcohol, and tetra saccharide glycerol glycolipid, contributes to the abundance of health advantages (Caili *et al.* 2006; Kim *et al.* 2012; Wang *et al.* 2012; Isutsa and Mallowa, 2013).

Pumpkin nutritional components:

The fruit of the Cucurbita genus is a superior source of nutrients. Pumpkin has high levels for pro-vitamin A, carotenoids, that give its distinctive colours due to the presence of substances like lutein (a bright yellow colour) and beta-carotene (orange color). The presence of β-carotene, lutein, lycopene and cryptoxanthin in trace levels is the exception (Zhou *et al.*

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2007). β-Carotene is transformed to vitamin A within the body, which is essential for vision, growth, and embryonic development and a deficit may result in vision and infant mortality. By scavenging free radicals as it quenches singlet oxygen and interacts with the radical itself, carotenoid works as an antioxidant and lowers the chance of developing certain diseases like cancer and cardiovascular diseases (CVDs). Mostly made up of pulp and seeds, pumpkin fruit is rich in both necessary or non-essential amino acid residues, which are necessary for both bodily and mental functions (Takahashi *et al.* 2011). Lysine is the amino acid that is present in the highest concentrations among the essential amino acids, while glutamic acid is the case for the non-essential ones. On a dry weight basis, the pumpkin seed has a crude protein content of 39.25 g/100 g, a crude oil content of 27.83 g/100 g, an ash content of 4.59 g/100 g, a crude fibre content of 16.84 g/100 g, an energy content of 2,401 kcal per 100 g, and concentrations of potassium, chromium, sodium, magnesium, aluminium, barium, calcium, zinc, and iron of (Kim *et al.* 2012). On a dry weight basis, the pulp contains low amounts of fat (2.3 g/100 g), carbs (66 g/100 g), protein (3 g/100 g) and carotenes (171.9 mg/g) (Martha and Gutierrez, 2016). Pumpkin pulp contains 2-10 mg/100 g of vitamin C and 9-10 mg of vitamin E per 100 g.

Nutraceutical properties:

As an antirheumatic (a substance that reduces rheumatic disease symptoms), demulcent (a substance that shapes a soothing film over mucous membranes), diuretic (a substance that increases urine production), nervine (a calming tonic with pumpkin 387 properties that soothes frazzled nerves), and taenifuge (a medication to remove tapeworms from the body), Cucurbita maxima has a variety of beneficial effects (Bhat et al. 2015). Additionally, the fibres in pumpkin help to bind the extra acids that the digestive system produces, which helps to buffer the pH of the stomach. It helps regulate blood sugar levels while treating gastrointestinal parasites, supporting benign prostatic hyperplasia (BPH), supporting urinary dysfunctions, and dysuria (Vergara *et al.* 2006).

Anti-oxidant activity:

The assessment of antioxidant activity in Cucurbitaceae seed protein often includes a variety of in-vitro tests, including measures of metal chelating activity, reducing power, and radical scavenging activity (Ozuna and Leon Galvan, 2017). The isomeric combination of β

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or δ-tocopherol is present in pumpkin seed oil (Matus *et al.* 1993). Tocopherols are a non-glycoside molecule found in vegetable oils that function as natural antioxidants.

Hypotensive activity:

Low blood pressure, particularly inside the arteries of a systemic circulation, is the main cause of hypotension. The findings demonstrated a preventive impact against pathological cardiac and aortic changes as well as lower chances of heart attacks due to the high magnesium content. Diastolic blood pressure significantly dropping in recent clinical research in postmenopausal women (Yoshinari *et al.* 2015).

Antidiabetic activity:

Due to insulin's non-secretion or resistance, diabetes mellitus is indeed a long-lasting metabolic condition that manifests as insulin shock (Makni *et al.* 2011). The pumpkin seed includes tocopherol isomers, which are useful in reducing diabetes since they have some antioxidant action. For intake in diabetic conditions, pumpkin fruit is employed (Xia and Wang, 2007).

Anticancer activity:

According to research, both antioxidants and polyphenolic substances in diet can regulate abnormal inflammatory signals and signalling pathways linked to cancer stem cells. The extract from cucurbita pepo may one day be used as a novel chemotherapy drug to treat cancer and tumour growth. Carotenoids from a diet high in pumpkin seeds have also been linked to a reduced risk of prostate cancer in addition to lowering the chances of gastric, breast, lung, and colon cancer. By eliminating a variety of free radicals produced in the body throughout metabolism, including as superoxide anions, hydroxyl radicals, and other reactive oxygen species, pumpkin polysaccharides have beneficial anticancer benefits (Chen and Huang, 2019).

Antimicrobial activity:

Pumpkin is significant for clinical microbiology and has medicinal uses. For pharmacological and microbiological studies, Cucurbita maxima leaves, fruit, and flower extract is used. Pseudomonas aeruginosa, Candida albicans, Acinetobacter baumanii, Enterococcus faecalis, Klebsiella pneumonia, Escherichia coli, and Staphylococcus aureus are all susceptible to the antibacterial properties of pumpkin oil-soluble components. The examined microbial isolates were resistant to three distinct proteins derived from pumpkin

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rinds, seeds, and pulp. Aqueous extract against the fungus Aspergillus flavus and the toxicity of aflatoxin B1 (AFB1) Researchers looked into the nutritional benefits of pumpkin 391 infection-related lung histolo morphological damages in rats (Saddiq *et al.* 2019).

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