

AVOCADO RESEARCH - ULTRASTRUCTURAL STUDIES

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We are continuing our ultrastructural studies on avocado fruit, with the major emphasis being on the organization of the membranes. Our primary focus for the last two years has been a study of the effects of low temperature storage and the resulting chilling injury. Our approach has been to use freeze fracture electron microscopy to determine changes in the molecular organization of the membranes of the fruit due to low temperature storage before and after injury has occurred. The results of this study are now in press in *Protoplasma*. Briefly, what we found was that the low temperature (6° C) apparently causes a change in the physical properties of some of the membrane lipids so that they undergo a transition from a fluid to a more solid phase. These lipids then separate into domains and lead to improper functioning of the membrane. With short term exposure to low temperature, these changes are reversible, and damage does not occur. However, after extended periods of low temperature storage, the changes become irreversible, and damage due to long-term membrane dysfunction leads to injury of the fruit. We are now studying the response of the chilling resistant plant, cauliflower, to low temperatures, and comparing these results to those obtained with avocados.

Another interest we have had in avocados is the specialized, "idioblast" oil cells in the fruit. Previously, we published a study on the development of these cells (*Bot. Gaz.* 144: 49-55, 1983). During our low temperature studies, we noted that the oil in these cells forms large crystalline arrays when subjected to low temperature, while the bulk, triglyceride oil of the rest of the cells of the fruit did not. This difference in physical properties of the lipids indicates a different composition. We are presently developing techniques to isolate these specialized cells in order to possibly determine their composition and possible role in fruit flavor.