

SOME QUESTIONS OF STANDARDIZATION OF ANTIMICROBIAL ACTIVITY OF EXTRACTS FROM PLANTS

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At the moment, there are still many blind spots in the field of standardization of herbal remedies, including those having antimicrobial activity. In normative documents of Ukraine, Europe, the United States, there is no assessment and evaluation criteria for antimicrobial activity testing of commercially available remedies, both synthetic and herbal ones, which certainly is a significant gap in standardization of antimicrobials.

The purpose of the research is to check antimicrobial activity of some natural and synthetic materials, and make the conclusion about the possibility of their use as a standard for testing of antimicrobial activity of herbal remedies.

Materials and methods. Substances of different groups have been selected for study purposes: flavonoids, tannins, alkaloids, triterpenes, anthraquinones, naphthoquinones, simple phenols, and xanthenes. Antimicrobial activity of drugs has been determined by the diffusion method of "wells" with diameter of microorganism growth delay zone. In order to evaluate antimicrobial activity of the formulations, the following six test strains of microorganisms have been used: *Staphylococcus aureus* ATCC 25923, *Escherichia coli* ATCC 25922, *Pseudomonas aeruginosa* ATCC 27853, *Proteus vulgaris* ATCC 4636, *Bacillus subtilis* ATCC 6633, and *Candida albicans* ATCC 885/653.

Results and discussion. Below there are the comparison results of antimicrobial activity of substances in order of descending. The following alcohol-aqueous solutions demonstrated medium-range antimicrobial activity: fluorescein 0.1% wt.; quinine 1.0% wt.; tannin 0.5% wt.; Alizarin 0.1% wt.; menadioni natrii bisulfis 1.0% vol.; and Vinpocetine 0.5% vol. The following alcohol-aqueous solutions showed

weak activity: glycyram 0.5% wt.; platyphyllin 0.2% vol.; gallic acid 0.5% wt.; Atropine 0.5% wt.; and papaverine 0.5% wt. The following alcohol-aqueous solutions demonstrated low activity: scopolamine 0.5% wt.; routine 0.5% wt.; baicalin 0.1% wt.; baicalein 0.5% wt.; quercetin 0.1% wt.; and escin 0.1% vol.

As it can be seen, the most active of the alcohol-aqueous solutions studied are fluorescein (a representative of synthetic xanthenes) and alizarin (a representative of synthetic anthraquinones) at a concentration of 0.1 % wt., followed by the solutions of tannin (a tannin representative) and vinpocetine (alkaloid) at a concentration of 0.5% wt., then the solutions of quinine (alkaloid) and menadioni natrii bisulfis (a representative of synthetic naphthoquinones) at a concentration of 1.0%wt., solutions of platyphyllin (alkaloid), glycyram (triterpene saponins), gallic acid (simple phenol), atropine, and papaverine (alkaloids) are promising, if the concentration of solutions of these substances is not less than 1.0% wt.

These data show that plant extracts, in which concentration of these substances is equal to or larger than those indicated above, will have middle-range antimicrobial activity, which may be indicative of their antimicrobial potential.

In general, solutions with a concentration of the substance to be 1.0 % wt., but not less than 0.1 % wt, may be selected as a standard for antimicrobial activity.

Data of our research can be used not only for standardization of extracts by the diffusion method of "wells", but also, in the long term, by combining thin-layer chromatography and microbiological diffusion method in serial - bioautographic method of analysis. This will identify the specific substance exhibiting antimicrobial activity in the extract and standardize it exactly according to it.

However, realization of this method requires a lot of research to identify optimal parameters of the process of analysis conducting, both as for chromatographic conditions and microbiological conditions.

Conclusions. Antimicrobial activity of several classes of compounds has been investigated. The most active antimicrobial agents have been selected. The prospects of combination of chromatographic and microbiological methods of analysis in the analysis of integrated drugs from plants have been demonstrated.