

GENUS MAIZE ITS PROPERTIES AND MEDICINAL USES

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Abstract: This article reviews information about the Genus *Cornus*, as well as its useful medicinal properties and medicinal uses. Information on the classification and history of the genus is also given, which is the basis for further study of the genus. Corn is not only a fodder plant, widely used in the agricultural industry, but also an excellent medicinal plant. About the useful properties of corn has been known since ancient times, and even then it had popularity in folk medicine. Its healing properties are used for the treatment and prevention of various types of diseases such as gallbladder and biliary tract diseases, kidney disease, diabetes, diseases of the cardiovascular system.

Keywords: genus *Cornus*, classification, therapeutic properties of corn, application of corn in medicine, corn research, corn extract.

Аннотация: данная статья рассматривает информацию о роде кукуруза, о его полезных лечебных свойствах и применении в медицине. Также приводится информация о классификации и истории данного рода, что является основой для дальнейшего его изучения. Кукуруза является не только кормовым растением, широко используемым в сельскохозяйственной промышленности, но и прекрасным лечебным растением. О полезных свойствах кукурузы было известно еще с давних времен, и еще тогда он обладал популярностью в народной медицине. Его целебные свойства применяются для лечения и профилактики разных видов заболеваний таких как, болезни желчного пузыря и желчевыводящих путей, почек, диабета, заболеваний сердечно-сосудистой системы.

Ключевые слова: род кукурузы, классификация, лечебные свойства кукурузы, применение кукурузы в медицине, исследование кукурузы, экстракт кукурузы.

Annotatsiya: Ushbu maqolada Makkajo'xori turkumi, uning foydali dorivor xususiyatlari va tibbiyotda qo'llanilishi haqidagi ma'lumotlar ko'rib chiqiladi. Shuningdek, ushbu urug'ning tasnifi va tarixi haqida ma'lumotlar keltirilgan bo'lib, bu uni yanada o'rganish uchun asos bo'ladi. Makkajo'xori nafaqat qishloq xo'jaligi sanoatida keng qo'llaniladigan yem-xashak o'simligi, balki ajoyib dorivor o'simlik hamdir. Makkajo'xorining foydali xususiyatlari qadim zamonlardan beri ma'lum bo'lib, o'sha paytlardayoq xalq tabobatida mashhur bo'lgan. Uning shifobaxsh xususiyatlari o't pufagi va o't yo'llari, buyrak, diabet, yurak-qon tomir kasalliklari kabi turli xil kasalliklarni davolash va oldini olishda qo'llaniladi.

Kalit so'zlar:Makkajo'xori turkumi, tasnifi, makkajo'xorining shifobaxsh xususiyatlari, makkajo'xorining tibbiyotda qo'llanilishi, makkajo'xorini o'rganish, makkajo'xori ekstrakti.

INTRODUCTION

Sugar corn, or maize (Latin: *Zea mays* ssp. *mays*) is an annual herbaceous cultivated plant [1], the only cultivated representative of the genus Maize (Latin: *Zea*) of the cereal family (Latin: Poaceae). Sugarcane maize is subdivided into different botanical groups depending on the structure and morphology of the grain. Each of these groups has its own unique characteristics that determine their use in the food industry or other areas. In terms of flavour, sugarcorn ranks among the top vegetable crops, and in terms of nutritional value and chemical composition it even surpasses most of them [2].

