

Health Benefits of Maize Crop - An Overview

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ABSTRACT

Corn or Maize is a very important crop in the world. It is a grain crop. Zea mays L. is a very good source of nutritional components and phytochemicals compounds. These phytochemical compounds have an important role in reducing the chances of chronic diseases. It comprises of many phytochemical compounds like phenolic chemicals, carotenoids and phytosterolic compounds. It is commonly considered that it has such compounds which are called Galanthus nivalis agglutinin lectins or named as GNA maize. If, we take a full tablespoon of maize oil then it fulfills the requirements of essential fatty acids compounds of a child or an adult. By the process of decoction, maize roots, silk, cobs and leaves are utilized in making products which are very helpful in preventing nausea, bladder problems, stomach problems, brain problems, lever problems and stomach problems. A prolamine named Zein which is highly alcohol soluble is found in maize kernels has very unique character in nutraceutical as well as in pharmaceutical industries. The starch of maize prevents from a lot of problems like obesity, cancer, ulcers and lever problems.

Keywords: Maize, GNA-maize, Zein, Phenols, Carotenoids, Phytosterols, Minerals, Vitamins, Proteins.

INTRODUCTION

Maize is an important crop which is grown annually in world and it belongs to the family Poaceae (Abdel-Aal et al., 2006). The word Zea is a Greek language word which means “sustaining life” and Mays is Taino language word which means “life giver”. It is understood as the staple food in many countries (Anonymous, 1994). After rice and wheat, the maize comes at ranking 3rd position in the world. During the 2013-14, Indian

maize production was 23 Million Metric Tons and all over the world production of maize was 967 MMT. Maize is known as queen of cereal crops in all over the world. USA is the largest producer of maize crop in all over the world which contributes about 35% of the total world corn production (Balasubhanshini et al., 2015). U.S economy mostly depends on the maize crop and it is known as mother grain of America.

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It is mostly used for animal fodder and forage. Maize crop is used in making grits, chapatti, starch solutions and snacks (Anonymous, 2011). So, different chemicals like phytochemicals are attained by the maize which are very helpful and healthy for human beings. Many proteins, vitamins, ashes, minerals and amino acids are isolated from the maize crop which are very helpful in human health sustainability (Birringer et al., 2002).

Nutritional Values of the Maize Crop

Nutritional value of the Maize crop is extremely well and high. It has high nutrients profile. It is rich in carbohydrates which are a good source of energy. Different proteins are

present in this maize crop. Fats, fibers, ashes, phosphorous, sodium, sulfur, riboflavin, amino acids, minerals, calcium, iron, potassium, thiamine, vitamin-C, magnesium and copper as well as ashes are present in the maize kernels (Breadley, 1992). These nutrients make the maize high profile nutrients value for human consumption. It is a full package for a proper health of the human. So, its flour as well as roasted kernels are used by the people. Vitamin-E is also present in the maize silk which is used as anti-oxidant. The nutritional value of the maize plant per 100g portion is given below in Table 1.

Nutritional Value of maize per 100g (Table 1)

Carbohydrates	72 g
Proteins	8.9 g
Fats	5 g
Fibers	2.2 g
Ashes	2.4 g
Moisture	11 g
Phosphorous	350 mg
Sodium	16 mg
Sulphur	115 mg
Riboflavin	0.11 mg
Amino acids	1.80 mg
Minerals	1.6 g
Calcium	11 mg
Iron	2.4 mg
Potassium	287 mg
Thiamine	0.43 mg
Vitamin C	0.13 mg
Magnesium	140 mg
Copper	0.15 mg

Source: Shah, Prasad, and Kumar (2015).

Phytochemicals Found in Maize

Phytochemicals are very important active chemical which biologically much important for human health. These are present inside the corn plant (Chew et al., 1996). These have a potential health benefits profile as these ones save the human body from chronic diseases in a very well manner. These phytochemicals are comprising of phenolic compounds, carotenoids and phytosterols (Anonymous, 2006).

Carotenoid Compounds

Carotenoids are those chemicals which belong to the red, yellow and orange color families of pigments. A large amount of these red, orange and yellow pigmented chemicals are present in yellow maize and also are present in maize

endosperm and flour (Deng et al., 2010). These pigments have further more two classes. One is carotenes, which are hydrocarbons containing chemicals with no oxygen and other class is xanthophylls which are oxygen containing compounds (Duffield-lilicco et al., 2004).

Phenolic Chemicals

Phenolic chemicals/compounds are present in all the plants which are very helpful for human health. These are flavonoids, phenolic acids, tannins, coumarins and stilbenes. These compounds are richly found in the maize bran. The main phenolic compounds found in the maize are ferulic acids and anthocyanins. When we highly refine to the maize bran, it is

very rich in fatty acids contents. Anthocyanins are also known as flavonoids. These are water soluble purple colored pigments which are very nutritive (Dupont et al., 1990).

