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LITHUANIAN RESEARCH CENTRE FOR AGRICULTURE AND FORESTRY

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

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INTRODUCTION

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 mainly used for energy purposes due to its ability to accumulate large amounts of biomass in a short time and is known for its valuable phytochemical properties. 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.

METHODS

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.*

RESULTS

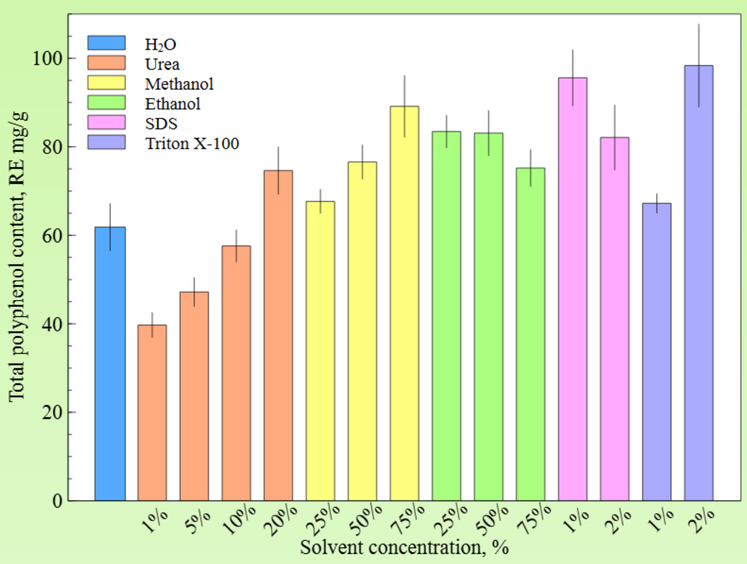

Figure 1. Total polyphenol content. RE – rutin equivalent.

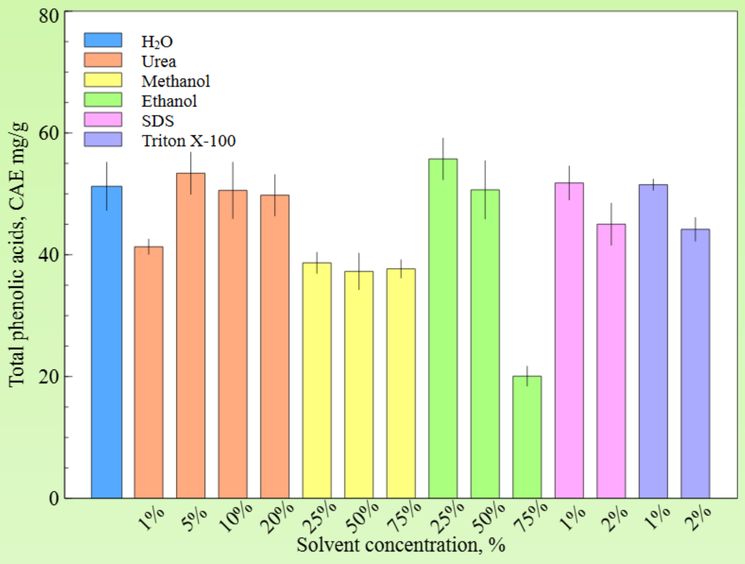

Figure 2. Total phenolic acids. CAE – caffeic acid equivalent.

