Trend of Chemical Research in the Oil Industry

A Resume of Recent Progress in the Chemistry and Technology of Glycerides

BY DAVID WESSON

BROADLY speaking, the chief work of today seems to be that of broadening our present knowledge of well-known processes with the end of introducing refinements and improvements rather than the development of new processes.

It is, perhaps, significant that at the St. Louis meeting of the American Chemical Society last month, there were no papers presented on fats and oils.

Improved analytical methods have given means for investigating the constitution of fats and oils not known a few years ago, and our literature contains, not only many reports on the constitution of well known oils, but also those which are comparatively rare. The painstaking methods of Jamieson of the Bureau of Chemistry in Washington are constantly bringing to light the properties of many oils hitherto unknown.

The discovery that the character of fats, using the term in its broadest sense, depends on the arrangement of the different fatty acids in the fat molecule has opened an almost limitless field for research, and the fat chemist of today realizes that the chemistry of the glycerides is an ever-widening field of interest.

Solvent Extraction

The method of solvent extraction is one which has already received much attention abroad, and is receiving more and more in this country. It is the ideal method of separating the oil from the seeds containing it. Take the cotton seed for instance, with our present method of pressing we leave in good practice 5.5 to 6.0 per cent of oil behind in the cake where it is available for cattle food or wasted if the meal is used for fertilizer. If the oil be extracted from the meats by proper solvents, and similar means be used for extracting the gums and gossypol this valuable protein residue can be made available as a meat substitute in human food and will greatly enhance the value of the seed as part of the cotton crop.

The future of solvent extraction depends on improved engineering methods combined with proper knowledge of different solvents.

Great advances are being made in the production of solvents by the petroleum refineries and the by-product coke ovens.

Refining Methods

In refining methods much has been learned about the proper application of alkalies. Our knowledge has been greatly increased by the notable researches of the refining committee of the American Oil Chemists Society.

The work done on the filtration of crude oils by the use of filter-aids is a step in the right direction. It is only common sense to remove all materials which can be

separated from the crude before treating it with caustic soda. The reason this has not been done until recently is because in the past filtration experiments on crude oils were attempted with unaided press cloths which allowed the slime to pass through with the oil. The result was almost as much emulsification and no gain in the refining loss.

In the matter of filtration of crude oils a great deal of work is being done investigating and improving filtering materials.

The clays treated with sulphuric acid produce some remarkable results as compared with the natural products. Referring to the latter, great improvements have been made by greater care in their preparation so that the refiner is assured of uniform products.

There are constant improvements taking place in the various carbons which, in the vegetable oil industry, have entirely supplanted boneblack.

In the deodorization of oils the trend seems to be toward better constructed machinery and a more scientific application of heat and of the basic principles of distillation.

The chemistry of the process seems to have been pretty welll worked out, and the future for improvement seems to rest on intelligent application.

In the process of hydrogenation much attention is being given to both continuous processes and selective hydrogenation. The latter is of especial importance in turning out uniform food products. The value of continuous processes over the batch method does not seem to have been fully demonstrated yet by practical use.

Synthetic fats by direct combinations of glycerides and fatty acids are now a possibility and under the right commercial conditions are available in times of scarcity. Considerable work is being done in synthesizing different glycerides on the laboratory scale, and the time may come when this work will lead to interesting developments commercially.

An enormous amount of work is being done with Vitamins. Several processes have been devised for separating fat-soluble Vitamins in such a form that they can be made available in food and medicinal products, so as to refute the argument that margerine is not as good as butter.

The work done by Hess and others has demonstrated pretty completely that anti-rachitic Vitamin D can be produced by the treatment of cholesterol and phytosterol with ultra-violet light. This product has the same anti-rachitic value as the Vitamin D found in Cod Liver Oil.

Recent research has developed the fact that Vitamin D can be commercially produced from ergosterol and it is now a commercial product available for either medicinal purposes or for bringing edible fats up to the same standard as butter fat insofar as Vitamin D is concerned.

There is considerable research being done in improving analytical methods which are constantly aiding and broadening the field of knowledge of the constitution of the glycerides.

It is believed that the future holds forth comparatively few revolutionary changes due to fundamental processes as stated before. Refinements and manufacturing improvements will give better products economically produced.