Maize is the main cultural cereal of pre-Columbian America, its cultivation is the basis of American agricultural civilisations. The ancestor of maize, according to the majority of scientists (J. Beadle, H. Iltis, etc.), was the wild cereal teosinte (old name *Euchlaena Mexicana*, new names *Zea mays* ssp. *parviglumis* and *Zea mays* ssp. *mexicana*), the range of which covers the mountainous areas from Central Mexico to Mexico. *mexicana*), the range of which occupies mountainous areas from Central Mexico to South-Eastern Guatemala (400-1800 m above sea level); some researchers (American botanists R. Reeves, P. Mangelsdorf, etc.) believed that maize originated from extinct wild maize and hybridised with teosinte already in cultivated form. The evolution of maize from the most ancient forms (5th millennium BC) to modern primitive (2nd millennium BC) and more productive (1st millennium BC) varieties is traced in detail on excavations of settlements of the Tehuacan valley (Puebla, Mexico). In the 2nd millennium B.C. artificial irrigation and, probably, methods of slash-and-burn agriculture began to be used for its cultivation. At the same time specialised equipment for maize processing (corn grinders and grinders: *mano* and *metato*, as well as pestles and mortars), its storage, cooking and eating (special clay vessels) appeared. It was during this period that maize became the most important source of food for local Indians. Being a grain crop, maize has been used for food, technical and fodder purposes. It is unknown in the wild. It is a single-house cross-pollinating plant with a coarse root system penetrating into the soil to a depth of 2 m, with an erect stalk with a height of 0.7 m for early maturing forms and up to 3 m and more for late maturing forms. Leaves are lanceolate, entire-edged, vaginal; flowers are small, separate-sexed (male inflorescence is a broom, female is a cob); fruit is a granule. Fruits have different shapes and colours. Corn grain contains 7-18 % protein, 60-70 % carbohydrates, 3-7 % fat, vitamins (E, PP, B group, etc.), salts K, Ca, Mg, etc. [3].

Another accepted classification divides maize into subspecies: siliceous maize (*Zea mays* subsp. *indurata*), toothed maize (*Zea mays* subsp. *indentata*), bursting maize (*Zea mays* subsp. *Everta*), sugar maize (*Zea mays*. *saccharata*, starchy maize (*Zea mays* subsp. *amylacea*). *Everta*), sugar maize (*Zea mays*. *saccharata*), starchy maize (*Zea mays* subsp. *amylacea*), waxy maize (*Zea mays* subsp. *ceratina*) and filmy maize (*Zea mays* subsp. *tunicata*); the latter is not used in production crops [3].

Experiential Learning Theory

Corn stigmas and oil have mainly therapeutic properties, which have a beneficial effect on several organs and life-support systems of the body:

1. In the circulatory system, substances extracted from the stigmas increase the number of platelets, contribute to the normalisation of blood coagulation, and vitamin E in the oil reduces the concentration of cholesterol after damage to the inner wall of the vessel.
2. antioxidant properties and ability to protect liver cells allows the use of stigmas in the treatment of toxic hepatitis and complications of diabetes mellitus.
3. Diuretic effect of corn oil and stigmas, as well as increasing bile secretion with a decrease in its viscosity and density helps to fight a number of diseases of the gallbladder, liver.
4. Maize hairs in aqueous infusions of various concentrations are used to dissolve carbonate stones.

Some therapeutic properties of raw corn are enhanced after processing, and some, on the contrary, are lost. For example, popcorn (if it is not 'discredited' by adding large amounts of sugar and salt) increases the amount of plant antioxidants (polyphenols) that prevent cell oxidation and aging. And corn flakes, after going through the stages of processing and cooking, lose almost all phenolic acids that can fight cancerous tumours [4].

Medicinal uses. The raw material known as 'corn hair', obtained from corn stalks with stigmas, is used for medicinal purposes. The stigmas contain fat-soluble, hydrophobic vitamins (involved in protein synthesis and ensuring normal blood clotting), ascorbic acid (ensuring the functioning of connective and bone tissue), fatty oil, some steroidal alcohols, glycosides, traces of essential oil. Since they have a choleric and diuretic effect, their extract in liquid form is prescribed for insufficient bile flow, as well as in infectious inflammation of the bile ducts (cholangitis), inflammation of the gallbladder (cholecystitis), the formation of carbonate stones there, liver disease (hepatitis). A little less often - in inflammation of the prostate gland, genitourinary tract, and as a means to slow bleeding. Fatty unrefined oil, which in the germ of some varieties of maize contains up to 57%, is prescribed as an auxiliary and prophylactic agent for obesity, disorders of lipid and protein metabolism in atherosclerotic formations, as well as - with impaired glucose absorption and the risk of diabetes mellitus.

