

Avocado Oil Studies

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Avocados are abundant throughout the American Tropics, but little commercial use has been made of them except as fresh green fruit. The oil of avocados contains appreciable quantities of vitamins A, D, and E and is said to have a high digestibility coefficient. These facts indicate that avocado oil would prove to be a desirable salad and cooking oil in those countries where avocados are produced abundantly and cheaply.

According to the literature, the edible portion of the fruit contains the following constituents: Water 60 to 85 per cent, oil 5 to 30, proteins 1 to 3, carbohydrates 5 to 6, minerals 1 to 2, and crude fiber 2 to 7 per cent, depending upon the variety. After removal of the greater portion of the water and oil in the extraction process the other constituents are five to eight times more concentrated in the remaining cake than in the unprocessed fruit. This cake would therefore be valuable as a stock feed. With the prevailing shortage of vegetable fats and oils, the use of avocado oil as a food and of the cake as a stock feed should have definite possibilities.

A limited amount of avocado oil is used in the cosmetic industry, where, because of its high skin-penetrating power and its ability to form fine emulsions readily, it is highly recommended. The present methods of preparing the oil for this use consist of slicing and drying the fleshy portion of the fruit and then extracting the oil by hydraulic pressure or with organic solvents, such as petroleum ether, ethyl ether, or benzene. Drying increases the cost of production, but it is not possible to extract the oil from un-dried fruit because of the high water content. Boiling the pulp with water, even under considerable pressure, releases the oil very slowly and gives poor yields, but freezing releases the oil so that it becomes available to organic solvents. This latter change is probably a result of two things, the dehydration of the cells containing the oil and a rupture of the cell walls. On the basis of this assumption a chemical treatment was sought that would produce the same results. Aluminum chloride and zinc chloride were tried and both gave satisfactory results. However, another method, using lime, was much cheaper and more practical. When treated with lime the pulp of Spinks avocados, known to contain 15.3 per cent of oil as determined by the method of the Association of Official Agricultural Chemists, gave the following percentage yield on the basis of total oil: Pressing 90.0 per cent, water flotation 82.3 per cent, and petroleum extraction by mechanical mixing 96.8 per cent.

When as little as 0.5 per cent of lime, slaked or un-slaked, was mixed with the fresh pulp which had been mashed and pressed through a fine sieve, the oil was released and the pulp set after standing a short time, so that the oil could be expressed in a hydraulic filter press, extracted with organic solvents by mechanical mixing, or obtained

by floating off with water. Slightly higher concentrations than 0.5 per cent gave a product that could be more readily handled in the press. Avocado pulp treated in this way yielded a clear, golden-yellow oil. This was bleached to a clear water-white oil by extended heating at 100°C, or by exposure to bright sunlight for several days. The latter treatment resulted in the development of rancidity, and some difficulty was experienced in removing the rancid principles by the usual caustic treatment. It is probable that the vitamin A content of the oil was materially reduced, if not entirely destroyed, by the bleaching treatments.

When the lime-treated pulp was extracted with petroleum ether or ethyl ether in a mechanical mixer the oil obtained was a clear green color. The intensity of the green color was influenced by the solvent used and by the length of time the lime-treated pulp was allowed to stand before extraction.

If use is to be made of the cake as a stock feed, the initial concentration of lime added to the pulp should be kept as low as possible, since a 0.5-per cent concentration of lime in the pulp became 4 or 5 per cent in the pressed cake. No extensive experiments have been carried out on the expressed cake obtained from the lime treatment, but it is known that stock will eat the cake provided the lime concentration is kept low.

From Report of the Puerto Rico Experiment Station 1942:18-19. Issued June 1943