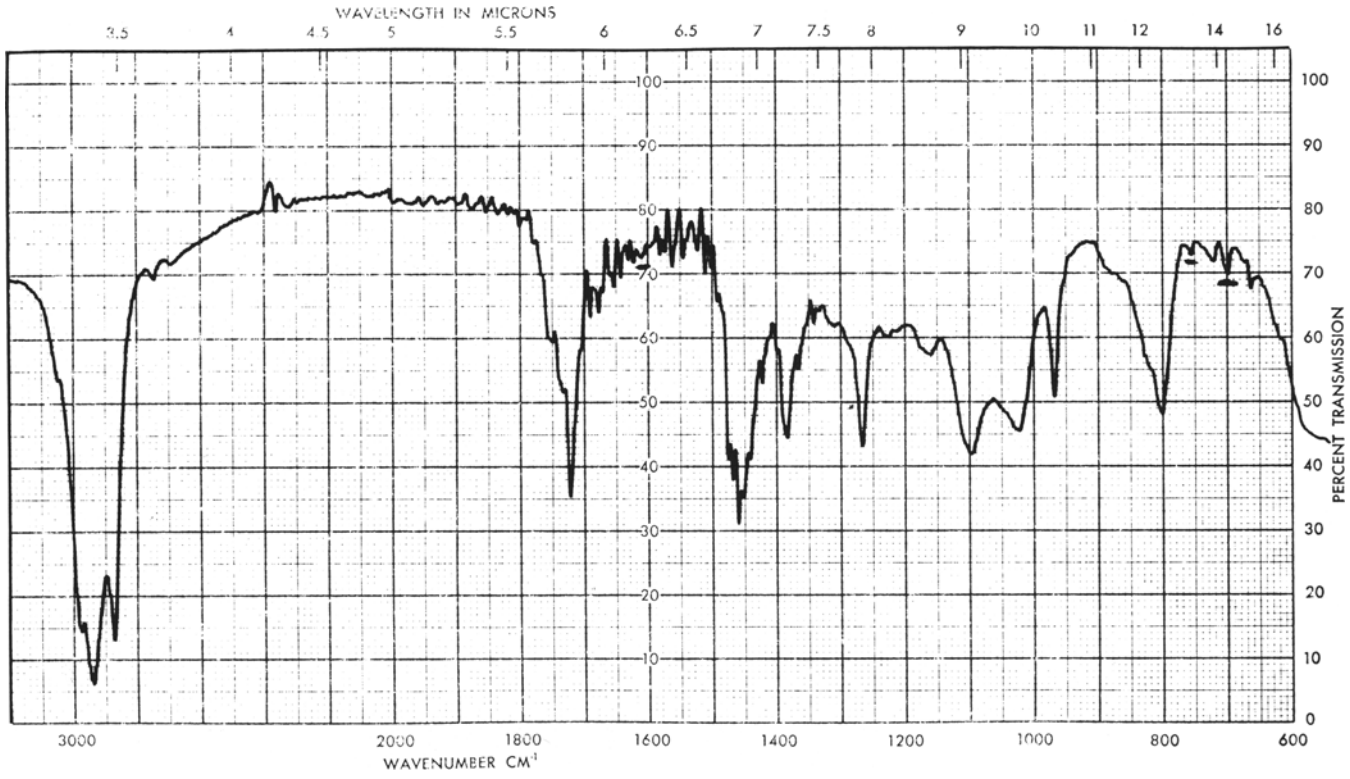

FIG. 4. Unsaponifiable matter from 0.01% Therminol 66 in crude palm oil. Film between salts.

levels between 0.01-0.10% can be approximated by inspection of peak hts and comparison with standard spectra.

To determine whether partially oxidized and polymerized Therminol 66 might affect the results, fluid which had been in use for 5 months at temperatures of 600 F was obtained and added to palm oil at a level of 0.1%. Therminol 66 was degraded further in an open beaker on a hot plate to a product insoluble in palm oil.

The partially oxidized Therminol 66, when recovered in the unsaponifiable portion, gave results similar to that of the fresh fluids.

Since the fully degraded fluid was insoluble, no further work was attempted on this mixture.

It was suggested that substituted aromatic compounds, such as Xylene, might interfere with this method of analysis. Generally, materials of this sort are not used in any edible oil plant; however, this point was investigated. A mixture of 95% palm oil and 5% xylene gave a small peak at 765 cm^{-1}. When 0.1% xylene was added to palm oil and the unsaponifiable recovered, however, only a poorly defined peak at 700 cm^{-1} was observed.

