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植物ゴムおよび粘質物の定性分析[*1]

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Qualitative Analyses of Plant Gums and Mucilages.

Masashi Tomoda and Tomoko Akiyama

Separation of three plant exudates, Gums Arabic, Tragacanth and Karaya, and three plant seed store polysaccharides, of Guar, Carob (Locust) and Tamarind trees, was attempted by zone-electrophoresis over glass fibre paper. The effective procedure for qualitative analysis of them was found to be the uses of solvent systems of sodium hydroxide-borax buffer and pyridine-acetic acid buffer as shown in Table I.

Table 1. Relative Electrophoretic Mobilities* of Plant Gums and Mucilages over Whatman Glass Fibre Paper (38×12 cm).

	Solvent 1		Solvent 2	
	GF 81 (a)	GF 83 (b)	GF 81 (c)	GF 83 (d)
Gum Arabic	0.66, **0.47	0.65, **0.34	1.69	1.65
Gum Tragacanth	0.81, 0.64, 0.42, **0.16	0.69, 0.50, 0.33, **0.19	1.33, 0.92, ** 0.63, 0	1.53, 1.12, ** 0.84, 0
Gum Karaya	0.76, 0.45 0.30, 0.15**	0.55, 0.28, 0.15, 0.02**	1.12, 0.55, 0.04**	1.60, 1.21, 0.05**
Guar mucilage	0.59, 0.38, ** 0.07	0.73, 0.39, ** 0.12	0.61, 0.37, ** 0.18, 0.06	0.70, 0.47, ** 0.26, 0.07
Carob (Locust) mucilage	0.79, **0.56	0.96, **0.71, 0.31	0.65, **0.43	0.65, **0.47
Tamarind mucilage	0.88, **0.35	0.86, **0.36	0.80	0.90

Solvent 1, 0.1N-NaOH:0.025M-$Na_2B_4O_7 \cdot 10H_2O$ (1:1), pH 12; 190 volt, 2 hr. (The origin was at the center. All spots moved toward the cathode).
Solvent 2, pyridine: HOAc: H_2O (8:18:474), pH 4.1; 380 volt, 2 hr. (The origin was at a distance of 13 cm from the cathode. All spots moved toward the anode).
* Ratio of movement of polysaccharide to movement of glucose. Distances moved by D-glucose were 6.1 cm on (a), 6.4 cm on (b), 4.9 cm on (c) and (d).
** shows the main spot.

Gums and mucilages were added into 0.05N sodium hydroxide, and solutions (Arabic & Karaya), suspensions (Tragacanth & Guar) or supernatants (Carob & Tamarind) were respectively used as sample solutions. The inside of apparatus was cooled with dry ice. *p*-Anisidine-sulfuric acid reagent[1] was used for detection. Three plant gums

*1 本報告は生薬学雑誌, 23 (2), 64 (1969) に発表.

1) K.W. Fuller, D.H. Northcote, *Biochem. J.*, **64**, 657 (1956).

