Innovative Approach to the Antibacterial and Prebiotic Lycium barbarum Extract: Solution after the Antibiotic Era

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Pseudomonas aerugniosa is one of the most common and often fatal nosocomial bacterium. Extracts from the herb Lycium barbarum were prepared for antimicrobial testing, using different extraction methods. The Kirby-Bauer disk diffusion test was carried out to detect the solutions' antimicrobial efficacy against pathogenic bacteria, including P. aeruginosa. The strains were used in testing on gut microbes included: Lactobacillus acidophyllus, Bifido longum and Escherichia coli, Enterococcus faecalis. The quantitative identification of the complex compound groups was performed using 1200 Agilent LC-MS (Liquid Chromatography - Mass Spectrometry), detecting in ESI (Electrospray Ionization) positive mode. The samples were purified and fractioned on preparative HPLC. The prepared solution extracted with a new method, exhibited a significant inhibition against P. aeruginosa compared to the control antibiotic in use today (diameter: 26 mm - 18 mm, this result has first been observed), while it had no inhibitory effect on commensal bacteria, but encouraged their growth (performed 100x growth). The analytical mapping and identification of the major antimicrobial complex groups was carried out. One of the isolated fractions exhibited most potent antimicrobial activity which was synergistically enhanced when combined with other fractions. The method for this solution preparation can be applied with other plants. Along with the nine identified innovations in the project, antibiotics which lost effectiveness over time might be revived. These results demonstrate a novel extraction way of plant-based compounds and their effectiveness in the treatment of P. aeruginosa.

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