Table 3 R_f Values of Selected Flavones and Flavonols on Silica Gel 60 F_{254} (0.25 mm, Merck)

Pigment[a]		Source[b]	Substituent position[c] OH	Substituent position[c] OCH_3	R_f
Flavones					
Apigenin-8-*C*-glu	Vitexin	a	5,7,4′		0.56
Apigenin-6-*C*-glu-7-*O*-glu	Saponarin	b	5,7,4′		0.20
Apigenin-7-*O*-glu		c	5,7,4′		0.57
Apigenin-7-*O*-apiosylglu	Apiin	d	5,7,4′		0.39
Luteolin-7-*O*-glu		c	5,7,3′,4′		0.54
Diosmetin-7-*O*-rhaglu	Diosmin	e	5,7,3′	4′	0.31
Flavonols					
Kaempferol-3-*O*-rha		f	3,5,7,4′		0.72
Kaempferol-3-*O*-glu	Astragalin	g	3,5,7,4′		0.65
Kaempferol-3-*O*-gal		f	3,5,7,4′		0.59
Quercetin-3-*O*-ara(f)		h	3,5,7,3′,4′		0.72
Quercetin-3-*O*-rha	Quercetin	h	3,5,7,3′,4′		0.69
Quercetin-3-*O*-ara(p)		h	3,5,7,3′,4′		0.61
Quercetin-3-*O*-glu	Isoquercitrin	i	3,5,7,3′,4′		0.53
Quercetin-3-*O*-gal	Hyperoside	h	3,5,7,3′,4′		0.51
Quercetin-3-*O*-rut	Rutin	j	3,5,7,3′,4′		0.30
Isorhamnetin-3-*O*-glu		k	3,5,7,4′	3′	0.58
Isorhamnetin-3-*O*-rut	Narcissin	k		3,5,7,4′,3′	0.36
Tamarixetin-7-*O*-rut		l	3,5,7,3′	4′	0.34
Myricetin-3-*O*-rha		m	3,5,7,3′,4′,5′		0.58
Myricetin-3-*O*-glu		n	3,5,7,3′,4′,5′		0.46
Myricetin-3-*O*-gal		o	3,5,7,3′,4′,5′		0.45

Developing solvent: Ethyl acetate–formic acid–acetic acid–water (100:11:11:27).

[a] glu = glucoside, rut = rutinoside, gal = galactoside, rha = rhamnoside, ara(f) = arabinofuranoside, and ara(p) = arabinopyranoside.

[b] Suitable pigment sources: a, *Cratageus monogyna*; b, *Saponaria officinalis*; c, *Anthemis nobilis*; d, *Petroselinum* spp.; e, *Diosma crenulata*; f, *Menyanthes trifoliata*; g, *Astragalus* spp.; h, *Betula* spp.; i, *Equisetum arvense*; j, *Ruta graveolens*; k, *Calendula officinalis*; l, *Tamarix* spp., m, *Myrica rubra*; n, *Primula sinensis*; o, *Camellia sinensis*.

[c] Substituent position refers to the corresponding aglycone and the numbering pattern in Fig. 2.

quite frequently. Acylation of sugars with aromatic and aliphatic acids is also of widespread occurrence. To make the analysis even more complicated, each anthocyanin may occur in different structural forms depending on factors such as pH, copigmentation, and metal chelation.

2. Distribution

In addition to the more restricted occurrence of the red carotenoids and the red to purple betalains and anthraquinones, anthocyanins are largely responsible for the scarlet through purple to blue colors of flowers, fruits, roots, and leaves of higher plants, fruit juices, red wines, etc. (27). They accumulate in the vacuoles of epidermal or subepidermal cells, but they may also be confined to the leaf mesophyll. The number of identified anthocyanins has increased dramatically in recent years to a total of 600 (author's records).

B. TLC

Paper chromatography, TLC, HPLC, column chromatography (ion-exchange resins, polyamide powder, gel material), and countercurrent chromatography have been the most commonly used