
Allelopathic potential and growth inhibitory substances in *Rumex maritimus* L.

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Abstract

Rumex maritimus (Polygonaceae) is an annual herbaceous plant distributed in North American, European and Asian countries. Although the medicinal values of *R. maritimus* are widely known, but there has yet been no report that addresses its allelopathic activity. Therefore, we explored allelopathic potential of *R. maritimus* to search allelopathic substances. The aqueous methanol extracts of *R. maritimus* were applied on the growth of cress, lettuce, alfalfa, rapeseed, barnyard grass, Italian ryegrass, timothy and foxtail fescue at four different concentrations. The extracts had inhibitory effects on the shoot and root growth of test plants, and the inhibition was increased with increasing extract concentration. These results suggest that the aqueous methanol extracts of *R. maritimus* possess allelopathic properties and may contain allelopathic substances. The extracts were then adjusted to pH 7.0 with 1N NaOH, partitioned against an equal volume of ethyl acetate. The ethyl acetate fraction was subsequently purified by several chromatographic steps and three growth inhibitory substances were identified by spectral data as 2-methoxystypandrone, altechromone A and 5,7-dihydroxyphthalide. At the concentrations of 3, 10 and 300 μM , the 2-methoxystypandrone, altechromone A and 5,7-dihydroxyphthalide inhibited 70.1, 65.3, 66.3% and 67.5, 87.1, 70.0% of shoot and root growth of cress compare to the control, respectively. The concentrations required for 50% shoot and root growth inhibition of cress for 2-methoxystypandrone, altechromone A and 5,7-dihydroxyphthalide were ranged from 5-12, 662-1410, 1730-2482 μM , respectively. Therefore, it is suggested that the growth inhibitory activities of *R. maritimus* on the test plants may be caused due to the presence of 2-methoxystypandrone, altechromone A and 5,7-dihydroxyphthalide in the *R. maritimus* extracts. This is the first report of having allelopathic substances in *Rumex maritimus*.

Keywords: allelopathy, *Rumex maritimus*, aqueous methanol extract, plant growth inhibitor

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