

pure acid sufficient to bring the total up to about 0.7 g. for 100 cc. of alcohol or 0.5 gm. for 50 cc. of alcohol. The "saturated" solution used can be tested for supersaturation by evaporating a portion of it and comparing with the solubilities of Table 6, provided the acid has been treated so as to avoid the action of the alcohol on it. It would seem necessary also to keep in mind this action between the alcohol and acid in determining stearic acid in mixtures which have been recovered from alcoholic solution.

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[CONTRIBUTION FROM BUREAU OF ANIMAL INDUSTRY, UNITED STATES DEPARTMENT OF AGRICULTURE].

## THE APPLICATION TO SOLID FATS OF RENARD'S TEST FOR PEANUT OIL.

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Tolman's modification of Renard's test for peanut oil<sup>1</sup> is the best method in use for the purpose and is generally employed in testing edible oils for adulteration. Briefly this method is carried out as follows: The sample is saponified with alcoholic potash and treated with lead acetate, the lead soap being treated with ether, which dissolves the lead oleate, linoleate, etc. leaving the lead stearate, palmitate and arachidate as a residue. The precipitate is treated with hydrochloric acid and the liberated fatty acids freed, separated and dried. They are then dissolved in 90 per cent. alcohol and cooled to 15°, when the arachidic acid crystallizes out, is weighed and the melting point taken. Twenty times the amount of arachidic acid gives the approximate amount of peanut oil present.

In connection with this method, however, Tolman and Munson say<sup>2</sup> "Twenty grams of the oil to be tested should be taken so that enough of the arachidic acid can be separated to make the melting point which should be determined in every case, as some oils, such as cottonseed and lard, will give a precipitate which resembles arachidic acid except that it has a lower melting point."

In working with mixtures of solid fats with cottonseed oil, the writer, in nearly every case in which a test was made has obtained a precipitate at the point where arachidic acid should come down, although this precipitate was very often gelatinous in appearance, whereas the arachidic acid is crystalline.

The following table shows comparative results obtained with oleostearin,

<sup>1</sup> Bulletin 65, Bureau of Chemistry, U. S. Department of Agriculture.

<sup>2</sup> Olive Oil and its Substitutes; Bulletin 77, Bureau of Chemistry, U. S. Department of Agriculture, p. 35.

lard, and the same lard with 10 per cent. peanut oil admixed. Determinations made on pure peanut oil are added for comparison.

	% solid acids	% crystallizing from 90% alcohol	% remaining in solution	Beginning of crystallization	Iodine number of crystals	Melting point of crystals
Peanut oil .....	13.73	4.24	9.49	37°	0.7	71.5
Lard .....	39.30	5.93	33.37	20°	7.4	54.3
Lard plus 10% peanut oil..	37.35	1.62	35.73	19°	4.2	55.0
Oleostearin.....	36.31	15.18	20.98	25°	4.9	61.5

The amount of solid acids in oleostearin and lard crystallizing at 15° from 90 per cent. alcohol is far greater than in peanut oil, although the temperature at which crystallization begins is far lower. The cause of the precipitation, while primarily, of course, the same as that of arachidic acid, *viz.* the supersaturation of the solution, differs in this, that the arachidic acid precipitates because of its very slight solubility in 90 per cent. alcohol, while the other acids come down because of the great quantity of them in the solution, as shown by the amount remaining in solution after crystallization.

As shown by the table, the melting points of the crystals from the pure lard and those from the lard containing 10 per cent. of peanut oil were about the same and hence not conclusive. The crystals were therefore redissolved in 90 per cent. alcohol and allowed to recrystallize. The melting points were again determined and found to be, pure lard 55°, lard with 10 per cent. peanut oil 77°, showing that nearly pure arachidic acid had been obtained in the latter case.

These results show that the addition of fats containing large percentages of solid fatty acids to cottonseed oil or other oils interferes materially with the detection of peanut oil by this method, and in case the presence of peanut oil is suspected in such mixtures, some modification of the method will be necessary to detect it; either to increase the proportion of 90 per cent. alcohol used, which would be objectionable, or to recrystallize the "arachidic acid" until a melting point higher than that of stearic acid is obtained, when the presence of arachidic acid is established.

SOUTH OMAHA, NEB.,  
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## THE OCCURRENCE OF NITRATES IN VEGETABLE FOODS, IN CURED MEATS AND ELSEWHERE.

BY W. D. RICHARDSON.  
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For the purpose of this paper the term "vegetable foods" is used so as to include fruits.

The presence and amount of nitrates in vegetable foods has been noted and determined by Frühling and Grouven, by Sutter and Alwens, by E. Schultze and H. Schultze and others<sup>1</sup>. Frühling and Grouven state

<sup>1</sup> Koenig, *Nahrungs und Genussmittel*, Vol. 2, p. 94-95.