

Biochemical Composition and Antimicrobial Activity of Some Plants in Mongolia

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Abstract

The antimicrobial activities of the methanol, butanol, ethylacetate, ethanol and chloroform extracts obtained from three different plant species of the Mongolian Gobi desert are evaluated by means of the disc diffusion method against eight species of bacteria. Extracts of *Ammopiptanthus mongolicus* demonstrated antibacterial activity against three species of microorganisms. Only butanol extract of *Incarvillea potaninii* demonstrated antibacterial activity against 3-5 species of microorganisms. The methanol and butanol extracts of *Gymnocarpus przewalskii* demonstrated antibacterial activity against five species. All extracts of three plant species did not demonstrate antibacterial activity against *Pseudomonas aeruginosa* and *Aspergillus niger*. In addition, we determined some biologically active substances, pH, vitamin P, raw oil, flavonoid, alkaloid and anthraglycoside in aboveground parts of these plants.

Key words: antimicrobial activity, biochemical composition, inhibition zone

Introduction

The desert zone occupies 19.1% of the Mongolian territory, of which 6.2% belongs to the semi-desert or desert-steppe, 9.2% to the typical desert and 3.7% to the extreme arid desert. The climate in Gobi desert is very extreme continental with annual precipitation of 50-100 mm. Flora of Gobi desert contains many rare and endemic species, such as *Populus diversifolia*, *Incarvillea potaninii*, *Ammopiptanthus mongolicus*, *Halimodendron halodendron* etc. (CBD Fourth National Report-Mongolia, 2009; Grubov, 1961, 1982; Bobrov, 1969).

Some researchers purified many kinds of antifreeze proteins (AFP) with high activity from the leaves of *A. mongolicus*. The antifreeze activities of these AFPs were measured by both osmometry and differential scanning calorimetry, and the inhibition of growth of ice crystals by the AFP was obvious. Additionally, the AFPs have been analyzed by sequencing, glycosylation reaction, mass spectroscopy, and circular dichroism spectroscopy. Both samples expressed some other unique structures different from those

of fish and insects. It was suggested that plant AFPs might have a particular antifreeze mechanism in comparison with that of fish and insects (Fei et al., 2008).

This decrease was induced by one of the alkaloids isolated from *A. mongolicus*, which grows in the Gobi desert. Alkaloid lessened the formation of FMNC with DETC both in the control animals and in those treated with lipopolysaccharide from *E. coli* initiating inflammation processes and intensification of NO synthesis. Proceeding from the data obtained the authors suggested that free radicals reacting with the antioxidant affect NO formation by increasing the level of free calcium in the cell (Burgebazar et al., 1991).

The antibacterial and antifungal activities of methanol, ethylacetate, hexane, butanol, ethanol, water and chloroform extracts of *Empetrum sibiricum* V.Vassil were assayed. The different extracts have been individually tested against a panel microorganisms including *Staphylococcus aureus*, *Enterococcus faecalis*, *Micrococcus luteus*, *Escherichia coli*, *Bacillus cereus*, *Aspergillus niger* and *Saccharomyces cerevisiae* (Battsetseg & Sukhdolgor, 2008).