

## ***CUCURBITA MAXIMA* DUCH. AS A MEDICINAL PLANT**

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**Abstract:** This paper's goal is to emphasize a new approach on a well-known plant resource (*Cucurbita maxima Duch.*), considering its alternative utilization in phytopharmacy, based on published data on the chemical composition of fruits, flowers and seeds, as well as on prior knowledge on uses as a remedy.

**Keywords:** *Cucurbita maxima*, pumpkin, phytopharmacy

“*Let food be your medicine and medicine be your food*” is an incentive Hippocrates launched more than 2400 years ago (Hakim, 1988), gaining more and more followers nowadays, as we become more aware about the benefits of a healthy living. Medicinal plants are those ones with medicinal properties, i.e. those ones that can be directly or indirectly used for medical purposes; the background principle of this approach is that these plants contain certain biologically active substances that influence the metabolic processes of humans. Considering its proved health effects, *Cucurbita maxima Duch.* (pumpkin) can be also included among the other medicinal plants. Between the known pharmacological activities are: antitumor (Hartwell, 1967; Saha et al., 2011), antiobesity (Das et al., 2010), antidiabetic (Saha et al., 2011), hepatoprotective (Saha et al., 2011), diuretic (Jose et al., 2008), antioxidant (Attarde et al., 2010), antigenotoxic (Villasefior and Lemon, 1996), vermifuge and taenicide (Al-Rawi and Chakravarty; Burkill et al., 1966), remedy for carbuncles (Al-Rawi and Chakravarty, 1964), uses in cataplasms (Al-Rawi and Chakravarty, 1964; Pitier, 1926), tonic (Al-Rawi and Chakravarty, 1964), warts cure (Hartwell, 1967). Besides, pumpkin seed oil has been recognized for several health benefits such as prevention of the growth and reduction of the size of prostate, thus reducing the symptoms of benign prostatic hyperplasia (Carbin and Eliasson, 1989; Carbin et al., 1990; Koch, 1995; Schiebel-Schlosser and Friedrich, 1998), reduction of bladder and urethral pressure and improving bladder compliance; two unsaturated fatty acids oleic and linoleic acid may account for relieve symptoms of enlarge prostate. Pumpkin seeds have enjoyed a long history in folk medicine for

use as tenifuges, due to their ability to rid the body of intestinal parasites, curcubitin being the substance correlated with anti-parasitic activity (Chung and Ko, 1976; Rybaltovskii, 1966); due to their reported L-tryptophan content, the seeds have been suggested as a remedy for depression (Eagles, 1990), while eating pumpkin seeds as a snack can help preventing the most common types of kidney stones (Suphakarn et al., 1987; Suphipat et al., 1993) by both reducing the levels of substances that promote stone formation in the urine and increasing the levels of substances that inhibit stone formation.

Pumpkins are native to North and Central America (Whitaker, 1975), where some *Cucurbita* varieties were cultivated before Europeans reached that area. Nowadays, pumpkins are cultivated in almost all areas with an appropriate climate in the world. Their fruits are the most valuable part of *Cucurbita* plants; some of them own a high nutritional value and a high level of carotenoids and for this reason, in many countries, *Cucurbita* fruits are important sources of provitamin A in human nutrition, being consumed usually boiled or baked, according to the local traditions.

Almost all parts of *Cucurbita maxima* plants are edible and healthful. The fruits (pumpkins or squashes) are well known; they are large, weighing 8 to 10 kg, sometimes up to 20 kg. The orange and yellow color of their flesh is related with the contained carotenoids – phytochemicals that may reduce risk of some cancers, heart attacks and some aging processes. The flowers are also loaded with carotenoids and can be eaten raw in salads or cooked. The leaves contain lot of iron and other minerals and vitamins; smaller new leaves are good ingredients in salads, while stems can be chopped and boiled with other vegetables, providing fibers. The seeds can be dried and eaten raw or baked; they contain valuable nutrients oils, proteins and vitamins.