Phytosterol Compounds

These are called plant sterols because these are found abundantly in the plants and these phytosterols are very important part of the plant cell walls and plasma membranes as well as other membranes too (Fernandez et al., 2009). About more than 260 phytosterols have been investigated till now. Which are highly important. The most found sterols are stigmasterol, sitosterol and campesterol. But their composition is different in different parts of the maize plant like germ, endosperm and pericarp (Anonymous, 2011).

Human Health Benefits due to Maize

Corn or Maize has a lot of health benefits. The beta-complexes vitamins are highly beneficial for the human health. They have a good role in maintenance of hairs, skins, heart and proper digestion. These are also good in rheumatism because these are helpful in moving the limbs and joints. The vitamins K, C and A along with carotenes have very positive effect on the improvement of immunity and health like proper functioning of thyroid glands. Maize or Corn silk has also potential benefits. These are used in many countries as to treat kidney problems, jaundice and fluids retentions (Chew et al., 1996). It also regulates the blood pressure and makes the body well. The fatty acids which are present in the maize are very helpful in maintaining the blood pressure, cholesterol and obesity. In maize oil, there is a good amount of vitamin-E which has anti-oxidant activity which in body makes the immune system very well and responsive. Maize has also anti HIV activity compound name Galanthus nivalis agglutinin (GNA) which is very useful in the HIV disease. Maize is believed as a well-treatment for HIV. Resistant starch in maize is also very well compound which is highly nutritive and its ingestion prevents the obesity and cholesterol level. It is also used in skin problem and cancers (Dupont et al., 1990).

CONCLUSION

It is concluded from the above discussion that maize has high nutrient profile. It has many phytochemicals which are used by humans for the treatment of different diseases. It is if taken on daily basis it may be proved very well as dietary supplement. We should eat or consume maize on daily basis as it is very helpful. It has ability to maintain the blood pressure range very well. Maize has also phytosterols that are helpful in reducing the weight gain.

Competing Interests

The authors declare no competing interest.

REFERENCES

- Abdel-Aal, E. M., Young, J. C., & Rabalski, I. (2006). Anthocyanin composition in black, blue, pink, purple, and red cereal grains. *Journal of Agricultural and Food Chemistry*, 54, 4696–4704. <http://dx.doi.org/10.1021/jf0606609>.
- Alpha-Tocopherol Beta Carotene Cancer Prevention Study Group. (1994). The effect of vitamin E and beta carotene on the incidence of lung cancer and other cancers in male smokers. *New England Journal of Medicine*, 330, 1029–1035.
- Balasubashini, M. S., Rukkumani, R., Viswanathan, P., & Menon, V. P. (2015). Ferulic acid alleviates lipid peroxidation in diabetic rats. *Journal of Phytotherapy Research*, 18, 210–214.
- Biology of maize. (2011). Retrieved from <http://dbtbiosafety.nic.in/guidelines/maize.pdf>.
- Birringer, M., Pfluger, P., Kluth, D., Landes, N., & Flohe, R. B. (2002). Identities and differences in the metabolism of tocotrienols and tocopherols in HepG2 Cells. *Journal of Nutrition*, 132, 3113–3118.
- Breadley, P. R. (1992). British herbal compendium (2). Bournemouth: British Herbal Medicine Association.
- Chew, B. P., Wong, M. W., & Wong, T. S. (1996). Effects of lutein from marigold extract on immunity and growth of mammary tumors in mice.

- Journal of Anticancer Research*, 16, 3689–3694.
- CRA, (2006). Corn oil (5th ed.). Washington, DC: Corn Refiners Association.
- Deng, J., Wu, X., Bin, S., Li, T. J., Huang, R., Liu, Z., & Hou, Y. L. (2010). Dietary amylose and amylopectin ratio and resistant starch content affects plasma glucose, lactic acid, hormone levels and protein synthesis in splanchnic tissues. *Journal of Animal Physiology and Animal Nutrition*, 94, 220– 226. <http://dx.doi.org/10.1111/jpn.2010.94.issue-2>.
- Duffield-Lillico, A. J., & Begg, C. B. (2004). Reflections on the landmark studies of β -carotene supplementation. *JNCI Journal of the National Cancer Institute*, 96, 1729–1731. <http://dx.doi.org/10.1093/jnci/djh344>.
- Dupont, J., White, P. J., Carpenter, M. P., Schaefer, E. J., Meydani, S. N., Elson, C. E., Gorbach, S. L. (1990). Food uses and health effects of corn oil. *Journal of the American College of Nutrition*, 9, 438–470. <http://dx.doi.org/10.1080/07315724.1990.10720403>.
- Fernandez, A., Torres-Giner, S., & Lagaron, J. M. (2009). Novel route to stabilization of bioactive antioxidants by encapsulation in electrospun fibers of zein prolamine. *Food Hydrocolloids*, 23, 1427–1432. <http://dx.doi.org/10.1016/j.foodhyd.2008.10.011>.
- Shah, T. R., Prasad, K., & Kumar, P. (2015). Studies on physicochemical and functional characteristics of asparagus bean flour and maize flour. In G. C. Mishra (Ed.), *Conceptual frame work & innovations in agroecology and food sciences* (1st ed., pp. 103–105). New Delhi: Krishi Sanskriti Publications.