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NOTE

Studies on the Flowers of *Asystasia gangetica*

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Fresh flowers of *Asystasia gangetica* (Linn) (Acanthacea) have been extracted with 80% ethanol. The aqueous concentrate on fractionation with various solvents yielded luteolin 7-O-neohesperidoside which has been characterised by chemical and physical techniques. The crude aqueous extract as well as the isolate have been investigated for the anti-inflammatory activity by *in-vivo* and *in-vitro* studies. From the results the anti-inflammatory activity of *Asystasia gangetica* could be correlated to the presence of luteolin 7-O-neohesperidoside.

Asystasia gangetica (Linn.) T. Anders (Syn. *A. coromondeliana* Wight ex Nees; *A. violocea* Dalz. non C.B. Clarke) is an erect herb found in peninsular India cultivated in the gardens for ornament. It belongs to the family Acanthacea. The amino acid and vitamin content of this plant have been quantitatively evaluated. The plant is used as antipruritic. The juice of this plant is used in swellings, worms and rheumatism. The leaves and flowers may be used as an intestinal astringent[1]. Flowers of the plant from Royal Botanical Gardens, Kew, U.K. contained luteolin, luteolin 7-O-glucoside and isosalispuroside[2]. The flowers from Pondicherry contained only the first two compounds[3]. The flowers of this plant have been re-investigated for their polyphenolic constituents.

Fresh flowers of *A. gangetica* (2 kg) collected in and around Kannivadi of Dindigul District during December were extracted and fractionated in the usual way. The petroleum ether fraction did not yield any isolable solid. The solid residue from ether fraction was characterised as luteolin on the basis of m.p., R_f, λ_{max}, colour reactions and the identity was confirmed by direct comparison with the authentic sample.

The solid from EtOAc fraction answered the usual tests for a flavonoid glycoside. The R_f values indicated the presence of a bioside. The hydrolysis (100°C, 2 h) of the glycoside yielded luteolin, the aglycone, and rhamnose along with glucose as sugar portions. The characterisation of the glycoside as luteolin 7-O-neohesperidoside was done on the basis of λ_{max} and ^{1}H-NMR studies. The crude aqueous concentrate of *A. gangetica* as well as the glycoside isolated from the flowers were investigated for *in-vitro* anti-inflammatory activity by hypo-

tonicity induced haemolysis method[4]. The method of Winter *et al.*[5] as described by Parmar and Ghosh[6] was employed to study the anti-inflammatory effect of the isolated compound on albino rats.

The ether fraction of *A. gangetica* has yielded luteolin while the EtOAc fraction has afforded luteolin 7-O-neohesperidoside. The identity of these compounds is established by R_f, colour reactions, λ_{max} and by hydrolytic studies.

The 400 MHz ^{1}H-NMR spectrum of the glycoside (DMSO-d_6) had δ values at 1.1–1.2 ppm (rhamnosyl protons), 3.4 ppm (rhamnoglucosyl 10-H), 4.9 ppm (rhamnosyl H-1), 5.0 ppm (glucosyl H-1), 6.2 ppm (H-6), 6.6 ppm (H-8), 6.9 ppm (H-5′), 7.3 ppm (H-2′,6′), 9.2 ppm (OH at 3′ and 4′) and 13.0 ppm (OH at C-3). Absence of a signal at δ 0.9 ppm indicated that the glycoside was not a glucoside. Further the absence of a signal at δ 5.8 ppm and 0.7–1.00 ppm indicated that the glycoside was 7-O-neohesperidoside[7]. Based on these observations the glycoside was characterised as luteolin 7-O-neohesperidoside.

The aqueous concentrate and the isolated compound when subjected to hypotonicity induced haemolysis produced percentage inhibition as depicted in Table-1. The results indicate that the drugs exhibit biphasic activity. It has to be noted in this connection that various workers have indicated a biphasic activity in the protection of HRBC lysis by nonsteroidal anti-inflammatory drugs[8].

TABLE-1
EFFECT OF *A. gangetica* AND THE ISOLATED GLYCOSIDE AGAINST HYPOTONICITY INDUCED HAEMOLYSIS

No	Drug	Dose μg/mL	% inhibition
1.	*A. gangetica*	62.5	69.47
		125.0	56.80
		250.0	2.11
		500.0	56.63
		1000.0	21.10
2.	Luteolin 7-O-neohesperidoside	62.5	83.15
		125.0	69.47
		250.0	66.32
		500.0	68.42
		1000.0	57.89

The glycoside when tested by carrageenin induced rat paw oedema method for anti-inflammatory activity produced a dose dependent inhibition. The anti-inflammatory activity produced by luteolin 7-O-neohesperidoside was significant and comparable to phenyl butazone, the standard drug used (Table-2). Thus the anti-inflammatory activity of *A. gangetica* could be very well correlated to the presence of the bioflavonoid *viz.* luteolin 7-O-neohesperidoside.

TABLE-2
EFFECT OF LUTEOLIN 7-O-NEOHESPERIDOSIDE ON CARRAGEENIN INDUCED RAT PAW OEDEMA

Treatment	Dose mg/kg bw	Mean increase in paw volume ± SE (mL)	Percentage inhibition
Control	—	1.0700 ± 0.02	—
Luteolin 7-O-neohesperidoside	10	0.8803 ± 0.14	17.75
	20	0.8112 ± 0.07	24.20
	40	0.6001 ± 0.07	43.92
Phenyl butazone	100	0.3181 ± 0.06	70.29

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