Vitamins and Palm Oil in Margarine

Vital Elements of Nutrition Always Found in Association with Yellow Coloring Matter, Carotin, in Plant Life

By ALBERT K. EPSTEIN

THE oil soluble vitamins A and D are recognized to be important constituents of the human diet. Dr. J. C. Drummond in his chapter on "The Nutritive Value of Edible Oils and Fats" in the book published in 1928 by E. Richard Bolton, entitled "Oils, Fats and Fatty Foods," pages 402 and 403, says the following regarding palm oil:

"Palm oil provides another interesting example of the association between vitamin A and the fat-soluble pigments that has been noticed, and specimens have been examined and found to possess a growth-promoting activity not much below that of butter."

In applying the recently developed Drummond color test for Vitamin A to various samples of refined palm oil, I have found that the unbleached colored oils gave a test corresponding to a high vitamin content, and the intensity of the reaction diminishes with the amount of bleaching and oxidation the oils have undergone.

I personally made tests on samples of palm oil which were made from carefully selected raw material and which were refined and deodorized by careful methods, and I found them to respond to the Drummond color test for vitamin A equivalent to about 60 units per gram, which is a higher test than that given by the average butter and equivalent to the test given by the best and richest butter in vitamin A.

It has already been observed by Prof. Steenbock of Wisconsin University and other experimenters that vitamin A is associated with the yellow coloring matter carotin which is present in many vegetable products and also present in palm oil, and that oxidation and heat which destroy the color in palm oil will also destroy the valuable vitamin A. As far back as 1922, Drs. J. C. Drummond and S. S. Zilva of the Biochemical Laboratory Institute of Physiology, University College, London, and the Biochemical Department, Lister Institute, London, have made feeding tests for the growth-promoting vitamins in palm oil and have found that,

"The more highly pigmented samples appear to show the higher growth promoting activity in the feeding tests. More than one sample has possessed as high a potency as that exhibited by the average sample of butter." (*Journal of the Society of Chemical Industry, Volume* 41, *page* 127, *T* 1922.)

Recent researches confirm the fact that the vitamin A is a substance which is either identical with carotin, which is responsible for the yellow color in plants and palm oil, or it is always associated with the carotin and if the yellow coloring is removed, the vitamins are removed with it.

It is therefore seen that the yellow coloring matter of palm oil is associated with the content of the growth promoting vitamin A and that palm oil is a vegetable edible oil which is rich in this valuable vitamin. This oil readily lends itself to be used in the manufacture of margarine in view of the fact that it is solid and contains a large amount of palmitic acid which gives the margarine certain valuable physical properties in that it makes it *more plastic* and *less brittle* than if an equal amount of coconut oil is used. This physical property together with its richness in the important food constituent vitamin A, which is absent in all other oils, makes this oil a desirable constituent of margarine.

Drs. Drummond and Zilva in the above mentioned publication in 1922, state:

"The main object of these experiments was to seek a cheap source of vitamin A in the form of a vegetable oil suitable for margarine manufacture. * * * *"

The science and technology of refining edible oils has been greatly enhanced during the past ten years since 1920-22, when Drummond and Zilva experimented with palm oil. By applying the accumulated experience in selecting good raw materials the American Refiner can produce at present an edible palm oil which is palatable and which contains an abundance of vitamin A, equal in potency to some butters and in some cases more potent than the average butter.

It is also known that vitamin D usually accompanies vitamin A. At the time Drummond made his feeding experiments in 1922 there was no differentiation made between these two vitamins. Spectrophotometric examination made on a good sample of palm oil indicates that it may also contain vitamin D to the extent of about five units per gram.

Textile Oils

(*From page* 106)

bers 5 and 6 were rather easily oxidized. When oils numbers 1, 2 and 3 were tested by the Mackey method, they gave the results shown in *Figure* 18. By comparing the curves obtained by the two different methods it can be seen that the Mackey test bears an agreeable relation to the new method in the appearance of the curves, which of course indicate oxidation at considerably higher temperatures.

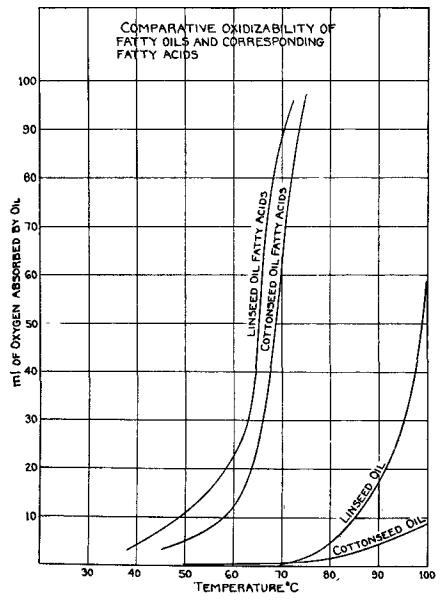

Fig. 19

Application of the New Method to the Study of Oils

THE new method for examining oils permits numerous applications to problems dealing with the behavior of oils toward oxidation. For example, the presence of unsaturated, free fatty acids in a glyceride were found to render an oil more sensitive to oxidation.[11] This effect is clearly presented in the curves of *Figure* 18.

The accuracy of this test permitted an extensive study of textile oils, in regard to their stability in the presence of oxygen, and also gave a means for evaluating numerous antioxidants and for measuring their effect upon oxidizable oils. The evaluation of antioxidants, untreated and stabilized oils is presented in another publication.[12]

[11] H. Aspergren, *loc.cit.*
[12] See Textile World, March 8, 1930.

Cohune Nut Cracking

A new type of dekerneling machine for cracking babassu, cohune, coquita and similar tropical oil-bearing nuts has been perfected by a machine designer of Plainfield, New Jersey, according to reports. The machine is said to be capable of handling nuts of any size and of cracking them open regardless of the shell thickness. The equipment is more than six feet overall height and weighs about two tons. The nuts are dumped into a large hopper, thence being fed to ten dekerneling units through separate tubes. The mechanism of operation is said to be quite simple. As the operation is started, the nuts pass from the hopper through the feed tubes into correct position within the machine. Heavy plungers then descend, rapidly driving sets of tungsten steel cracking chisels into the shells. As the cracking chisels rise, the broken shells automatically spread out. Shells, husks and kernels are thrown onto a sieve which vibrates in a horizontal plane, instantly separating the kernels from the husks and the shells. It is claimed that the machine recovers the kernels entirely undamaged, seldom even scratched.

The Department of Commerce requests all manufacturers of mayonnaise to return the questionnaires covering the department's survey of the mayonnaise industry for 1930, at the earliest possible date. The results of the department's previous survey of the industry were of tangible value to all mayonnaise manufacturers.