Despite some differences in the approach to treatment, often folk healers used corn stigmas for the same indications as modern doctors representing scientific medicine.

1. South Slavic tradition prescribed the use of decoction of corn stigmas for urolithiasis and inflammation of the urinary tract. But in addition, they were prescribed to combat tapeworms.
2. East Slavic healers 'prescribed' corn decoctions for diseases of the gallbladder and ducts, as well as a diuretic.
3. In Central Asia corn was used to treat tuberculosis.

Boiled corn cakes with vinegar were applied to eczema, healed skin cracks on hands and feet. Chewed corn kernel was considered a remedy that could improve eyesight by applying the resulting mush to the eyes. It was also used as a healing potion in case of insect bites. Eaten corn was considered to be a binding agent for GI disorders. And enema from boiled flour, according to folk healers, could cure intestinal ulcers. Not universally, but quite widely in folk medicine is still used the ability of corn stigmas to relieve nervous tension and act soothingly. In addition, in lotions and through internal use stigmas are recommended for glaucoma and haemorrhages in the vitreous body and conjunctiva of the eye. There are several recipes for decoctions and infusions of corn stigmas, which are prepared depending on what health problems need to be solved [5].

Recent scientific research has made it possible to talk about corn-based preparations as a way to effectively combat obesity, type 2 diabetes, and inflammation of various kinds. In spring 2019, a team of researchers from the University of Illinois tested how purple (purple) corn phenolics in aqueous extracts extracted from the pericarp of Apache Red hybrids would affect laboratory mice. The concentration of anthocyanins and phenolic compounds extracted varied significantly depending on the particular hybrid, but a therapeutic effect to some degree was recorded in all cases. The scientists observed an alteration in the development of adipose tissue cells (adipocytes) under the influence of the maize extract and a reduction in fat content by 8-56% (depending on the phenol tested). They also found that a key marker of insulin resistance decreased by 29-64% and cellular glucose uptake decreased by 30-139% (depending on the chemical composition of the anthocyanins).

It is expected that in the near future, the selection of the ideal concentration of phenolic compounds and chemical composition will reduce the effects of oxidative processes in insulin-resistant fat cells and, in general, improve the insulin profile in obese people [6].

A few years earlier, in 2012, a Korean research group from the Department of Biochemistry at Hallym University also experimented with purple maize from Chile and Peru to determine how anthocyanins derived from this maize would affect the development of diabetic kidney disease (nephropathy). The experiment was conducted in 2 stages: first in vitro and then in mice. The cells were exposed to corn anthocyanins in different concentrations from 1 to 20 $\mu\text{g/ml}$ for 6 hours. The mice (both diabetic patients and controls) were administered the drugs for 8 weeks. The result was an interruption of cellular signalling, which stimulates the mechanism of nephropathy development and may also inhibit macrophage infiltration closely associated with kidney inflammation. Thus, the researchers concluded that the use of maize anthocyanins can be considered as an element of a general strategy to prevent renal vascular disease in type 2 diabetes [7].

Corn also contains glutamic acid, which plays an important role in metabolism and is especially necessary for the regulation of the brain and heart. Glutamic acid is also used in the treatment of diseases associated with human mental disorders.

