Note

Identification of Flavones in Sixteen
Leguminosae SpeciesMakoto KANETA, Hiroshi HIKICHI,
Seiichi ENDO and Noboru SUGIYAMA*

Fukushima Technical College, Iwaki-shi, Fukushima

*Kokushikan University, Machida-shi, Tokyo

Received July 30, 1979

In the previous papers,¹⁾ we described the investigation of flavones of the genera *Gramineae*, *Compositae*, *Rosaceae*, and *Liliaceae*. The present paper describes the identification of flavones in sixteen *Leguminosae* species by paper chromatography and ultraviolet spectroscopy. In this work, the presence of apigenin 7-*O*-glucoside (1), 6,8-di-*C*-glycosyl apigenin (2), acacetin 7-*O*-glucoside (3), luteolin 7-*O*-glucoside (4), 6-*C*-glycosyl luteolin (5), 6,8-di-*C*-glycosyl luteolin (6), Kaempferol 3-*O*-rhamnosylgalactoside 7-*O*-rhamnoside (7), quercetin 3-*O*-galactoside (8), quercetin 3-*O*-rhamnoside (9) and isorhamnetin 3-*O*-rhamnosylglucoside (10) was demonstrated in the plants. The methods used for identification were described in detail in the previous papers.¹⁾ The identified flavones are shown in Table I in which the compounds marked with a had not been reported in these plants before. The *R_f* values, UV and mass spectral data and the data of acid hydrolysis shown in Table II agreed with those reported for known compounds.²⁾

Acknowledgment. The authors are grateful to Dr. Shungo Henmi, Director of Iwaki Branch, Fukushima-ken Horticultural Experiment Station for giving the specimens of *Leguminosae* species.

REFERENCES

- 1) M. Kaneta and N. Sugiyama, *Bull. Chem. Soc. Jpn.*, **42**, 2084 (1969); *idem, ibid.*, **45**, 528 (1972); *idem, J. Chem. Soc.*, 1971, 1982; *idem, Agric. Biol. Chem.*, **37**, 2663 (1973); *idem, ibid.*, **42**, 475 (1978); *idem, ibid.*, **43**, 657 (1979); *idem, ibid.*, **44**, 1405 (1980).
- 2) "The Systematic Identification of Flavonoids," ed. by T. J. Mabry, K. R. Markham and M. B. Thomas, Springer-Verlag, New York, 1970, p. 82, 89, 91, 96, 98, 100, 121, 128, 129, 140, and pp. 35~38.

TABLE I. THE FLAVONES OF SIXTEEN
Leguminosae SPECIES

Species	Compounds identified
<i>Albizia julibrissin</i>	Quercetin 3- <i>O</i> -glactoside ^a
Durazz	Quercetin 3- <i>O</i> -rhamnoside ^a
<i>Amphicarpaea Edgeworthii</i>	Apigenin 7- <i>O</i> -glucoside ^a
Benth. var. Japonica	
Oliver	
<i>Astragalus Sinicus</i> L.	Isorhamnetin 3- <i>O</i> -rhamnosyl-glucoside ^a
<i>Canavalia gladiata</i> D. C.	6,8-di- <i>C</i> -glycosyl apigenin ^a
<i>Kummerowia striata</i>	Quercetin 3- <i>O</i> -galactoside ^a
Schindl	6- <i>C</i> -glycosyl luteolin ^a
<i>Lespedeza Buergeri</i> Miq.	6,8-di- <i>C</i> -glycosyl apigenin ^a
	Quercetin 3- <i>O</i> -rhamnoside ^a
<i>Lespedeza cuneata</i> G. Don.	6,8-di- <i>C</i> -glycosyl luteolin ^a
	Quercetin 3- <i>O</i> -galactoside ^a
	Quercetin 3- <i>O</i> -rhamnoside ^a
<i>Lespedeza japonica</i> L. H.	6,8-di- <i>C</i> -glycosyl apigenin ^a
Bailey	
<i>Lespedeza pilosa</i> Sieb.	6,8-di- <i>C</i> -glycosyl apigenin ^a
<i>Phaseolus angularis</i> W. F.	Kaempferol 3- <i>O</i> -rhamnosyl-galactoside 7- <i>O</i> -rhamnoside ^a
Wight	
<i>Pueraria Thunbergiana</i>	Kaempferol 3- <i>O</i> -rhamnosyl-galactoside 7- <i>O</i> -rhamnoside
Benth	
<i>Robinia pseudo-Acacia</i> L.	kaempferol 3- <i>O</i> -rhamnosyl-galactoside
	7- <i>O</i> -rhamnoside
	Luteolin 7- <i>O</i> -glucoside ^a
	Acacetin 7- <i>O</i> -glucoside ^a
<i>Trifolium pratense</i> L.	Quercetin 3- <i>O</i> -galactoside ^a
<i>Vicia amoena</i> Fisch. var.	Quercetin 3- <i>O</i> -galactoside ^a
<i>Sachalinensis</i> Fr. Schm	
<i>Vicia unijuga</i> Al. Br.	Apigenin 7- <i>O</i> -glucoside ^a
	Luteolin 7- <i>O</i> -glucoside ^a
	Quercetin 3- <i>O</i> -galactoside ^a
<i>Wistaria floribunda</i> DC	Apigenin 7- <i>O</i> -glucoside ^a
	Luteolin 7- <i>O</i> -glucoside ^a

^a First identified by our work.

TABLE II. IDENTIFICATION OF FLAVONES

Substance	UV spectra ($\lambda_{\max}$, nm)			Products by acid hydrolysis	Mass spectra <i>m/e</i> of parent molecular ion of aglycone	Identity
	MeOH	NaOMe	AlCl ₃			
1	268nm	269	276	Apigenin Glucose	270	Apigenin 7- <i>O</i> - glucoside
	333	300sh	300			
		385	348			
2	274	282	265sh			6,8-di- <i>C</i> -glycosyl apigenin
	335	333	280			
		399	307			
			352			
			387			
3	268	286	277	Acacetin Glucose	284	Acacetin 7- <i>O</i> - glucoside
	324	358	300			
			345			
			384			
4	255	263	274	Luteolin Glucose	286	Luteolin 7- <i>O</i> - glucoside
	267sh	300sh	298sh			
	348	394	330sh			
			432			
5	242sh	267	277			6- <i>C</i> -glycosyl luteolin
	256	278sh	300sh			
	271	335sh	330sh			
	349	406	429			
6	257	266	279			6,8-di- <i>C</i> -glycosyl luteolin
	272	281	303sh			
	349	345sh	332sh			
		408	430			
7	265	246	255sh	Kaempferol Galactose Rhamnose	286	Kaempferol 3- <i>O</i> - rhamnosylgalacto- side 7- <i>O</i> -rhamno- side
	318sh	269	274			
	350	300sh	301			
		350sh	352			
		389	400			
8	257	272	275	Quercetin Galactose	302	Quercetin 3- <i>O</i> - galactoside
	270sh	327	305			
	300sh	408	330sh			
	360		436			
9	256	270	275	Quercetin Rhamnose	302	Quercetin 3- <i>O</i> - rhamnoside
	265sh	326	305sh			
	300sh	395	333sh			
	350		430			
10	254	271	269	Isorhamnetin Glucose Rhamnose	326	Isorhamnetin 3- <i>O</i> - rhamnosyl- glucoside
	265sh	328	300sh			
	305sh	412	365sh			
	356		402			