The health effects of *Cucurbita maxima* plants are due to their complex chemical composition. According to the Agricultural Research Service of the United States Department of Agriculture, the fresh pumpkin fruits contain around 90% water, the proximate analysis leading to 1 g/ 100 g proteins, 0.1 g/ 100 g lipids, 6.5 g/ 100 g carbohydrates, 0.5 g/ 100 g fibers. The major chemical constituents are potassium (340 mg/ 100 g), phosphorus (44 mg/ 100 g), calcium (21 mg/ 100 g), magnesium (12 mg/ 100 g), sodium (1 mg/ 100 g). The concentration of microelements are relatively high: iron – 0.80 mg/ 100 g, zinc - 0.32 mg/ 100 g, selenium - 0.30 mg/ 100 g, manganese - 0.125 mg/ 100 g, copper - 0.127 mg/ 100 g. Vitamins are well represented by ascorbic acid (9 mg/ 100 g), niacin (0.60 mg/ 100 g), panthotenic acid (0.298 mg/ 100 g), riboflavin (0.11 mg/ 100 g),

thiamin (0.05 mg/ 100 g), total folate (0.016 mg/ 100 g), vitamin K (0.0011 mg/ 100 g) and vitamin A (426 RAE or 8513 IU). The antioxidant activity is mainly due to carotenoids, such as  $\alpha$ -carotene (3.1 mg/ 100 g),  $\beta$ -carotene (4.016 mg/ 100 g), lutein and zeaxanthin (1.5 mg/ 100 g) and to vitamin E ( $\alpha$ -tocopherol – 1.06 mg/ 100 g). The content of the total saturated fatty acids is low (52 mg/ 100 g), as well as the content of monounsaturated fatty acids (13 mg/ 100 g) and of polyunsaturated fatty acids (5 mg/ 100 g).

The pumpkin flowers contain around 95% water, 1.03 g/ 100 g proteins, 0.07 g/ 100 g lipids and 3.28 g/ 100 g carbohydrates. The major chemical constituents are potassium (175 mg/ 100 g), phosphorus (49 mg/ 100 g), calcium (39 mg/ 100 g), magnesium (24 mg/ 100 g), sodium (5 mg/ 100 g), iron (0.70 mg/ 100 g) and selenium (0.007 mg/ 100 g); the vitamins' spectrum is narrower than for fruits, these being represented by ascorbic acid (28 mg/ 100 g), niacin (0.69 mg/ 100 g), riboflavin (0.075 mg/ 100 g), thiamin (0.042 mg/ 100 g), total folate (0.059 mg/ 100 g) and vitamin A (97 RAE or 1947 IU). The content of the total saturated fatty acids is lower than in the case of fruits (36 mg/ 100 g), as well as the content of monounsaturated fatty acids (9 mg/ 100 g) and of polyunsaturated fatty acids (4 mg/ 100 g).

The dried pumpkin seeds contain around 5.23% water, 30.23 g/ 100 g proteins, 49.05 g/ 100 g lipids, 10.71 g/ 100 g carbohydrates, 6 g/ 100 g fibers. The major chemical constituents are phosphorus (1233 mg/ 100 g), potassium (809 mg/ 100 g), magnesium (592 mg/ 100 g), calcium (46 mg/ 100 g), sodium (7 mg/ 100 g) and zinc (7.81 mg/ 100 g). Vitamins are represented by ascorbic acid (1.9 mg/ 100 g), niacin (4.987 mg/ 100 g), riboflavin (0.153 mg/ 100 g), thiamin (0.273 mg/ 100 g), total folate (0.058 mg/ 100 g), vitamin K (0.0073 mg/ 100 g), vitamin A (1 RAE or 16 IU) and  $\alpha$ -tocopherol (2.18 mg/ 100 g). The content of the total saturated fatty acids is high (8.66 g/ 100 g), as well as the content of monounsaturated fatty acids (16.242 g/ 100 g) and of polyunsaturated fatty acids (20.98 g/ 100 g).

The relatively high carotenoid content of *Cucurbita* fruits lead to their utilization in different products, such as soft drinks (Park, 1995; Tămas, 1989; Tanaka, 1993), baby foods (Bhaskarachary, 1995; Fernandez, 1998), forages (Neamtu, 1978; Tămas, 1986; Simpson, 1979), antioxidants for food products (Passotto, 1995), cosmetic products (Bombardelli, 1996; Hoppe, 1994), irregularity remedy (Smith, 1999), replacement for tomato juice (Dunham, 1990), pharmaceutical products (Bombardelli, 1996), bread (commercial “pumpkin bread”), cans etc.

To conclude, besides their nutritional value, *Cucurbita maxima* plants have proved health benefits; more than that, there are no known side

effects or reports of toxicity regarding consumption of pumpkins, pumpkin seeds, pumpkin flowers or pumpkin leaves!

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