

**STUDY OF BIOLOGICAL ACTIVE COMPONENTS AND  
STRUCTURE OF VEGETATIVE ORGANS OF XANTHIUM  
STRUMARIUM L.**

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**Abstract:** The article discusses research conducted at the Urgench State University scientific laboratory. The material was collected in the Khorezm region using classical methods of collecting and storing plant materials. The data from the studies show that antibacterial properties of the plant were found in the fruits, stems and leaves of the common cocklebur.

**Key words:** plant materials, *Xanthium strumarium*, seed phytostimulation, extracts, seed germination, germination, Khorezm region.

The plant is used in folk medicine for respiratory infections, dysentery, skin diseases, toothache, as an astringent, antiseptic, fungicidal agent, etc. The fatty oil of the seeds is suitable for use as a technical, and after purification - as a food, as well as an anti-inflammatory, antipyretic, antipruritic, diaphoretic, calming agent for the nervous system [32; pp. 27-29]. In dermatology, fresh or canned juice and decoction of the plant are used to treat eczema, psoriasis, urticaria, neurodermatitis. The fruits and grass of this plant were used to treat cholera, squeezed juice from the grass due to the high iodine content was recommended for diseases of the thyroid gland [32; pp. 27-29].

Modern folk medicine of the countries of Central Asia uses cocklebur very widely. The juice of the fresh plant of Tabibah in Central Asia is used as an anti-asthmatic, anti-hemorrhoidal, anti-spasmodic, and for throat spasms. Its seeds are smoked for tuberculosis of the throat. Tea from roasted seeds is used to treat tuberculosis and thyroid diseases.

Children are bathed in a decoction of the plant for fungal diseases, eczema, and scabies. Dry, crushed fruits and leaves in the form of an ointment on cow fat are used externally for insect bites and eczema.

Extracts of the whole plant, especially the leaves, roots, fruits, and seeds are used in Indian folk medicine to treat leukoderma, poisonous insect bites, epilepsy, salivation, long-standing cases of malaria, rheumatism, tuberculosis, allergic rhinitis, sinusitis, urticaria, rheumatoid arthritis, constipation, diarrhea, leprosy, lumbago, neuritis, bacterial and fungal infections.

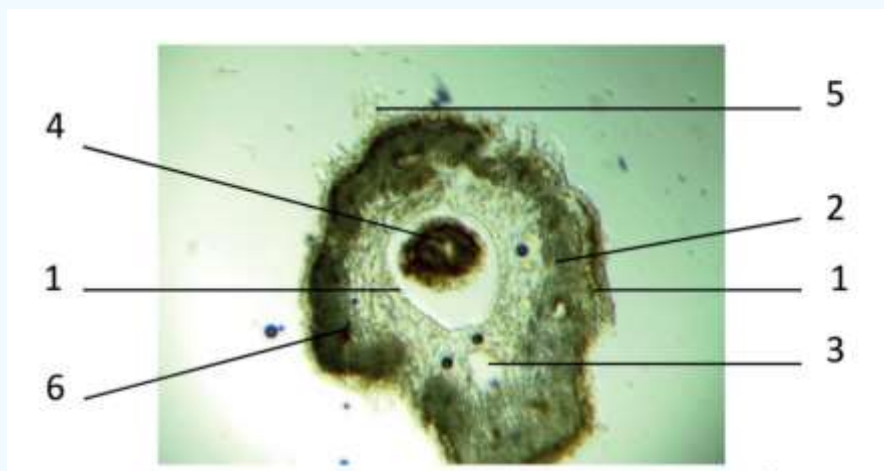
The antibacterial, antitumor, antifungal, anti-inflammatory, antinociceptive, hypoglycemic, antimutagenic, antioxidant, antitrypanosomal, antidepressant activity of the plant, diuretic effect, insecticidal and herbicidal activity are described. The authors explain most of the pharmacological effects by such components as sesquiterpene lactones, glycosides, phenols, polyesters, present in all parts of the plant. The antioxidant and antibacterial activity of the ethanol extract of the root of *X. strumarium* was studied and the antibacterial effect of the extract on two gram-positive strains (*Bacillus subtilis* NCIM2718, *Staphylococcus aureus* ATCC 25923) and three gram-negative strains of bacteria was established.