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Cucurbit Seeds: III. Ultrastructure of Quiescent Storage Tissues

ABSTRACT

Electron-microscopic examinations of seeds from wild xerophilous cucurbits revealed that their storage tissues ultrastructurally resembled those of commercially important oilseeds such as castor, cotton, peanut, soy, and tung.

INTRODUCTION

A resurgence of interest is developing in the uses of cucurbits, particularly wild, xerophilous species, as sources

of oil and protein from their seeds, rather than as sources of carbohydrates from their fleshy fruits. For instance, *Cucurbita foetidissima* H.B.K. is being studied intensively by the Ford Foundation as an economically and nutritionally valuable oilseed crop suitable for production in the Middle East (1-3, and L.C. Curtis, Ford Foundation, Beirut, Lebanon, private communication).

We examined the subcellular structure of seeds of *C. foetidissima, Cucurbita pepo* L., *Cucurbita digitata* Gray, *Cucurbita palmata* S. Wats., and *Apodanthera undulata* Gray with the electron microscope to determine how oil and protein are stored within the seed tissues. Seed oils of the latter three species are composed of conjugated trienoic fatty acyl residues (4).

EXPERIMENTAL PROCEDURES

Dry, quiescent cotyledonary tissues were obtained from seeds stored over P_2O_5 in vacuo and were fixed in 2% aqueous $KMnO_4$ at room temperature for 1 hr. The tissues then were rinsed in water several times, serially dehydrated in aqueous acetone mixtures, and embedded in Maraglas (5) or Spurr's (6) epoxy resins. Thin sections were cut on a Sorvall Porter-Blum microtome with a diamond knife and examined in a Philips EM-300 electron microscope.

RESULTS AND DISCUSSION

Figure 1 shows typical cells that comprise the cotyledonary storage tissues of the seeds of *C. foetidissima, C. pepo, C. digitata, C. palmata*, and *A. undulata*. The intracellular contents are ultrastructurally similar to the corresponding storage cells of commercially important oilseeds, such as castor (7), cotton (8), peanut (9), soy (10), and tung (11). The bulk of the cytoplasm consists of two organelles: spherosomes, which contain the reserve oil of oilseeds (9), and protein bodies (aleurone grains), which contain storage protein (12,13). Embedded within the protein bodies are globoids that contain metallic salts of phytic acid (14) and crystalloids that contain storage globulin (13). These organelles in wild cucurbit seeds are morphologically similar in all respects to their counterparts in the above-mentioned, commercially important oilseeds.

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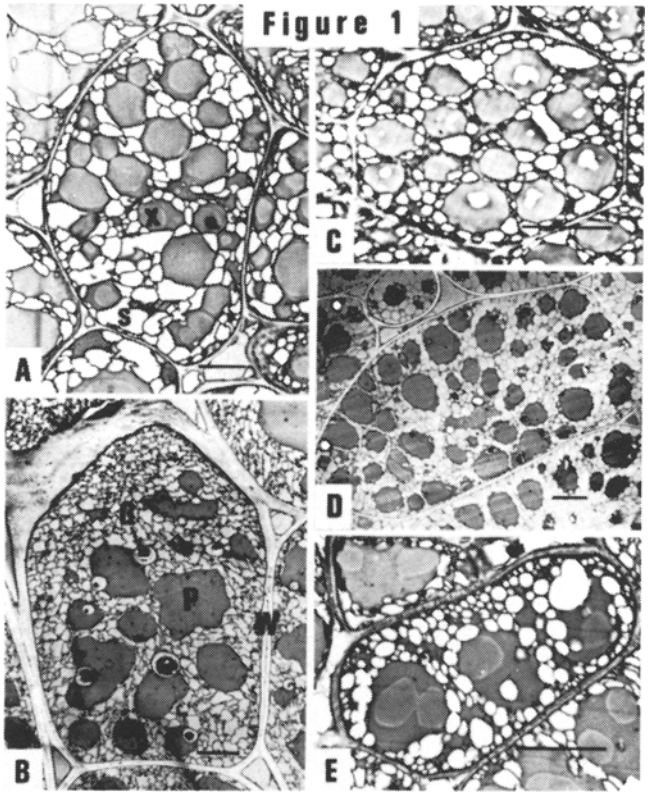

FIG. 1. Cotyledonary tissues of cucurbit seeds. W = Cell wall, P = protein body, S = spherosome, G = globoid, and X = crystalloid. In each figure, the bar represents five microns. A: *Cucurbita foetidissima*, B: *Cucurbita pepo*, C: *Cucurbita palmata*, D: *Cucurbita digitata*, and E: *Apodanthera undulata*.

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