impeller speeds. (This corresponds to a low value for industrial use of 338 lb. of steam per hour for a 25,000-lb. batch.) The resulting data plotted in Figure 9, show the relation and benefit of using higher impeller speeds. Note that the value of K at zero rpm. is very close to that obtained when the spider mechanism is employed for distribution. Since the slope of the curve of K *vs.* rpm. should approach zero as equilibrium conditions are approached, it is clear that equilibrium conditions between steam and lard are not reached even at the highest impeller speeds used. For maximum steam economy the steam should be saturated with free fatty acids, but this was not attained.

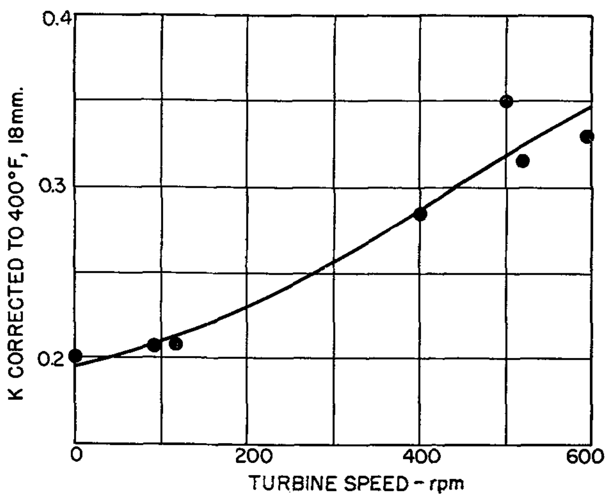

FIG. 9. Effect of mixing impeller speed on rate constant K.

Irregularity in Plots

In the semi-log plots of FFA concentration in the lard *vs.* time, deviations from the straight-line curves shown in Figure 3 were observed. The data sometimes resulted in irregular displacements of the curves as shown in Figure 10. In these cases, the rate K was taken as the slope of the first straight-line part of the curve.

In order to test whether these irregularities were due to a hydrolysis of fatty esters in the lard by the stripping steam, nitrogen was introduced as a stripping agent in place of steam. A plot of such runs shows similar irregularities indicating that hydrolysis was not the cause, and it is now believed that the effect is due to a condensation of FFA on the top or walls of the container, or in the vacuum line and periodic re-entrance of this FFA into the body of the lard.

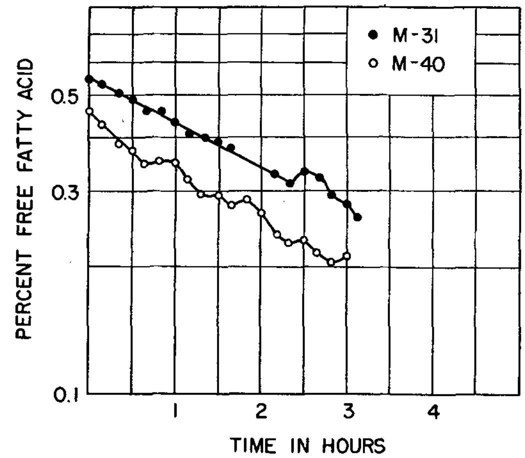

FIG. 10. Free fatty acid vs. time.

Conclusion

The rate of steam stripping of free fatty acids from lard can be evaluated in terms of a rate-constant K defined by Equations 5 and 6. Reproducible results were realized for many different batches of leaf and prime steam lards. The effects of temperature, total pressure, and steam rate were evaluated, thus making possible the calculation of stripping rate constants on a comparable basis. Comparable values of the rate constant K have been compared for conditions with and without the use of mechanical agitation with a flat-blade mixing impeller. Use of the rotating mixing impeller showed substantial increases (30 to 50%) in the reaction rate constant, over those obtained with steam sparging without the mixer. Accordingly the use of this type mixer should result in large savings of steam for stripping and for maintaining the necessary vacuum by the steam jet condenser.

Acknowledgment

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CORRECTION

A. L. Clingman of the South African Council for Scientific and Industrial Research, Pretoria, writes (as of March 13, 1953) that there was an error in the article by himself and D. A. Sutton, entitled "The Chemistry of Polymerized Oils. II. Dehydropolymers of Methyl Linoleate and Methyl Stearate," which appeared in the February 1953 issue of the Journal of the American Oil Chemists' Society. The footnote at the bottom of page 54 should have read as follows: "I.V. = 173.0; prepared by debromination of tetrabromostearic acid by the Hormel Research Foundation, Austin, Minn."