There is evidence of the antitumor effect of the fruits of *X. strumarium*, which grows in China. They isolated 6 lignans from the fruits and tested their effect in vitro against cancer cells, including a human hepatoma cell line (HepG2), a human breast cancer cell line (MCF-7), a human colon cancer cell line (HCT-116), and a human gastric cancer cell line (SGC-7901) [39; pp. 1–5].

The antimicrobial activity of the essential oil (EO) against gram-positive and gram-negative bacteria and fungi is noted. Antibacterial and antifungal screening showed that EO significantly inhibits the growth of *Staphylococcus aureus*, *Bacillus subtilis*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Candida albicans*, and *Aspergillus niger*. According to the scolicidal assay, EO exhibits significant activity against *E. granulosus*.

Having studied the microscopic structure of the vegetative organs of the common cocklebur, scientists have determined that the cocklebur fruit is an achene

with a skin, having large needle-like outgrowths. Having analyzed the cross-section of the needle (hooked thorn) of the fruit (Fig. 1), they determined that it has an oval shape, where a 1-layer of epidermis is located along the perimeter and under it lies a strongly sclerenchymatized parenchyma, and in it there are rounded receptacles.



*1 – epidermis, 2 – parenchyma, 3 – receptacles, 4 – seed fragment,  
5 – trichomes, 6 – druses*

*Fig. 1. Cross-section of the needle of the fruit of Xanthium Strumarium L. Magn.*

*4x1*

The structure of the main part of the peel (pericarp) of the fruit was determined (Fig. 2). The pericarp has simple hairs of various structures, these are two-celled thin-walled hairs with a bladder-like cell at the base and a pointed terminal, thin-walled caterpillar-shaped hairs, sometimes with a rough-warty surface and a pointed cell at the end, multicellular thick-walled hairs in the form of a cone with a surface like that of caterpillars, only their terminal cell falls off and forms a long nose. There are also multicellular thick-walled hairs with a multicellular base.

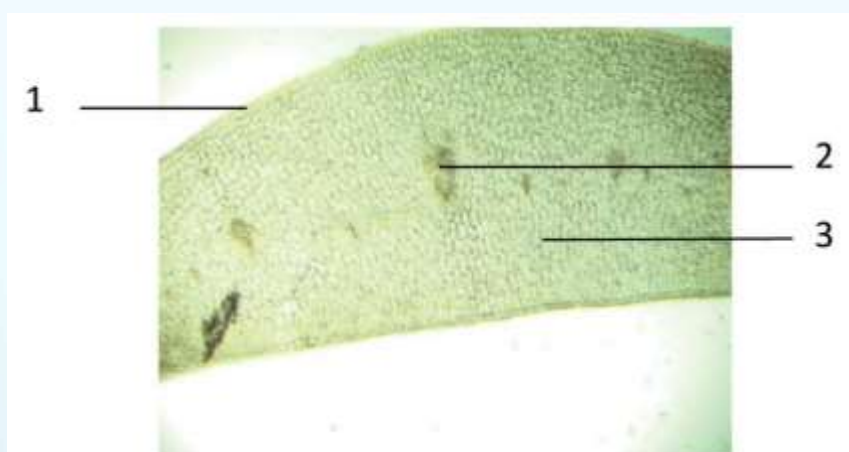


*1 – trichomes, 2 – glands, 3 – epidermis, 4 – exocarp, 5 – receptacles,  
6 – mesocarp, 7 – endocarp*

*Fig. 2. Cross-section of the peel of the fruit of Xanthium Strumarium L.*

*Magn. 10x16*

When examining the cocklebur seed under a microscope (Fig. 3), it was found that the inside of the seed is filled with dense endosperm cells, which consist of light-colored cells of an oval or round shape.



*1 – epidermis, 2 – vascular bundle, 3 – endosperm*

*Fig. 3. Cross-section of Xanthium Strumarium L. seed. Magn. 4x16.*

The fruits of Xanthium Strumarium L., in the region, ripen in October-November, with an average of one bush of the plant yielding 160-170 pieces of fruit,

and from individual abundantly fruiting bushes you can collect more than 330 pieces of fruit. On average, 7 bushes grow per 1 sq.m, sometimes there are up to 26 bushes per 1 sq.m, with the plants being weaker and bearing fruit less abundantly.

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