indicate that the first eight fractions contain chiefly unsaponifiable material (alcohols) with perhaps 5 to 15 percent of true wax. Fraction 9 is apparently composed of about equal amounts of alcohol and wax while fraction 10 is composed almost entirely of wax. The last four distillate fractions apparently do not contain significant amounts of free alcohols.

The saponification equivalents of the acetates prepared from the alcohols of the first nine fractions show that the average molecular weight of the alcohols varies from 450 to 467, corresponding to a molecule containing 30 to 32 carbon atoms. The assumption that the alcohols are of the usual straight chain type is supported by the melting points of the alcohols and acetates. The alcohols of the combined fractions 6, 7, and 8 have an average molecular weight of 467, corresponding to an alcohol of 32 carbon atoms, and their melting point, 87.6° to 87.9° C., approaches the temperature of 89.2° C. reported as the melting point of dotriacontanol (3). The melting point of the acetates of these combined fractions is 72.2° to 73.0°, which is essentially the same as the value 72.6 to 72.8° reported for dotriacontanyl acetate (4). Although the analysis indicates that the alcohol in these three fractions is the C_{32} straight-chain alcohol, the material must be considered a mixture containing some longer and some shorter homologs.

Fraction 10, the first fraction which was essentially all wax, yielded a mixture of alcohols having an average molecular weight of 405, corresponding to an average chain length of 27.7 carbon atoms. The melting point, 77.0° to 78.0° C., is somewhat less than the value 79.2° C. reported for the C_{26} alcohol, but the melting point of the mixed acetates is 60.5° to 62.5° C., slightly higher than the value 60.0° to 60.1° reported for the acetates of the C_{26} alcohol (4). The alcohol portion of fraction 10 must therefore contain an alcohol at least as short as C_{26} mixed with the longer alcohols such as occur in the earlier fractions.

Fractions 11 to 14 show progressive fractionation of the wax, the alcohols of the last fraction being similar to those of the first eight fractions.

The analyses of the fractions showed such differences in their alcohols that X-ray patterns were obtained by Dr. J. N. Mrgudich, of the University of Illinois Chemistry Department, in an effort to identify definitely the alcohols present. The patterns, however, were ill-defined, indicating that the alcohols were complex mixtures, and no further conclusions could be drawn. Patterns of the acids from fractions 10 and 14 and of the ethyl esters of these acids were somewhat more definite and indicated the presence of the C_{26} or C_{28} acid.

The iodine number of the residue was 8.9. This accounts for only half of the unsaturation in the original wax. A portion of the remainder was certainly lost in the crystallization of the residue, and another portion was perhaps lost through polymerization in the still. It is thought probable that the unsaturation, as well as the lowered saponification equivalent of the residue, can be attributed to partially polymerized soybean oil which was not removed by the washing and crystallization procedures.

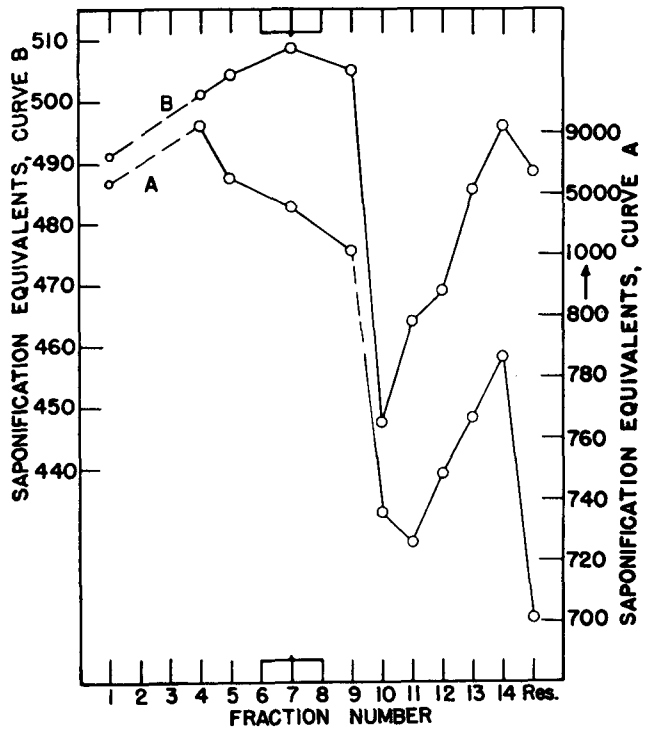

Figure 3.—Saponification equivalents.

A. Wax fractions.
B. Acetates prepared from alcohols of wax fractions.

Any hydrocarbons in the wax should have appeared with the alcohols. The agreement between the saponification equivalents of the acetates and the melting points of the alcohols and acetates may be taken as evidence that hydrocarbons are not present in significant amounts.

Summary

Wax from the winterizing press cake of soybean oil contains approximately 10 percent free alcohol in addition to true wax. No free acids and apparently no hydrocarbons are present. The principal alcohols range from C_{32} to below C_{28}, while the acids have an average chain length of approximately 22 carbon atoms. The wax amounts to not more than 0.002 percent of the original oil.

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3. Francis, F., Collins, F. J. E., and Piper, S. H., Proc. Roy Soc. A, *158*, 691 (1937).
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CORRECTION

We regret that the formula at the top of the right hand column, page 106, May 1941 issue, in the article Copra Quality Under New Rules by P. W. Tompkins was printed incorrectly. It should read:

Corrected F.F.A. to compare with 7% oil in cake =

$$\frac{0.615 \times 6.45\% + (0.0539\text{-}0.02) \times 1.05\%}{(0.6689\text{-}0.02)} = 6.17\%$$

(Reported as 6.2%