

Essential Oils of Polygonum L. Plants Growing in Kazakhstan and Their Antibacterial and Antifungal Activity

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Abstract : Bioactive substances of plant origin can be one of the advanced means of solution to the issue of combined therapy to inflammation. The main advantages of medical plants are softness and width of their therapeutic effect on an organism, the absence of side effects and complications even if the used continuously, high tolerability by patients. Moreover, medial plants are often the only and (or) cost-effective sources of natural biologically active substances and medicines. Along with other biologically active groups of chemical compounds, essential oils with wide range of pharmacological effects became very ingrained in medical practice. Essential oil was obtained by the method hydrodistillation air-dry aerial part of Polygonum L. plants using Clevenger apparatus. Qualitative composition of essential oils was analyzed by chromatography-mass-spectrometry method using Agilent 6890N apparatus. The qualitative analysis is based on the comparison of retention time and full mass-spectra with respective data on components of reference oils and pure compounds, if there were any, and with the data of libraries of mass-spectra Wiley 7th edition and NIST 02. The main components of essential oil are for: Polygonum amphibium L. - γ -terpinene, borneol, piperitol, 1,8-cyneole, α -pinene, linalool, terpinolene and sabinene; Polygonum minus Huds. Fl. Angl. - linalool, terpinolene, camphene, borneol, 1,8-cyneole, α -pinene, 4-terpineol and 1-octen-3-ol; Polygonum alpinum All. - camphene, sabinene, 1-octen-3-ol, 4-carene, p- and o-cymol, γ -terpinene, borneol, β -terpineol; Polygonum persicaria L. - α -pinene, sabinene, β -terpinene, 4-carene, 1,8-cyneole, borneol, 4-terpineol. Antibacterial activity was researched relating to strains of gram-positive bacteria Staphylococcus aureus, Bacillus subtilis, Streptococcus agalacticae, relating to gram-negative strain Escherichia coli and to yeast fungus Candida albicans using agar diffusion method. The medicines of comparison were gentamicin for bacteria and nystatin for yeast fungus Candida albicans. It has been shown that Polygonum L. essential oils has moderate antibacterial effect to gram-positive microorganisms and weak antifungal activity to Candida albicans yeast fungus. At the second stage of our researches wound healing properties of ointment form of 3% essential oil was researched on the model of flat dermal wounds. To assess the influence of essential oil on healing processes the model of flat dermal wound. The speed of wound healing on rats of different groups was judged based on assessment the area of a wound from time to time. During research of wound healing properties disturbance of integral in neither group: general condition and behavior of animals, food intake, and excretion. Wound healing action of 3% ointment on base of Polygonum L. essential oil and polyethyleneglycol is comparable with the action of reference substances. As more favorable healing dynamics was observed in the experimental group than in control group, the tested ointment can be deemed more promising for further detailed study as wound healing means.

Keywords : antibacterial, antifungal, bioactive substances, essential oils, isolation, Polygonum L.

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