Short Communication

Carboxylic Acids and Unsaponifiable Matters in *Parkia filicoideae* Welw. Seeds

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Although the seed of *Parkia filiocoideae* Welw. has a low lipid content (10%), it continues to attract research interest because of its high protein value (32%)(1). Girgis(2) reported that seed oil contains as much as 80% unsaturated fatty acids, ranking it close to soybean oil with about 85% unsaturated fatty acids. If *P. filicoideae* seed compares so closely in its protein content and lipid unsaturation to the soybean, properly designed animal feeding experiments with parkia seed should show the seed to be comparable to, if not better than, soybean; this is not the case. In an effort to obtain a possible clue to the nutritional problems of the seed, the water extract was analyzed and the lipid reinvestigated in hopes of obtaining compounds that could account for any antifeeding or potentially toxic activities. The findings of this study are reported in this communication.

The water soluble extract of the seed, when treated with phenacyl bromide, gave a syrup. A combination of repeated thick plate chromatography and preparative HPLC of the syrup afforded the following compounds identified by IR, 1H-NMR, MS spectroscopy, and mixed melting point determination: ethanoate (41%), hydroxylpropenoate (20%), and methanoate (10%). Analysis of both the phenacyl esters and methyl esters of the carboxylic acids from the lipid by HPLC and GC, respectively, revealed that the seed oil contained about 54% unsaturated fatty acids. A comparative study of the heat content and refractive index of parkia oil, soybean oil, *Thevetia peruviana* seed oil and groundnut oil, before and after heating to 250 C for 3 hr, provided evidence in support of the lower degree of unsaturation of parkia seed oil. The major fatty acids of parkia seed oil, C18:0, C18:1 and C18:2, are present at 17%, 43% and 11%, respectively. Soybean, *Thevetia peruviana* seed, groundnut and *P. filicoideae* seed oils unsaturated fatty acid contents are 85%, 73.0%, 84.3% and 54%, respectively. Additional support for the parkia seed oil being much lower than 80% unsaturation was inferred from obtaining only traces of volatile carbonyls when the oil was heated to 250 C for 3 hr while air was bubbled into it. According to Scheberle and Gorsch (3) and White and Armstrong (4), linoleic acid and related dienoic compounds would undergo autoxidation and produce volatile carbonyls when heated strongly for a reasonable period.

The unsaponifiable material from the lipid, when studied by chromatography and preparative HPLC, provided crystalline compounds which were analyzed by IR, 1H-NMR and MS spectroscopy to be β-sitosterol, Δ^7-stigmasterol and squalene. These compounds are being reported for the first time for the parkia seed, but are know to occur commonly in most plants. An oily product of the unsaponifiable material obtained as the fast eluate from flash chromatography was not available in sufficient quantity and purity for mass measurement. IR and 1H-NMR spectra of this product suggested the presence of a δ-lactone; alkaline hydrolysis proved the lactone to be highly stable. MS spectra with a parent peak at M^+ 424, $^m/e$ 423 (M^+-H), $^m/e$ 396 (M^+-C0), $^m/e$ 394 (M^+-CH_20) co-occurring with other peaks confirmed lactone as a major product. Since lactones are known to possess a variety of physiological properties, as exemplified by the great toxicity of hymenoxone, a sesquiterpene (5), extra interest is maintained in the lactone, which constitutes less than 1% of the lipid. The oily product may provide a clue to why parkia seed does not perform as expected in feed experiments.

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