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Flavanol from flower's of Nymphaea stellata willd

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ABSTRACT

Nymphaea stellata willd is a large, perennial aquatic herb with a short ovoid, acute root stock found in ponds and ditches throughout the warmer parts of India belonging to family Nymphaeaceae and is reputed in Indian system of medicine. Material (Flower's) was collected in the months of August and September from the Rishikesh area of Uttarakhand. Extraction was done with EtOH and EtOAc. Flavanol glucosides was isolated by column chromatography over silica gel (Merck 60-120 mesh) using eluting solvent Ethyl acetate : methanol : water (25:4:3). The compounds were characterized by various chemical and spectroscopic techniques.

KEYWORDS

Nilotpal;
Nilkamal;
Kumuda;
Chemical analysis.

INTRODUCTION

Nymphaea stellata willd is a large perennial aquatic herb belonging to Nymphaeaceae family and is reputed in Indian system of medicine used in coughs and hysteria, syrup of the flowers is useful in high fevers, heart apoplexy and inflammatory diseases of the brain. Haq et. al.[1] have studied on the hot water soluble polysaccharides from the flowers of Nymphaea stellata willd. Flowers of other species (Nelumbo nucifera) of Nymphaeaceae family are used for ornament[2-4], extracts of flower has antidiabetic effect[5]. Jambhor et. al.[6] have isolated the different flavanol glycosides i.e., quercetin 4'-beta-xyloside, quercetin-3-galatoside and 3-methyl quercetin-3'-beta-xyloside from the flowers of Nymphaea alba.

EXPERIMENTAL

The air dried and coarsely powdered flower's of Nymphaea stellata willd (1.5 Kg.) was extracted with 95% alcohol (4 X 12 Hrs.). the yellowish extract (4 Lit.) was concentrated under reduced pressure. The concentrated solution was reduced and divided into ethyl acetate soluble and insoluble part. Ethyl acetate soluble part concentrate gave two yellow spots on paper chromatography but yielded no appreciable amount for analysis. The insoluble part (100 gm) was column chromatographed over silica gel (Merck 60-120 mesh) and eluted with solvent of increasing polarity. Elution of the column with ethyl acetate: methanol (25:4) afforded compounds A and B, purified by crystallization from ethanol.

RESULTS AND DISCUSSION

Characterization of compound A

Compound A was identified as Kaempferol-3-D-glucoside having m.p. 176-178^{0}C, showed single spot on TLC. It gave deep red colour with Mg-HCl (Shinoda

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test[7]) and bluish pink colour with Zn-HCl, the characteristic reactions of the flavanoids, brownish red colour with alcoholic $FeCl_3$ and positive Molish test for carbohydrate. It was yellow green in UV and dark yellow in UV/NH_3 and gave yellow colour with alkalies. These colour reactions indicated the compound to be a flavanol glycoside. On acid hydrolysis, the compound gave aglycone, m.p. 276-78^0 C (identified as Kaempferol by UV, m.m.p., Co-IR and Co-Pc) and D-glucose (identified by Co-Pc) in equimolar proportion indicating it to be a monoglucoside. The glucoside also underwent hydrolysis with almond emulsion revealing the β-linkage of the glucose moiety.

The UV spectrum of the compound showed the absorption at λ_{max} (MeOH) 265, 355 nm and absorption in infrared spectrum at υ_{max} (KBr) 3400-3200, 2920, 1655, 1610, 1570, 1515, 1450 (aromatic C=C), 1350, 1310, 1240, 1210, 1165, 1140, 1110, 1005, 875, 820, 800 cm^{-1}, which were comparable to those of flavanol glycoside (Kaempferol-3-glycoside). The above chemical and spectral analysis identified the compound as Kaempferol-3-0--D-glucoside.

Characterization of compound B

Compound B was identified as Quercetin-3-D-glucoside having m.p. 234-36^{0}C. It gave green colour with $FeCl_3$, orange-red colour with Mg-HCl and positive Molish test for carbohydrate. It was dull brown in UV changing to bright yellow when exposed to UV/NH_3. These reactions revealed the compound to be a flavanol glycoside. On acid hydrolysis the compound gave quercetin, m.p. 316^{0}C (identified as Quercetin by UV, m.m.p., Co-IR and Co-Pc) and D-glucose (identified by Co-Pc) in equimolecular proportion indicating it to be a monoglucoside. The glucoside also underwent hydrolysis with almond emulsion revealing the -linkage of the glucose moiety. The compound B was identified as Quercetin-3-0- -D-glucoside on the basis of chemical and spectral analysis.

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