COMPARATIVE EVALUATION OF ANTIMICROBIAL ACTIVITY OF ESSENTIAL OILS OF PEPPERMINT, SALVIA OFFICINALIS, COTS PINE AND MELISSA OFFICINALIS

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Introduction: In recent years, numerous studies have shown the presence in essential oils of antibacterial, antifungal, antiviral, antitumor, antioxidant activity. This allows us to consider new options for creating alternative preparations from plant materials.

At present, a huge number of microorganisms, especially nosocomial strains, represent a serious problem for people's health due to the wide spread of multidrug resistance, which complicates the choice of adequate chemotherapy. One of the reasons for its formation is the massive use of antimicrobials, which is complicated by a number of side effects: dysbiosis, allergic reactions, formation of cross-resistance. In this regard, a constant search for new drugs with antimicrobial activity, but having a different mechanism of action compared with the known antibiotics, and deprived of side effects of antibiotics.

The basis for the creation of such drugs are ethereal-oil plants, which can exhibit antimicrobial activity. Such plants include: peppermint, common oregano, Salvia officinalis, yarrow, Melissa officinalis, common pine, almost all kinds of juniper and other ether-plants.

Aim: The purpose of our research was the study of the antimicrobial activity of essential oils of Peppermint, Salvia officinalis, Scots pine and Melissa officinalis for Staphylococcus aureus, Escherichia coli and Bacillus subtilis. Screening of the antimicrobial activity of essential oils was performed by a disco-diffusion method.

The 18 hour cultures of the test strains were incubated in a thermostat at a temperature of 37 ° C, suspended in sterile saline, to a concentration of 105 CFU / ml according to the McFarland turbidity standard. We evenly distributed 500 l of the suspension on the surface of the agar Mueller - Hinton for equitable growth. The essential oil was dissolved in 10% aqueous dimethylsulfoxide (DMSO) with the addition of Tween-80 and sterilized by filtration through membrane filters with a pore size of 0.45 nm. In sterile conditions, empty sterile disks 6.0 mm in diameter were impregnated with 50 μl of essential oil and applied to the surface of sown agar. For inspection, a disk impregnated with a suitable DMSO concentration was placed to monitor the solvent. The standard disk with gentamicin was used as reference

control. The dishes were left for 30 minutes at room temperature and then placed in a thermostat for 24 hours. The growth retardation zone was measured with a ruler.

Results: The results obtained demonstrate the presence of antimicrobial activity of all the essential oils studied, although the degree and spectrum of antimicrobial activity are different.

The most pronounced antimicrobial activity is found in the essential oils of peppermint, Salvia officinalis and Scots pine. The largest growth retardation zone was in peppermint and Salvia officinalis with respect to Staphylococcus aureus, a slightly smaller zone of growth retardation under the influence of these oils was in Bacillus subtilis. Weak antimicrobial activity was noted in relation to Staphylococcus aureus and under the influence of essential oils of Scots pine and Melissa officinalis.

On growth Escherichia coli essential oils of Scots pine, Melissa officinalis and Salvia officinalis had a lesser effect: the zones of growth retardation around the discs with oil of medicinal sage and Scots pine were insignificant, and around the disks with essential oil of Melissa officinalis - there were practically none. At the same time, the greatest activity under the influence of peppermint was noted in relation to staphylococci – the growth inhibition was observed on all the dishes.

Escherichia coli growth inhibition zones under the influence of peppermint essential oil were the most significant in comparison with the effect of other oils. The inhibition of the growth of Bacillus subtilis was also the greatest under the influence of peppermint oil. The obtained results indicate the presence of high antimicrobial activity of peppermint essential oil with respect to Staphylococcus aureus, Escherichia coli and Bacillus subtilis, which we took for the experiment.

Conclusions: Analysis of the results leads to the conclusion that Melissa officinalis exhibits the least antimicrobial effect with respect to the microorganisms under study, although it does exist. Essential oils of Salvia officinalis and Scots pine have antimicrobial activity against Staphylococcus aureus and against Escherichia coli, but their activity is lower in comparison with the antimicrobial effect of peppermint.

In this connection, it is of interest to further study the antistaphylococcal activity of essential oils with further determination of their minimum inhibitory concentration. These and other plant-ester-bearing plants grow on the territory of Ukraine and can become an excellent source of raw materials for the creation of effective antimicrobial agents.