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Biochemical assessment of extract from *Oxalis corniculata* L.: Its role in food preservation, antimicrobial and antioxidative paradigms using *in situ* and *in vitro* models

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Food poisoning, often due to microbial contamination and improper storage practice, is a matter of concern. Plants and plant based products are gaining interest in processed food in food industry as an alternative to synthetic antimicrobials. In this context, here, we analysed flavonoid rich methanolic extract from the creeping woodsorrel, *Oxalis corniculata* L. leaf for its biochemical assessments along with its bioactivity against some common pathogenic bacteria. The bioactivity of the extract as evaluated in both *in vitro* and *in situ* methods, verified that the *Oxalis corniculata* leaf extract exert reduces power, hydroxyl radical scavenging activity, inhibition in liposome peroxidation, and DPPH free radical quenching activity. The extract also inhibited the formation of peroxide during subsequent storage in the oil-emulsion system as well as in heated oil. The greater reducing activity of the extract prevented hydroxyl radical induced pUC18 DNA strand breaks and thereby retain its original conformation. The extract also prevented the oxidative damage of goat liver cells during Fenton reaction. *In vitro* antimicrobial experiments implied that extract has inhibitory effect against *Staphylococcus aureus*, *Escherichia coli*, *Salmonella* Typhi, *S.* Typhiimurium and *Vibrio cholera*. *E. coli* showed the highest and *V. cholera* the lowest sensitivities against the extract. Moreover, the extract can be utilized for preservation of fish meat as it prevented the growth of food poisoning bacteria *S. aureus* during storage at 10°C. HPLC chromatogram detected the predominance of three active principal components, i.e. flavonoids in the following order: rutin>p-hydroxybenzoic acid>ferulic acid.

Keywords: Antimicrobial, Creeping woodsorrel, Ferulic acid, Flavonoid, Food preservation, Hydroxybenzoic acid, ROS, Rutin, Storage