The constant use of corn oil reduces the level of cholesterol in the blood. For preventive and therapeutic purposes, it is recommended to consume at least 70-75 grams of corn oil per day in the development of atherosclerosis. In the 'corn stigmas' also contains a lot of useful substances, such as fatty oils, bitter glycosides compounds, essential oil, various alkaloids and flavonides, sitosterol and saponins, gum, vitamin C, vitamin K, stem substances. They also contain trace

elements necessary for our body - manganese, chromium, aluminium, iron, copper, etc. Corn stigmas are collected during the ripening of the cob (but the best are considered collected during the period of milk ripeness of the grain), dry them in a well-ventilated place, in the shade or under a canopy. Corn is a plant belonging to those that are used almost all parts in one or another branch of medicine and cosmetology, in addition to use as food. Not only corn kernels, corn stalks or other parts are used for medicinal purposes, but also corn starch and oil. Corn oil is simply necessary for people with diabetes - well reduces blood cholesterol. Infusions of corn stigmas are indispensable for blood purification, as an antitumour, diuretic and anti-inflammatory agent. Corn stigmas are used to cleanse the bile ducts, destruction of gallstones in the gallbladder and their subsequent withdrawal. Infusions of corn cobs treat pneumonia and tuberculosis. Water-soluble fibre of corn is used in some dietary supplements (biologically active additives). Corn is an environmentally friendly product. The plant does not accumulate nitrates, its use as a food product or medicine is safe. Corn has such a wonderful property as prevention of cardiovascular diseases and malignant neoplasms. Perfectly copes and cleanses the body of toxins and toxins. Corn is also useful for children - it helps to gain body weight, while supplying the growing body with the necessary microelements and essential vitamins. It is an excellent source of carbohydrates and minerals in a form that is easily digested by the body [8].

Corn stigma extract can have a marked diuretic effect without altering proximal tubule function, sodium and uric acid excretion. In vivo studies have shown a positive effect of corn stigmas on the level of uric acid, which plays an important role in the development of cardiovascular pathologies, as well as their ability to protect the kidneys when taking some nephrotoxic drugs [9]

Corn stigmas extract has been found to improve the secretion and outflow of bile, relieve spasms and reduce inflammation of the gallbladder and ducts. In this regard, their use may be indicated in chronic cholecystitis, biliary dyskinesia and other pathologies of the hepatobiliary system [10].

In addition, a meta-analysis of several randomised trials showed that corn stigmas decoction helps to normalise high-density lipoprotein (HDL) levels and reduce total cholesterol and low-density lipoprotein (LDL) in patients with angina pectoris. The authors of the study suggested that corn decoction alone, as well as in combination with conventional drug therapy, may have a favourable effect on blood lipid profile [11].

Interesting results of research on the effect of corn stalks and stigmas on immunity indicators were obtained by scientists of the Korean Immunological. During in vitro experiments, the scientists found that corn stigma extracts can change the activity of macrophages, stimulate the production of enzymes - cyclooxygenase and oxidase synthase, which are involved in immune reactions. Earlier studies have also established the ability of maize raw materials to inhibit tumour necrosis factor and adhesion of bacterial lipopolysaccharides on cell walls [12].

Recently, studies have also been published to evaluate the antibacterial activity and antibiotic-modulating effect of maize stalks and stigmas extract. Researchers found that it can exhibit antimicrobial activity against *Staphylococcus aureus*, *Escherichia coli* and *Pseudomonas coli* [13].

CONCLUSION

Maize, being both a cultural and medicinal plant, gains its importance not only in agricultural activities, but also in medicine. Since ancient times corn has been one of the main sources of food for domestic animals, raw materials and fodder, and corn is also widely used in folk medicine. Due to its rich chemical composition, corn is used to treat various systemic diseases. In the course of research, it has been proved that corn has a diuretic effect, is used in diseases of the cardiovascular system. The antioxidant abilities of corn help in cleansing the liver of toxins in hepatitis. In addition, corn stigma extract stimulates bile secretion, reduces its viscosity and improves bile outflow, which makes them applicable in diseases of the gallbladder and bile ducts. In recent years, many studies have been carried out that prove the content of various compounds such as anthocyanins, glutamic acid and many others that play an important role in the prevention of renal and vascular diseases, diabetes, metabolic disorders. All these above-mentioned facts lay the ground for further research of Maize as a raw material for the production of medicines used for the treatment and prevention of many diseases.

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