



FATS AND PROTEINS RESEARCH FOUNDATION, INC.

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"THE DIRECTOR'S DIGEST"

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Scientists are eternally hopeful, always optimistic, but good research scientists always subject their original optimistic hypotheses to the most rigorous laboratory experimentation and evaluation. Sometimes such careful laboratory research supports the hypotheses, but more frequently the original concept is not immediately supported by extensive, critical laboratory investigation. Unfortunately a recent report from Jules D. Porsche and Associates on the FPRF-sponsored project "Microbial Modification of Saturated Fatty Acids and Tallow" indicates that this study falls in the latter category.

Despite promising preliminary results (see "The Director's Digest", April 21, 1965), detailed laboratory investigations has shown that the oleic acid formed from the saturated stearic acid by the particular microorganism under study does not result from the direct dehydrogenation of stearic acid. Rather the oleic acid is formed by synthesis from oxidative degradation products of stearic acid. In fact the microorganism could produce oleic acid from other compounds such as alcohols. Obviously the energy relationships that would be involved in the production of oleic acid through the oxidative degradation of stearic acid and synthesis of oleic acid make the process economically unfeasible. Resting cells of the microorganisms produced only very small amounts of oleic acid from stearic acid, but did produce considerable amounts of a variety of hydrocarbons. These could not be identified by thin layer chromatography or infrared analysis. They contain no functional groups and are apparently of rather high molecular weight. Thus these compounds are unlikely to be of commercial value and no additional work on them is planned. Furthermore no additional research will be done with the same microorganisms. With the knowledge gained from the study thus far, some screening of other microorganisms will be made for possible application in producing compounds of potential commercial value from saturated fatty acids and fats.

It should be emphasized that the failure to attain the ultimate objective of forming unsaturated fatty acids directly from saturated acids in this research project must not be interpreted as indicating that such a transformation is impossible. We just haven't found the right microorganism and the proper conditions for the change.

One of the major problems of the rendering industry involves improved utilization of the collagen protein. Theoretically the nutritive value of this type of protein could be improved by appropriate fermentation techniques whereby the collagen is transformed into higher quality yeast or bacterial protein. Early this year, FPRF contracted with Jules D. Porsche and Associates to undertake a study on the "Microbial Modification of Collagen" to improve the nutritive quality of collagen protein.

The first quarterly report on the project indicates that a few yeasts will grow quite readily on collagen as the only source of carbon and nitrogen. Growth is improved somewhat by the addition of small amounts of glucose, trace minerals and yeast extract. Dramatic increases in growth were obtained by including small amounts of proteolytic enzymes in the fermentation medium. Apparently the collagen is partially degraded by the enzyme and thus made more readily available to the yeast. This technique may make it possible to utilize a much wider variety of yeasts for collagen conversion and thus increase the possibility of improving the nutritive quality.

NOTES ON OTHER FPRF PROJECTS

Beef Cattle Feeding Trials at North Carolina State University

These trials are designed to determine the value of fat and sucroglyceride in rations for growing-fattening beef cattle. After 121 days on test the cattle are showing excellent performance. There are no differences in gains between the lots fed rations containing 5% fat and those fed rations in which part of the fat is replaced with sucroglyceride. However, the gains are so high (approximately 3 pounds per day) that no improvement in rate of gain could be expected by any ration modification. Final results on these trials, including feed efficiency data, will not be available for several weeks.