

# Biologically Active Constituents of a Polyphenol Extract from *Geranium sanguineum* L. with Anti-Influenza Activity

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From the aerial roots of the medicinal plant *Geranium sanguineum* L. a polyphenol-rich extract with strong anti-influenza activity has been isolated. To investigate its active fractions, the extract was partitioned by solvents with increasing polarity. The *n*-BuOH fraction contained the majority of the *in vitro* antiviral activity; the EtOAc fraction was the most effective one *in vivo*. A bioassay-directed fractionation of the *n*-BuOH and EtOAc fractions was performed to obtain information about the nature of the chemical components of the plant extract, responsible for the antiviral effect. The individual constituents were identified by spectroscopic methods and comparison with authentic samples and by HPLC. The cell-toxic and virus-inhibitory effects of the fractions and some individual polyphenol compounds, found in *Geranium sanguineum* L., were studied using the replication of representative influenza viruses in cell cultures. This study showed that the presence of a variety of biologically active compounds as well as the possible synergistic interactions between them seem to be decisive for the overall antiviral effect.

**Key words:** Bioassay-Guided Fractionation, *Geranium sanguineum*, Antiviral Activity