

Assessment of the Phenolics Content in *Epilobium angustifolium* and *Epilobium hirsutum* Extracts and Their Pharmacological Activity

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ABSTRACT

The recent outbreak of Omicron strains of coronavirus disease urged the search for novel treatments from natural products such as *Epilobium* species. The present work reports a comparative HPLC-DAD study of the polyphenolic composition of the crude extracts of *Epilobium angustifolium* and *Epilobium hirsutum*. Oenothien B, gallic acid, hyperoside, and isoquercetin were the dominant phenolic compounds. *E. hirsutum* methanol extract showed a high radical scavenging activity as demonstrated by the HPLC-ABTS assay due to its richness in phenolic compounds. The polysaccharide-rich extracts and water extracts of *E. hirsutum* showed potent anti-coronavirus SARS-CoV-2 activity against the Omicron strain at 10 µg/mL with inhibition percentages of 38.4% and 46.1%, respectively. In contrast, the methanol (50% v/v) extract was inactive. Rutin and chlorogenic acid docked well into the binding pocket of the coronavirus spike protein. Emerging evidence suggests that suppressing excessive neutrophilic inflammation during the late stage of coronavirus infection benefits patients' survival. The methanol extracts of both plants completely inhibited fMLF/CB-induced elastase release in human neutrophils at 10 µg/mL (IC₅₀ 2.44 µg/mL), while the water extract showed an IC₅₀ of 5.67 µg/mL. While several compounds docked well into the spike protein, the major and marker compound oenothien B showed promising in vitro anti-coronavirus activity with an IC₅₀ of 6.08 µM in hACE2-overexpressing HEK293 cells, mimicking the entry of wild-type SARS-CoV-2 into human host cells. The results indicated that *E. hirsutum* might be helpful in the treatment of coronavirus infections and related inflammatory syndromes.

Conflicts of Interest

The authors declare no conflicts of interest.

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