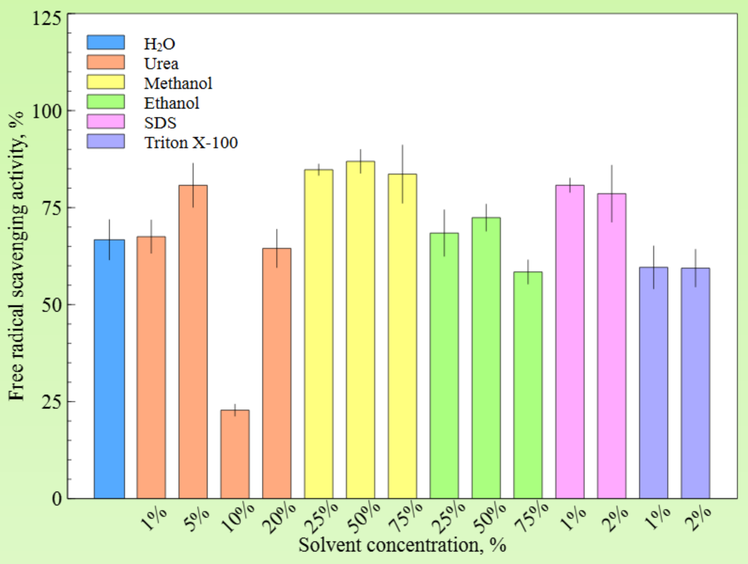

Figure 3. Free radical scavenging activity.

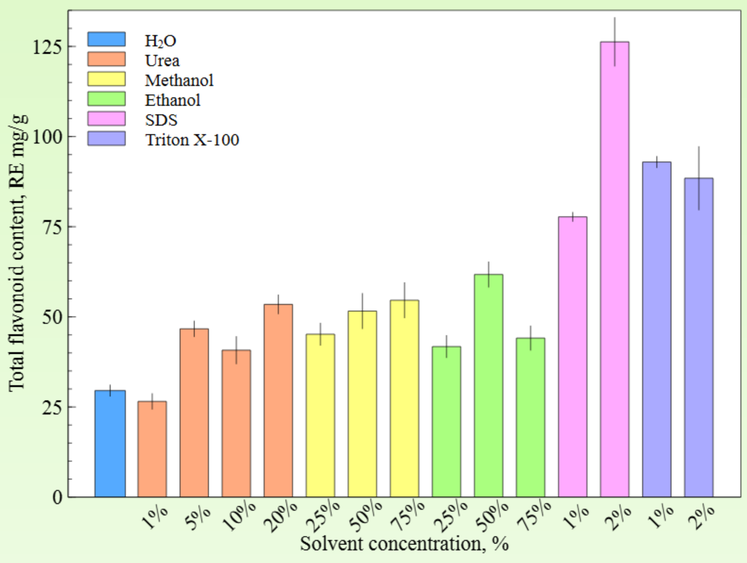

Figure 4. Total flavonoid content. RE – rutin equivalent.

Solvent	Urea		Methanol		SDS		Ethanol		Triton-100X	
Concentration	10%	20%	50%	75%	1%	2%	50%	75%	1%	2%
Escherichia coli	Resistant	Resistant	Resistant	Resistant	Resistant	Resistant	Resistant	Resistant	Resistant	Resistant
Pseudomonas aeruginosa	Resistant	Resistant	Resistant	Resistant	Resistant	Resistant	Resistant	Resistant	Resistant	**Susceptible**
Bacillus subtilis	Resistant	Resistant	Resistant	Resistant	**Susceptible**	**Very susceptible**	Resistant	Resistant	**Slightly susceptible**	**Slightly susceptible**
Staphylococcus aureus	Resistant	Resistant	Resistant	Resistant	**Susceptible**	**Susceptible**	Resistant	Resistant	**Susceptible**	**Slightly susceptible**
Salmonella typhimurium	Resistant	Resistant	Resistant	Resistant	Resistant	**Slightly susceptible**	Resistant	Resistant	Resistant	Resistant

Figure 5. Antibacterial activity.

CONCLUSIONS

The largest amount of phenolic content was determined in 2% Triton X-100 extracts – 98.4±9.29 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. Six extracts indicated similar highest antioxidant activity, ranging from 78.6±7.28 to 86.9±3.01% per 0.5g of plant material. The largest amount of flavonoids were obtained in surfactants extracts, ranging from 77.7±1.21 to 128.3±6.69 RE mg/g. It is likely that higher amount of flavonoids correlate with antibacterial activity. Obtained results indicate that the strongest antibacterial activity was determined in extracts prepared with surfactants, where *Bacillus subtilis* was most susceptible to 2% SDS extracts.

ACKNOWLEDGEMENTS

This research was carried out under EU structural funds grant No. 09.3.3.-LMT-K-712-24-0188.

Kuriame Lietuvos ateitį

2014–2020 metų Europos Sąjungos fondų investicijų veiksmų programa