MORPHOLOGICAL, ANATOMICAL AND PHYTOCHEMICAL STUDY OF PUNICA GRANATUM LINN

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The problem of creating and studying antimicrobial agents attracts specialists in various fields of Abstract: modern medicine. Obviously, herbal medicinal products, to some extent, can be considered as an alternative to antibiotics, while some forms of bacterial infections caused by multiresistant strains of gram positive and gram negative bacteria resistant to other classes of antimicrobial agents and chemicals used to treat a variety of dosage forms. One way of solving this problem is the creation of new antimicrobial agents that have no side effects. Promising for this group are drugs based on plant material. Substances that cause plant antimicrobial activitiy include, in particular tannins. Therefore, the search and investigation of an antimicrobial medicinal plant containing tannins in order to create new herbal remedies are timely and urgent problem today. One such plant is the Pomegranate - Punica granatum L., leaves, bark, fruit pericarp which, according to the literature, has antibacterial, antiviral, anthelmintic, diuretic, cardiotonic, analgesic activities. Purpose - pharmacognostic study of leaves, bark and fruit of pomegranate tree that includes characteristics of morphological and anatomical diagnostic features of pomegranate tree phytochemical study materials and study of antimicrobial activity of decoctions. To achieve this goal, the following tasks were required:- to conduct a patent-information search of literature sources on chemical composition, pharmacological activities, use of pomegranate in folk and official medicine; to study morphological and anatomical features of diagnostic signs of pomegranate; to conduct general phytochemical analysis of leaves, bark, fertilized fruit of pomegranate; to carry out standardization of pomegranate decoctions; to study the antimicrobial activity of pomegranate tree according to museum strains of Staphylococcus aureus, Bacillus cereus, Bacillus subtilis, Eschérichia coli, Pseudomonas aeruginosa, Salmonella enterica serovar abony. The subjects of the study were: sources of information on chemical composition, pharmacological activities, use of pomegranate in folk and official medicine, dosage forms, herbal products of the pharmaceutical market; medicinal herbs - dried organs of pomegranate tree collected during fruiting, leaves, bark and fruit; decoctions of leaves, bark, pomegranate fruit. The identification of the main groups of biologically active substances of medicinal plant raw materials by means of qualitative reactions was performed by conventional methods of obtained aqueous, aqueous-alcohol and hydrochloric acid extracts.

Keywords: tannins, pharmacognostic study

1. INTRODUCTION

The problem of creating and studying antimicrobial agents attracts specialists in various fields of modern medicine. Obviously, herbal medicinal products, to some extent, can be considered as an alternative to antibiotics, while some forms of bacterial infections caused by multiresistant strains of gram positive and gram negative bacteria resistant to other classes of antimicrobial agents and chemicals used to treat a variety of dosage forms. One way of solving this problem is the creation of new antimicrobial agents that have no side effects. Promising for this group are drugs based on plant material. Substances that cause plant antimicrobial activity include, in particular tannins. Therefore, the search and investigation of an antimicrobial medicinal plant containing tannins in order to create new herbal remedies are timely and urgent problem today. One such plant is the Pomegranate - Punica granatum L., leaves, bark, fruit pericarp which, according to the literature, has antibacterial, antiviral, anthelmintic, diuretic, cardiotonic, analgesic activities

2. MATERIALS AND METHODS

Identification of the major groups of biologically active substances (BAS) of medicinal plants using qualitative reactions conducted by conventional methods of the obtained aqueous, aqueous-alcoholic and hydrochloric acid extracts.

Quantitative determination of tannins in herbal drugs conducted by Leventhal titrimetric method (permanganatometry). The method consists in titration with a solution of potassium permanganate aqueous extract in the presence of an indicator - indigosulfonic acid.

Sample preparation: About 2 g of dried grass or flowers are ground and sieved with a sieve with a diameter of 3 mm. The exact portion (about 2 g) is placed in a 500 ml flat-bottomed flask, poured into 250 ml of boiling water and refluxed on an electric stove for 30 minutes with periodic stirring. The liquid is cooled to room temperature and filtered into a conical flask.

Quantitative determination of tannins: Pipette 25 ml of the extract and place in a conical flask with a capacity of 750 ml. Add 500 ml of water and 25 ml of indigosulfonic acid solution and titrate with constant stirring with potassium permanganate solution (0.02 mol / 1) until golden yellow. In parallel, conduct a control experiment. added 525 ml of water to the conical flask, added 25 ml of indigosulfonic acid and titrated with potassium permanganate solution (0.02 mol / 1) until golden yellow.

Calculations.The content of tannins X,%, in terms of absolutely dry raw materials is calculated by the formula: $(V - V1) \times K \times 250 \times 100 \times 100/m \times 25 \times (100 - W)$, where V is the volume of potassium permanganate solution (0.02 mol / 1) used for titration of the extract, ml; V1 is the amount of potassium permanganate solution (0.02 mol / 1) used for titration in the control experiment, ml; K is the amount of tannins corresponding to 1 ml of potassium permanganate solution (0.02 mol / 1) used for titration (0.02 mol / 1) (in terms of tannin): (K = 0.004157 for hydrolyzed tannins), (K = 0.00582 - for condensed) m - mass of raw materials, g; W - weight loss during drying of raw materials,%; 250 - total volume of extract, ml; 25 - volume of extract taken for titration, ml.

