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VEGETABLE LECITHIN AS AN ANTIOXIDANT

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Vegetable lecithins have been recommended for use as antioxygenic or stabilizing substances to delay rancidity in fats and oils, although complete experimental evidence as to their efficacy is lacking. Measuring the induction period of the oxidation of lard by means of the oven-test, two commercial samples of soy-bean lecithin were shown to be weak antioxidants, having indices of 1.7 and 1.8 respectively, (antioxygenic index being the induction period of the fat with added antioxidant divided by the induction period of the fat alone). Indices determined by the oxygen-absorption method were somewhat smaller. Similar concentrations of liver lecithin added to the lard were less strongly antioxygenic, showing an index of 1.3. In the oven test definite rancidity by odor appeared 40-50 hours after a positive Kreis test and indices calculated on the basis of the time of appearance of odor were usually smaller than those obtained on the basis of the Kreis test.

After purification of the soy-bean lecithins by precipitation with acetone marked differences were found in the antioxygenic properties, indices obtained by means of the Kreis test being increased. By the odor test the index for sample A was larger and that for B remained the same. These differences may be explained by the behavior of the acetone-soluble material separated from the original lecithin, that from A having weak pro-oxygenic properties, that from B being a weak antioxidant. In other words, the original lecithin A contained traces of pro-oxidants and when these substances were removed by acetone the indices of the lecithins were increased. The commercial product A contains 40 percent cocoanut oil and this is possibly the source of the pro-oxidants. Nothing is known as to the history of B.

Rancidity is an autocatalytic reaction and the first stage in the process seems to be the formation of peroxides which act as catalysts to accelerate the reaction. Attempts are being made further to study the changes which take place during the induction period of a fat in order to explain the effect of the antioxidant in prolonging this period. Determinations of active oxygen (peroxides) of the

lard showed the first appearance of the Kreis test at a peroxide content equivalent to 3.0 cc. of 0.002 N sodium thiosulfate solution per gram of fat. This value was not changed by the presence of the vegetable lecithins. A positive odor of rancidity appeared in the lard alone and with added lecithin at an active oxygen content varying from 25 to 60 cc. of the 0.002 N thiosulfate solution. Information as to antioxygenic properties obtained by use of the peroxide curves thus correlates better with the Kreis test than with the odor test for the end of the induction period.

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