Letter to the Editor

About the Conversion Factor of Phosphorus to Phosphatides in Soybean Oil

ABSTRACT

The factor of 30 recommended by the official AOCS method Ca 12-55 for converting phosphorus to phosphatides in soybean oil is in reality a conversion factor to "acetone insolubles." While applicable to crude soybean oils, its applications to degummed and refined oils is open to question. A corresponding revision of the method Ca 12-55 seems therefore indicated.

Sir: In a recent communication, List et al. (1) discuss the origin of the conversion factor of elemental phosphorus to phosphatides in soybean oil recommended by the official AOCS method Ca 12-55 (2). According to this method, the percentage of phosphorus in crude, degummed and refined vegetable oils may be converted to the percentage of phosphatides by applying a factor of 30, and Note 3 of the method states: "This is an approximation for converting % phosphorus to the phosphatides in soybean oil." List et al. suggest that a paper by Scholfield et al. (3) on the composition of soybean phosphatides is the source of this oft quoted value. According to their own findings (1), the correct conversion factor is 31.7, which is in agreement with a later work of Scholfield et al. (4).

The above mentioned communication of List et al. is a timely reminder that the statement in Note 3 of the official AOCS method Ca 12-55 is incorrect. Conversion factors of 30-32 have been calculated from the determination of phosphorus and the *acetone insoluble* contents of *crude* soybean oils. The "theoretical" conversion factor of phosphorus to phosphatides such as lecithin is about 25.5, as employed for instance in the earlier work of Jamieson and McKenney (5). The discrepancy between these factors is due to the circumstance that the acetone insoluble material obtained from soybean oil contains 18-20% of glycolipids and other nonphosphatidic components. It would seem, therefore, that the statement in Note 3 of the AOCS method previously referred to should be modified by replacing the term "phosphatides" by "acetone insolubles."

Furthermore, it seems advisable to replace the term "soybean oil" in Note 3 with "crude soybean oil." Results obtained in this laboratory, and to be published, indicate that the phosphorus content of the acetone insolubles of degummed oils is higher than that of the corresponding crude oils. Incidentally, this could be expected, as some of the nonphosphatidic compounds associated with the phosphatides of the crude oil are water soluble and therefore eliminated during the degumming step. Alkali refining is likely to increase the above mentioned difference by removing some of the fatty acid radicals and amines of the phosphatides. Thus, the conversion factor of phosphorus to acetone insolubles in crude soybean oil is not applicable to degummed and refined oils. In the case of the latter oils, even the "theoretical" factor of 25.5 may be found much too high. On the other hand, in view of the data presented by List et al. (1), some collaborative work seems to be called for to decide whether the conversion factor of 30 for acetone insolubles in crude soybean oils should be suitably increased.

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REFERENCES

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