TABLE III

Continued Use of a Cation Exchange Resin Catalyst (Dowex-50) in Two-Stage Tallow [a] Splitting Operations—Employing Acid Regeneration After Each Operation

Experiment No.	Resin Treatment	Free Fatty Acids (as % oleic acid) after 12 hr. at 100°C.
1	Used 3% Fresh resin	100
2	With 100 ml. 4N. HCl	100
3	With 100 ml. 4N. HCl	100
4	With 100 ml. 4N. HCl	98
5	With 100 ml. 4N. HCl	96

[a] An untreated "Special" grade tallow: initial F.F.A. 3%.

In each operation considerable mechanical breakdown of resin particles occurs because of abrasion due to refluxing and stirring. Some of the resulting fine particles are carried away during separation, regeneration, and washing of the resin. It was found that after four complete operations only one-third (*i.e.*, 1%) of the original resin remained. Despite this loss the residual resin, when regenerated for a fifth operation, maintains a high yield of fatty acids. These results indicate that there is a considerable increase in catalytic activity when the average particle size is decreased. The continued use of the resin in such "batch" operations results in a loss of catalyst, but this loss is partly compensated for by increased catalytic activity due to increased resin surface.

The continued efficient "batch" operation of such a tallow splitting process would require: a) regeneration of the residual resin at the end of each complete operation, b) addition of fresh resin to replace mechanical loss. Column operation of this tallow splitting process would minimize mechanical loss of catalyst, but there may be some difficulty in maintaining an adequate flow rate with 200-400 mesh particles.

The investigation of cation exchange resin catalysts in fat hydrolysis is being continued with comparative studies of mineral acid and resin catalysts, using "Sulfonate" and "Sulfonic Acid" types of fat splitting agents.

Summary

An acid regenerated cation exchange resin (Dowex-50, 200-400 mesh) is an effective catalyst for tallow splitting. The optimum level of catalyst was approximately 3% of the weight of fat. A two-stage operation for 12 hr. at 100°C. gave fatty acid yields which ranged from 96% to 100% (calculated as % oleic acid).

The Dowex-50 catalyst was easily recovered after each operation, regenerated with 100 ml. of 4N. hydrochloric acid, and used again in the next operation with no appreciable decrease in catalytic activity.

The original resin can be used in continued efficient tallow splitting operations if the residual resin is regenerated after each complete operation and additional fresh resin is added to make up mechanical loss.

Acknowledgment

Appreciation is expressed to G. A. Lamers for technical assistance during this investigation. Tallow samples were obtained through the courtesy of the Columbus Rendering Company, Columbus, Ohio.

REFERENCES

1. Bauman, W. C., Skidmore, J. R., and Osmun, R. H., Ind. Eng. Chem., *40*, 1350 (1948).
2. Levesque, C. L., and Craig, A. M., Ind. Eng. Chem., *40*, 96 (1948).
3. Schlenk, H., and Holman, R. T., J. Am. Oil Chem. Soc., *30*, 103 (1953).
4. Sussman, S., Ind. Eng. Chem., *38*, 1228 (1946).
5. Thomas, G. G., and Davies, C. W., Nature, *159*, 372 (1947).

[Received May 20, 1953]

Report of the Refining Committee, 1952-53

DURING the year 1952-53 the activities of the Refining Committee were confined to the work of a subcommittee consisting of V. C. Mehlenbacher, Wales Newby, E. H. Tenent, and W. T. Coleman, chairman. The subcommittee undertook to study the refining characteristics of cottonseed oil solvent extracted from pre-pressed seed with a view toward recommending a tentative laboratory procedure.

Mr. Coleman reported to the Refining Committee at the 1953 meeting in New Orleans to the effect that the behavior of this oil was so erratic that the subcommittee had not been able to determine any method of refining it in the laboratory which would give concordant results. He stated that in his opinion the behavior of the oil was due to wide processing variations which were extremely difficult and costly to control. Therefore he doubted whether a uniform oil of this type would be produced in the near future.

After considerable discussion it was decided to discharge the subcommittee with the thanks of the Refining Committee for their work since it was the consensus that no useful purpose would be served at this time by any further study of the oil in question.

This action of the Refining Committee means that it will be the responsibility of the seller to specify the method to be used by the buyer in refining the official sample; *i.e.*, expeller, hydraulic, regular, or slow breaking.

E. M. JAMES, chairman.