EVALUATION OF ANTIBACTERIAL PROPERTIES AND PHYTOCHEMICAL COMPOSITION OF *ARTEMISIA DUBIA* WALL. EXTRACTS

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An excellent alternative to synthetic and chemical plant protection products are biological pesticides of natural origin made from plant extracts and/or essential oils. *Artemisia dubia* Wall. is a perennial herbaceous plant rarely found in Lithuania. The plant is mainly used for energy purposes due to its ability to accumulate large amounts of biomass in a short time [1]. *Artemisia dubia* Wall. belongs to the genus *Artemisia*, which is widely known for its valuable phytochemical properties [2], making it an attractive object for biotechnological research. The aim of this research was to evaluate the effect of different solvents (bidistilled water, methanol, ethanol, Urea, Triton X-100, sodium dodecyl sulfate (SDS)) on the extraction of bioactive compounds from *Artemisia dubia* Wall. plant and to determine antibacterial activity of the extracts. If the hypothesis that *Artemisia dubia* Wall. extracts indicate antibacterial activity would be confirmed, the extracts of this plant could be used to produce biological pesticides in the future. Replacing chemical plant protection products with biological ones is a strategic step in implementing the European Green Course program and reducing the environmental pollution.

Plant material was grown and collected at Lithuanian Research Centre for Agriculture and Forestry in Kedainiai district. Extracts of dried *Artemisia dubia* Wall. were prepared using ultrasound-assisted extraction method. Total polyphenol content (using Folin-Ciocalteu reagent), total flavonoids (using $AlCl_3$ reagent), total phenolic acids (using Arnow reagent) and radical scavenging activity (using DPPH reagent) were evaluated using spectrophotometric methods. Antibacterial activity was evaluated using agar well diffusion method against 5 different bacteria: *Salmonella typhimurium, Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus and Bacillus subtilis*.

The largest amount of phenolic content was determined in 2% Triton X-100 extracts – 98.4±9.29 RE mg/g, while the smallest amount was found in 1% Urea extracts – 39.7±2.78 RE mg/g. The largest amount of phenolic acids was determined in 5% Urea and 25% Ethanol extracts, respectively 53.4±3.42 and 55.7±3.39 CAE mg/g, while the smallest amount was obtained in 75% ethanol extract – 20.1±1.60 CAE mg/g. Six extracts indicated similar highest antioxidant activity, ranging from 78.6±7.28 to 86.9±3.01% per 0,5g of plant material, while 10% Urea extracts indicated smallest antioxidant activity – 22.8±1,49% per 0,5g of plant material. The largest amount of flavonoids were obtained in surfactants, ranging from 77.7±1.21 to 128.3±6.69 RE mg/g, while the smallest amount was obtained in bidistilled water and 1% Urea extracts, respectively 29.6±1.51 and 26.6±2.12 RE mg/g. The strongest antibacterial activity was observed in extracts prepared with surfactants, where *Bacillus subtilis* was most susceptible to 2% SDS extracts.

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References

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