Papers on Vegetable Oils Are Read Before the American Chemical Society

AT the annual spring meeting of the American Chemical Society, at Richmond, Va., held the week of April 11, several papers were read in which the oil chemists will be interested. Dr. E. P. Clark, who is conducting basic chemical research into cottonseed products for the Interstate Cottonseed Crushers Association, read a preliminary report of new investigations upon the Chemistry of Gossypol. An abstract of Dr. Clark's paper prepared by the Society states:

"As is well known, the feeding to stock of cottonseed or excessive amounts of cottonseed meal produces a syndrome which if the feeding is continued terminates fatally. According to Carruth and to Schwartze and others, the principle responsible for this toxic effect is gossypol. However, in cottonseed meal very little free gossypol is present, but a substance 'd' gossypol can be obtained as an aniline derivative by hot aniline extraction. It has been suggested that this 'd' gossypol may be an oxidation, reduction or hydrolytic product of gossypol which is physiologically inert. The chemistry of gossypol and 'd' gossypol is practically unknown. Marchlewski suggested the formulas $C_{13}H_{14}O_4$, or $C_{32}H_{34}O_{10}$, while Carruth suggested $C_{30}H_{28}O_9$ or $C_{30}H_{30}O_9$ and further states that possibly it is a condensation product of two molecules of a flavone. The preliminary report upon this subject now being made pertains to the nature of the gossypol molecule and to the identity of the two substances 'aniline gossypol' and 'aniline' 'd' 'gossypol' with a suggestion as to the cause of the diminution of toxicity due to the cooking and pressing process used in the manufacture of cottonseed oil. As to the nature of gossypol, it has now been found that it is a nitrogenous body in which the nitrogen is undoubtedly present in ring formation."

* * *

Other papers were read before the Biological Chemistry Division, which have been abstracted follow:

The present status of the so-called cottonseed meal injury. By J. O. Halverson.

Two views have come to be held in regard to the injury caused by the heavy feeding of cottonseed meal. Since the isolation of a toxic substance, gossypol, from the seed of the cotton plant, by Withers and Carruth, one view holds that this toxic substance is the cause of this injury, thus causing cottonseed meal poisoning. Another view, since the discovery of the deficiency diseases, holds that the excessive feeding of the meal from the seed of the cotton plant may cause effects which may be due to nutritive deficiencies in the ration. Such deficiencies in a ration high in cottonseed meal may cause symptoms similar to those of gossypol poisoning. McGowan and Crichton have recently shown this on pigs.

* * *

Studies on gossypol: The elimination of d-gossypol from cottonseed meal. By F. W. Sherwood.

The results reported in this paper show that under proper conditions, and in the presence of ferrous sulfate, 90 per cent or more

of the d-gossypol in cottonseed meal can be destroyed. They further show that when cottonseed meal is heated to 125° C. in an autoclave the addition of an iron salt is unnecessary, water alone being sufficient to destroy the d-gossypol. With the lot of cottonseed meal used in these experiments 90 per cent or more of the d-gossypol present was destroyed by heating the dry meal to 125° C. for one hour in an atmosphere of steam. In 19 other samples of cottonseed meal the amount of d-gossypol destroyed varied from 36 to 76 per cent, with an average of 53 per cent of that originally present, when they were heated in an autoclave to 125° C. for one hour.

To Vitaminize Oleomargerines?

SCIENTISTS here and in Europe, more or less collaborating on the problem, have come to the same conclusion, according to Dr. Alfred F. Hess, of the College of Physicians and Surgeons at Columbia University, that the anti-rachitic vitamin D. is formed when certain sterols, a group of substances similar to fats, widely distributed in the lower plants, are exposed to ultra-violet light. Both Dr. Hess and Drs. O. Rosenheim and T. A. Webster, of the National Institute for Medical Research in London, have collaborated with Professor A. Windaus, of Göttingen University, in Germany, who has been engaged in research on the chemical problems involved in the isolation of the anti-rachitic vitamin for years.

About two years ago, Dr. Hess reported that cholesterol, occurring in all animal fats and oils, and its counterpart, phytosterol in vegetable foods, after irradiation with ultra-violet light, was the substance actually responsible for preventing rickets. Irradiated cholesterol in very much smaller doses would produce the same results as cod liver oil, only one millionth of a gram being necessary to protect a rat.

Now, however, another step in the pursuit of the vitamin has been accomplished. The English workers, Dr. Hess and Professor Windaus, of Göttingen, all believe that it is only a small portion of the cholesterol which is activated by ultra-violet light. This is an allied substance called ergosterol. This compound is widely distributed in lower plant forms and only very minute quantities are needed to protect laboratory animals from rickets.

"It was found," says Dr. Hess, "to bring about a healing process of the bones when even as little as .0003 mg. per capita daily was given. In tests in which irradiated cholesterol is fed, it has been found that approximately 1 mg. is needed to initiate healing. Other experiments will be undertaken to ascertain the relationship of ergosterol to cholesterol and the extent of its distribution in the body."

The practical value of the discovery of this concentrated form lies in the fact that it will be possible now to dispense with the cod liver oil. Hitherto it has been the practice to resort to such general remedies as sunlight and a diet of foods known to contain anti-rachitic elements. A German authority has suggested that one of the consequences of this research will be to put oleomargarine products on an equal basis with butter and cream.