# FLAVONOIDS OF CIRSIUM ARVENSE

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From the flowers of Cirsium arvense (Canada thistle) previously treated with chloroform we have obtained an ethanolic extract. By separating this on a polyamide sorbent we have isolated four individual flavonoid substances.

**Substance I**, $C_{15}H_{10}O_5$. Mp 349–351° C (from ethanol), $\lambda_{max}$ 270 and 336 mμ. For the acetate mp 183–185° C, $R_f$ 0.86 [benzene–ethyl acetate–acetic acid (formamide) (24.5 : 73.5 : 2)]. The constants of I correspond to those of apigenin [1].

**Substance II**, $C_{15}H_{10}O_6$. Mp above 300° C, $\lambda_{max}$ 268 and 352 mμ. For the acetate mp 224–226° C, $R_f$ 0.63 [benzene–ethyl acetate–acetic acid (formamide) (24.5 : 73.5 : 2)]. This substance is identical with luteolin.

**Substance III**, $C_{21}H_{20}O_{10}$. Mp 222–225° C, $\lambda_{max}$ 268 and 333 mμ, $[\alpha]_D$ −62.2° (dimethylformamide), $R_f$ 0.77 [butan-1-ol–acetic acid–water (4 : 1 : 5)]. The hydrolysis of III with 10% $H_2SO_4$ gave an aglycone $C_{15}H_{10}O_5$ with mp 349–351° C, identical with substance I.

In the mother liquor after hydrolysis, D-glucose was detected by paper chromatography. On the basis of the hydrolysis products, and UV and IR spectra, substance III was characterized as apigenin 7-glucoside [2].

**Substance IV**, $C_{27}H_{30}O_{14}$. Mp 250–260° C, $\lambda_{max}$ 268 and 333 mμ, $R_f$ 0.55 [butan-1-ol–acetic acid–water (4 : 1 : 5)]. The hydrolysis of IV with 10% $H_2SO_4$ gave an aglycone with mp 349–350° C identified as an apigenin (UV and IR spectra, $R_f$, mp).

D-Glucose and L-rhamnose were identified by paper chromatography. The constants of substance IV correspond to roifolin (apigen 7-rhamnoglucoside).

## REFERENCES

1. Ya. K. Yatsyuk and S. S. Lyashchenko, KhPS [Chemistry of Natural Compounds], 5, 54, 1969.
2. T. A. Geissman, The Chemistry of Flavonoid Compounds, Pergamon Press, New York, 227, 1962.

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