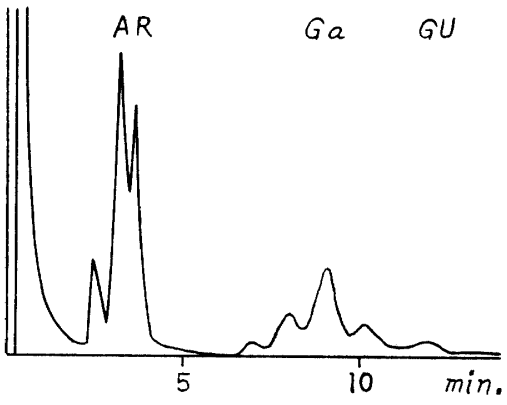

Fig. 1-1. Gum Arabic

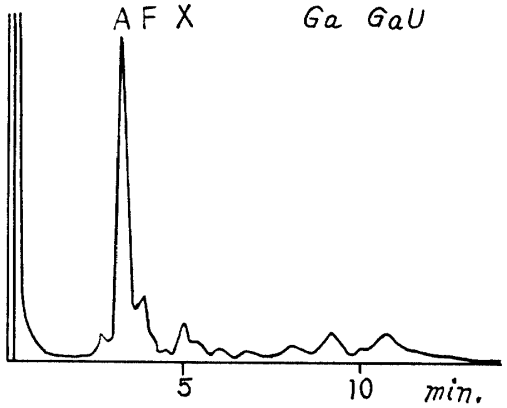

Fig. 1-2. Gum Tragacanth

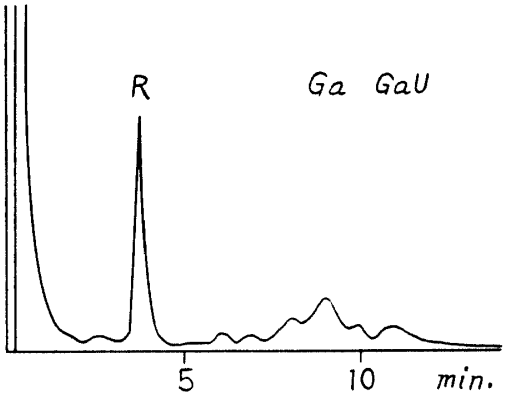

Fig. 1-3. Gum Karaya

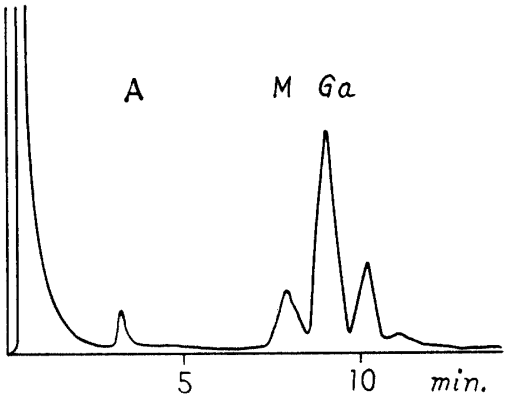

Fig. 1-4. Guar Mucilage

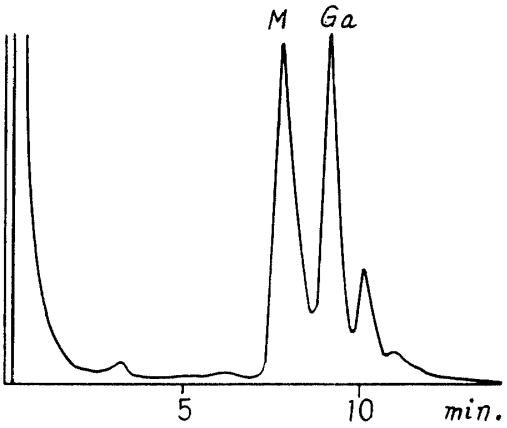

Fig. 1-5. Carob Mucilage (Locust)

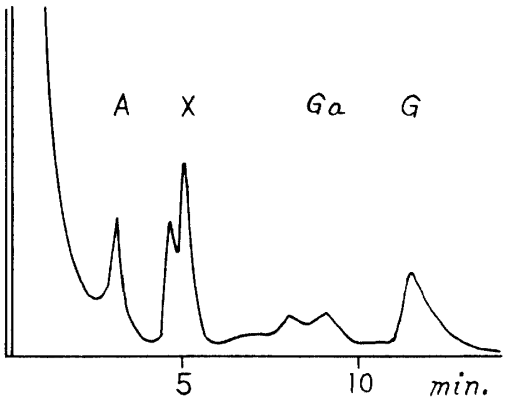

Fig. 1-6. Tamarind Mucilage

Fig. 1. Gas-Chromatogram of TMS Derivatives of Methanolyzates of Plant Gums and Mucilages
(Abbreviations of TMS Methyl Glycosides)

A: L-arabinose, X: D-xylose, R: L-rhamnose, F: L-fucose, G: D-glucose, Ga: D: galactose, M: D-mannose, GU: D-glucuronic acid, GaU: D-galacturonic acid

were also detectable by the metachromasy with toluidine blue reagent.[2] The result shows that each sample is a mixture of several polysaccharides, but the distinct difference of mobilities of the main spots is useful for the identifications of gums and mucilages.

Gas–liquid chromatography of trimethylsilylated methanolyzates[3] of these samples was carried out using 5% SE30 on Chromosorb G column at 180°. The methanolysis was done by heating with methanol containing 1% hydrogen chloride for 4 hr at 100°. The results obtained (Fig. 1) showed to be also available for the identification of each samlpe. L-Arabinose was found as an unknown component sugar from three seed mucilages.

2) K.G. Rienits, *Biochem. J.*, **53**, 79 (1953).
3) T. Yamakawa, N. Ueta, *Japan. J. Exp. Med.*, **34**, 37 (1964).