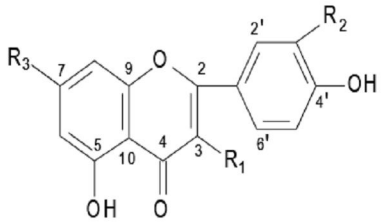

Isolation and structure elucidation of antioxidant compounds from leaves of *Laurus nobilis* and *Emex spinosus*.

Compounds	R_1	R_2	R_3	$[M]^+$	MF	UVλ(nm)/MeOH
A	OH	H	OH	286	$C_{15}H_{10}O_6$	265, 365
B	*O*-rhamnosyl	H	OH	432	$C_{21}H_{20}O_{10}$	265, 350
C	*O*-rhamnosyl	H	*O*-rhamnosyl	578	$C_{27}H_{30}O_{14}$	265, 350
D	H	OH	OH	286	$C_{15}H_{10}O_6$	250, 350
E	*O*-rutinosyl	OH	OH	610	$C_{27}H_{30}O_{16}$	265, 360

Abstract

In recent years, there has been increasing interest in finding naturally occurring antioxidants from plants for use in food and medicinal materials to replace synthetic antioxidants since such antioxidants are being restricted due to their side effects like carcinogenicity. The aim of this work was to examine the *in vitro* antioxidant activity of *Laurus nobilis* and *Emex spinosus* leaves and to isolate and structurally elucidate the active compounds in those leaves. The aqueous ethanolic extracts (70%) of *Laurus nobilis* and *Emex spinosus* leaves exhibited free radical scavenging action against 1,1-diphenyl-2-picrylhydrazyl (DPPH). Their concentrations of 50% inhibition (IC_{50}) were 25.3 and 20.73 µg/mL, respectively. Activity-guided separation of these extracts using a combination of different chromatographic methods (TLC and column chromatography) resulted in the isolation of five chromatographically pure compounds (three from *Laurus nobilis* and two from *Emex spinosus* leaves). Spectroscopic methods (^1H, ^{13}C-NMR, UV and MS) and chemical methods (detection tests and acidic hydrolysis) revealed the isolated antioxidant compounds to be flavonoid substances that were identified as kaempferol, kaempferol- 3-rhamnopyranoside, and kaempferol-3,7- dirhamnopyranoside from *Laurus nobilis* extract and luteolin and rutin from *Emex spinosus* extract. The five flavonoids had varying ability to inhibit DPPH radicals (IC_{50} from 4 to 35.8 µg/mL). Luteolin and rutin had strong scavenging action with an IC_{50} of 4 and 4.6 µg/mL, respectively, and this action was stronger than that of synthetic antioxidant BHA, *i.e.,* butylated hydroxyanisole (IC_{50} = 5.6 µg/mL).