

OBB-3

LANGMUIR FILMS AND LIGHT SCATTERING STUDIES OF MESQUITE GUM SAMPLES AND THEIR FRACTIONS.

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Mesquite gum (MG) is a family of complex biological macromolecules derived from the bark of *Prosopis spp*, a desert plant botanically related to the Acacia genus, the source of gum arabic (GA). The main constituents of MG are polysaccharides, comprised by a central backbone chain of β -D-galactose, bearing a high density of side branches (1). Besides the polysaccharide chains, MG contains proteoglycans (complex protein-polysaccharides covalently attached) with an average protein content of ~4 %. A similar chemical structure has been documented for far more studied GA.⁽²⁻⁴⁾

The aim of this work was to investigate the structure and interfacial properties of MG at the air/water interface, performing static and dynamic light scattering experiments and Langmuir monolayers. To this end, native MG collected in the central zone of the state of Sonora, México, was fractionated by hydrophobic interaction chromatography.⁽⁴⁾ Light scattering (static and dynamic) studies were conducted in a ALV/DLS/SLS instrument (Mod. 5000, Langen/Germany) to obtain molecular weight, radius of gyration and hydrodynamic radius on the native and fractionated MG. Langmuir monolayers were obtained for the native and the three fractions of MG samples in a balance (Nima Technology Ltd.)⁽⁶⁾ with a KCl 1 M. solution as subphase at 25 °C. Isotherms of both MG and GA are shown in Fig. 1a. As it is observed, the GA shows a greater pressure for larger area, compared with the pressure of the monolayer of MG, probably due to the larger molecular area of GA⁽²⁻⁷⁾. Fractions II and III of MG, clearly showed greater pressure than

whole MG or GA (Figure 1b). This might be indicative of closer packing achieved by the MG proteoglycans. Indeed, the greater pressure was achieved by the apparently smaller

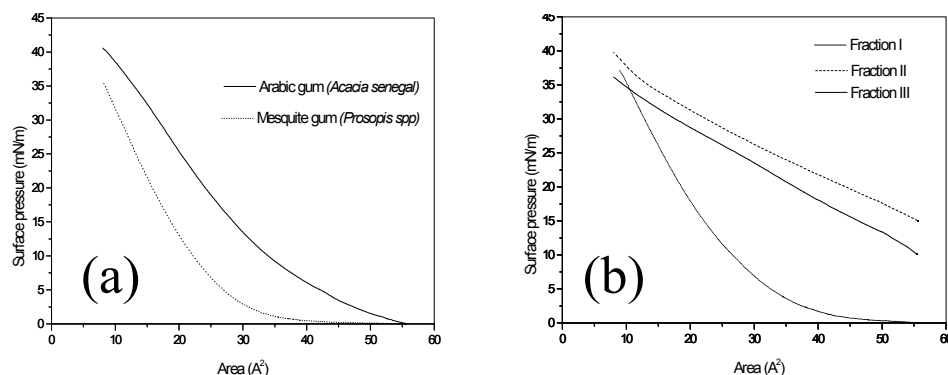


Figure 1 Isotherms of (a) native MG and GA and of (b) Fractions I, II and III of MG.

species, as can be appreciated in Table 1 below, where molecular weight (M_w) and radius of gyration (R_g) data are shown for both MG and GA and their fractions.

Table I . Characterization of molecular weight and molecular dimensions for MG and GA.

MATERIAL		M_w (g/mol)	R_g (nm)
Mesquite gum	Whole gum	2.3×10^5	118.34
	Fraction I	6.2×10^5	89.77
	Fraction II	10.0×10^5	45.85
	Fraction III	9.3×10^5	66.69
Gum Arabic	Whole gum	5.5×10^{5a}	13.30 ^a
	Fraction I	3.8×10^{5a}	
	Fraction II	14.5×10^{5a}	25.50 ^a
	Fraction III	2.5×10^{5b}	

a (Ref. 5) ; b (Ref. 9)

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