3. RESULTS

Determination of morphological and anatomical diagnostic features was performed on dry solid and crushed fixed material. The objects of study were leaves, bark, shoots and pericarp of the fruit of the trees cultivated pomegranate - Punica granatum (imported from Morocco). Production and microscopic examination of drugs from the surface, transverse sections carried out by well-known techniques of microscopic analysis using an optical microscope IDB-1E. Photomicrographs were taken with a SONI DCS 38 camera. At microscopic research of an exocarp of a fetal fruit, on a cross section, covers of cells of an external single-row epidermis are unevenly thickened

therefore lie not in one plane, and a little stepwise.

At microscopic research of a leaf plate the top epidermis, from a surface, consists of thick-walled, in delineation almost square cells. The lateral contours of some cells of the upper epidermis are slightly wavy. Cells of the lower epidermis, from the surface, more elongated, polygonal, with slightly curved thickened membranes. The stomata occured exclusively on the lower epidermis. They were numerous, elliptical in shape. The number of accompanying peritoneal cells from 3 to 5 (anocytic respiratory complex).

In cross section, the leaf blade has a dorsiventral structure. The upper and lower epidermis are singlelayered, the cells of the upper epidermis are covered with a much thicker layer of smooth cuticle than the cells of the lower epidermis Picture 1 Fragment of the cross section of the fetus:



Picture 2 Fragment of the upper epidermis of the leaf blade (from the surface):



Aqueous, aqueous-alcoholic and hydrochloric acid extracts were obtained for general phytochemical analysis. The obtained extracts were investigated for the presence of biologically active substances by conventional methods. About 1 g of dried crushed to a size of 1-2 mm raw material (flowers and herbs) was placed in a flat-bottomed flask with a capacity of 250 ml., was added 50 ml of hot water and heated on a boiling water bath for 20 minutes. The liquid was cooled to room temperature, filtered into a conical flask and used for qualitative reactions. General sedimentary reactions

- with proteins: to 2 ml of each extract was added dropwise a 1% solution of gelatin. Mud appears, which disappears when excess gelatin solution is added (for all extracts).

- with alkaloids: to 2 ml of each extract was added a few drops of 1% alcoholic solution of quinine chloride. An amorphous precipitate appears (for all extracts).

Color reactions:

- to 2 ml of each extract was added 4 drops 1% solution of iron-ammonium alum. A dark blue color is formed, which indicated the presence of hydrolyzed tannins in each of the extracts.

- detection of tannins in the joint presence of both groups:To 1 ml of extracts were added 2 ml of 10% acetic acid and 1 ml of 10% lead acetate. White mud was formed, which indicates the presence of a small amount of condensed tannins in all extracts. When adding 5 drops 1% solution of iron, ammonium alum and 0.1 g of crystalline sodium acetate forms a dark blue color, which again confirms the presence in the aqueous extracts of hydrolyzed tannins. The obtained positive results of qualitative reactions indicated the presence of tannins in the leaves, bark of shoots and fruit of the pomegranate fruit.

The results of qualitative reactions indicate the presence of both hydrolyzed and, to a lesser extent, condensed tannins in aboveground organs.

4. DISCUSSIONS

The morphological and anatomical features of the structure of the fetal fetus, bark of shoots and pomegranate leaf plate were studied and their characteristic diagnostic features were revealed. During morphological examination of the fetal fetus color, odorless, astringent taste. Under the skin there are nests, separated by membranous light fleshy partitions with a smooth surface of light yellow color. Microscopic examination of the fetal fetus revealed that the cells of the outer epidermis of the exocarp are window-shaped, unevenly thickened, lie stepwise in different planes; collenchyma 2-3-row lamellar; the mesocarp is represented by a loose storage parenchyma, with single crystals of calcium oxalate and groups of scleroids (6 to 8), which have simple pores and characteristic layers on thick woody shells; cells of the inner epidermis from the surface, slightly elongated, slightly wavy with a cord-like unevenly thickened shells.

5. CONCLUSIONS

Morphological examination of the leaf blade revealed that the leaves are entire, simple, short-petiolate, leathery, entire, oblong-lanceolate, pointed to the base and blunt-pointed at the apex, with a sharply protruding vein on the underside, dark green, glossy on top 4 -6 cm long and 1-2 cm wide, astringent taste.

Microscopic examination of the leaf blade revealed that the upper epidermis consists of thick-walled, almost square cells. The cells of the lower epidermis are polygonal with slightly curved thickened membranes. Numerous elliptical stomata occur exclusively on the lower epidermis. The number of accompanying peritoneal cells from 3 to 5 (anocytic respiratory complex).

Phytochemical study of aqueous, water-alcohol and hydrogen chloride extracts of leaves, bark of shoots and fruit of pomegranate fruit for the presence of the main groups of biologically active substances revealed the content of a significant amount of tannins (in all studied organs).

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