

Title: In vitro growth-inhibitory effect of plant-derived extracts, compounds and their derivatives against medical importance bacteria

Autors: Smid F., Kudera T., Rondevaldova J., Kokoska L.

Institution:

¹Department of Crop Sciences and Agroforestry, Faculty of Tropical AgriSciences, Czech University of Life Sciences Prague, Kamycka 129, 165 21 Prague 6, Czech Republic

Resume:

Diarrhea is a common cause of death in developing countries and the second most common cause of infant deaths worldwide. Since the conventional diarrhea therapies such as antibiotics are known to produce various adverse effects and their availability in developing countries is limited, the plant-derived medicines and plant extracts are considered as possible alternative therapy of diarrhea treatment. Therefore, the objective of this research was to investigate *in vitro* growth-inhibitory effect of plant extracts, compounds and their derivatives.

The minimum inhibitory concentrations (MICs) of ethanoic extracts from eight plant species (*Alphina oxyphyla*, *Berberis aristata*, *Embllica officinalis*, *Hydrastis canadensis*, *Mallotus philippinensis*, *Ocimum kilimandscharicum*, *Quercus rubur* and *Santalum album*), twelve plant-derived compounds (aloe emodin, anthrachinon, capsaicin, curcumin, naringenin, norhydrogenic acid, pterostilbene, resveratrol, rhein, rutin, sanguinarine and trihydroxyisoflavone) and one plant compound derivative (zinc pyrithione) were determined by the broth microdilution method against diarrhea causing bacteria *Enterococcus faecalis*, *Escherichia coli*, *Listeria monocytogenes* and *Salmonella Enteritidis*. Moreover MICs of plant extracts were determined against *Campylobacter jejuni* and *Clostridium perfringens*.

In case of compounds tested, the best results were obtained for zinc pyrithione with the MIC 4 µg/mL followed by sanguinarine with MICs ranking from 16 to 32 µg/mL, both compounds for all tested bacterias. Moderate antibacterial effect has been observed for rhein and pterostilbene on *Enterococcus faecalis* with the MICs 32 and 64 µg/mL, respectively. In contrast to the previously reported growth-inhibitory effect of sanguinarine on *Enterococcus faecalis*, according to our best knowledge, there are no reports on antibacterial effect of zinc pyrithione, a compound used in treating dandruff and seborrheic dermatitis, on representatives of diarrhea causing bacteria. With exception of *S. album*, which produced moderate antibacterial effect against *E. faecalis* (MIC = 256 µg/mL) and *L. monocytogenes* (MIC = 512 µg/mL), none of the extracts tested exhibited significant growth-inhibitory effect against diarrhea causing bacteria in this study.

Keywords: diarrhea, antimicrobial activity, plant compounds, MIC, ethanoic extracts

Acknowledgements: This research was supported by CIGA 20142014 and IGA.20155012.