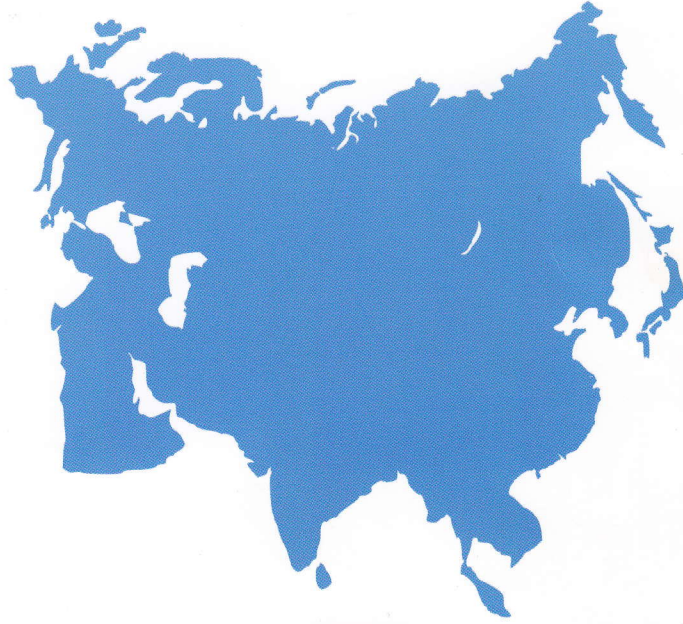

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Determination of Reducing Power and Minimum Inhibitory Concentration of *Crocus alata* Extracts

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Aim of the study: *Crocus alata* is an early spring ephemeral and geophytic-geocarpic species that grows in subalpine areas of the northern and western Tianshan Mountains. It is an endemic of Kazakhstan flora belonging to the group of bulbous and tuberous plant. It is interested as a source of naturally active substances that have many useful biological properties. The species has been used as spasmolytic, anti-inflammatory, bactericidal, antiviral and diuretic agents and to treatment of some diseases. The purpose of this study is to investigate antioxidant and antimicrobial properties of the methanol and ethanol extracts of *C. alata*.

Material and Methods: Aerial part and bulbs of *C. alata* were collected in Almaty region during the flowering phase. The air dried and powdered samples were extracted with methanol and ethanol. Reducing Power assay. The extract (0.75 ml) of various concentrations (0.2-1.2 mg/ml) was mixed with 0.75 ml of phosphate buffer (0.2 M, pH 6.6) and 0.75 ml of potassium hexacyanoferrate, followed by incubation at 50°C for 20 min. Then was added 0.75 ml of trichloroacetic acid solution (10%) and mixture centrifuged at 800 g for 10 min. 1.5 ml of the obtained supernatant was mixed with 1.5 ml of distilled water and 0.1 ml of ferric chloride (FeCl₃) solution (0.1%) for 10 min. The absorbance of reaction mixture was taken at 700 nm. Four bacterial strains including gram-positive *Staphylococcus aureus* ATCC 25923, *Bacillus cereus* RSKK 863 and gram-negative *Escherichia coli* ATCC 25922, *Proteus vulgaris* ATCC 33420 were used for evaluation of minimum inhibitory concentration (MIC) of the extracts. MIC was carried out in 96-well plates using Tryptic soy broth. Extracts at the final concentrations of 2 µg/ml, 4 µg/ml, 8 µg/ml, 16 µg/ml, 32 µg/ml, 64 µg/ml, 128 µg/ml, 256 µg/ml were examined.

Results: Reducing power of *C. alata* extracts increased with concentration. The highest reducing power was observed in methanol extract from aerial part. Ethanol extract from aerial part showed stronger reducing power than methanol and ethanol extracts from bulb, when both extracts from bulb showed the same activity. The extracts of *C. alata* showed varying degree of antimicrobial activity. MIC against different bacteria ranged from 2 µg/ml to 16 µg/ml. The methanol extracts were most effective than the ethanol extracts. Methanol extracts from bulb presented same MIC (2 µg/ml) against *E. coli*, *P. vulgaris* and *S. aureus*. *E. coli* and *B. cereus* were also susceptible (MIC 2 µg/ml) to the methanol extracts from aerial part than *P. vulgaris* and *S. aureus* (MIC 4 µg/ml and 16 µg/ml, respectively). MIC of the methanol extract from bulb estimated 4 µg/ml for *B. cereus*. Among the tested bacteria only *S. aureus* was susceptible to the ethanol extracts from aerial part and bulb with 2 µg/ml and 4 µg/ml MIC, respectively. Ethanol extracts did not show any activity against *B. cereus*, *P. vulgaris* and *E. coli*. The extracts from aerial part of *C. alata* have a high reducing power potential and some degree of antibacterial activity.

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Keywords: *Crocus alata*, extract, reducing power, antibacterial, MIC.