TABLE X

Mean Organoleptic Scores of Experimental Full-Fat Flours (12 Evaluations by Taste Panel)

Sample lot designation	Mean score[a]	Samples associated with the same letter do not differ significantly at the 95% level		
J[b]	3.73	x		
Commercial soy flour[c]	4.93	x	y	
P	5.63		y	z
GG	5.92		y	z
O	6.14		y	z
N	6.14		y	z
M	6.41		y	z
H	6.44		y	z
B	6.51		y	z
G	6.58		y	z
BB	6.72			z
A	6.80			z
K	6.87			z

[a] Scoring—strong flavor (0) → bland (10).
[b] Significantly lower than samples K,A,BB,G,B,H,M,N,O,GG and P.
[c] Significantly lower than samples A,K and BB.

Clinical and acceptability testing is also being done by the College of Medicine of the National Taiwan University, Taipei, Taiwan. It is part of a large-scale clinical test with infants up to 12 months of age to compare the extruded soy flour formulated as a milk, with various other soybean products.

Conclusions

The studies described indicate that a full-fat soybean flour of good flavor, high-nutritive value, low-bacteria count and good oxidative stability can be produced by the new extruder-cooking process. The high-nutritive value of the soy flour is attributed to the relatively high temp-short retention time process. Growth inhibitors are effectively destroyed, whereas the heat-labile amino acids, vitamins and other nutrients are preserved. The process largely removes the objectionable bitter-beany taste in soybeans as shown by acceptance scores obtained in taste-panel tests.

The studies were carried out in commercial-scale equipment, which is highly compact for its capacity due to the very short retention periods. The design of this equipment and the extruder-cooking process, therefore, should meet the requirements of UNICEF in providing compact, high-efficiency processing units for installation in newly developing countries.

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REFERENCES

1. Baliga, B. P., M. E. Bayliss and C. M. Lyman, Arch. Biochem. Biophys. *84*, 1 (1959).
2. Bird, H. R., R. V. Boucher, C. D. Caskey, Jr., J. W. Hayward and J. E. Hunter, J. Assoc. Offic. Agr. Chemists *30*, 354 (1947).
3. Feedstuffs *33*(25), 1 (1961).
4. Hill, F. W., Feedstuffs *31*(34), 6 (1959).
5. Jiminez, A. A., T. W. Perry, R. A. Pickett and W. M. Beason, Feedstuffs *33*(44), 42 (1961).
6. Lyman, C. M., W. Y. Chang and J. R. Couch, J. Nutr. *49*, 679 (1953).
7. Milner, M., Food Technol. *17*(7), *26* (1963).
8. "Official and Tentative Methods," AOCS, V. C. Mehlenbacher, T. H. Hopper and E. M. Sallee, eds., 2nd ed., rev. to 1959, Chicago, Ill., 1945–1959.
9. Poats, F. J., H. O. Doty, Jr. and C. P. Eley, ERS Bull. 32, U.S. Dept. Agr., October 1961, p. 16.
10. Scrimshaw, N. S., Food Technol. *17*(7), 30 (1963).
11. Smith, A. K., and S. J. Circle, Ind. Eng. Chem. *30*, 1414 (1938).
12. Soybean Council of America, "Tentative Quality and Processing Guide for Edible Soy Flour or Grits," July 1961.
13. Stephenson, E. L., and L. Tollett, Feedstuffs *31*(8), 8 (1959).
14. Wu, Y. V., and H. A. Scheraga, Biochemistry *1*, 698 (1962).

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Report AOCS Industrial Oils and Derivatives Committee, 1964

The Industrial Oils and Derivatives Committee and four of its Subcommittees met during the AOCS meetings in New Orleans April 20 and 21, 1964. The following summary of these meetings is published to keep the members of the Society informed regarding the activities of this committee, K. E. Holt, Chairman.

Consolidation of Methods

Following the 1963 fall meeting of the Society it was reported that tentative approval had been given to the consolidation of the methods coming under the jurisdiction of the Industrial Oils and Derivatives Committee. Along with this consolidation a "Recommended Practices for Testing" Method would be written for each group or type of product that falls into the category of industrial oils or derivatives of these oils. These methods have now been completed and approved by the Industrial Oils and Derivatives Committee and are ready for submission to the Uniform Methods Committee. If they meet the approval of this Committee, they will be published in the next revision of the AOCS Official Methods Book.

Fatty Nitrogen Products Subcommittee, G. G. Wilson, Chairman

Three Task Groups of the Fatty Nitrogen Products Subcommittee reported on the progress of their work. Task Group 1 on Fatty Amido Amines reported that no progress has been made on the development of methods for primary amine value, hydroxyl value and non-amine and imidazoline value. They will continue to work on these methods. Task Group 3 on Fatty Diamines and Task Group 4 on Fatty Amines are working to develop a procedure to adapt the gas chromatograph for the separation and analysis of these products. Each of the Task Groups will prepare a standard sample by use of pure diamines in the case of Task Group 3 and pure amines in the case of Task Group 4. The Task Group members will use the official AOCS Gas Chromatograph Method or any other Gas Chromatograph Method that will give adequate separation of the standard sample components. They will report peak areas, response factors and percent of components.

Epoxidized Oils Subcommittee, Dave Barlow, Chairman

Results of scouting tests on hydroxyl procedure for epoxidized oils were presented at the Subcommittee meeting. These tests were carried out in the laboratories of Union Carbide, Swift and Archer Daniels Midland and the procedures scouted were 1) a phenyl isocyanate method, 2) an infrared spectral method, 3) the AOCS method using acetic anhydride and 4) a modified acetylation procedure. Only the last method, a room temperature acetylation, appears amenable to further study. It was decided that a full Subcommittee collaborative study should be made on the modified acetylation procedure at room temperature.

The application of an idione value method and

heat stability method to expoxidized oils were discussed. It was decided that there is need for development of a standard heat stability test on epoxidized oil. As the first phase of this study, the Chairman will assemble the various heat stability tests used by the members and distribute them to the Subcommittee for comments.

Polymerized Fatty Acids Subcommittee, G. G. Wilson, Chairman

The Polymerized Fatty Acids Subcommittee has approved the use of AOCS methods on sampling, acid value, saponification value, unsaponifiable, Gardner color and percent water for testing of polymerized fatty acids. The Subcommittee is now working on the development of a satisfactory method for determination of unsaturation and, also, a satisfactory gas chromatograph method.

Drying Oils Subcommittee, Don Bolley, Chairman

The Drying Oils Subcommittee is continuing to work on the development of a method for measuring haze or cloud in drying oil samples. Ed Handschumaker of Spencer Kellogg Company reported on work done on measurement of haze using a nepholometer. The results of this work look very promising and the study will continue in the hopes of developing a method suitable for routine laboratory use.

New Subcommittees

Following the 1963 fall meeting it was reported that the Society would be surveyed to determine if there was enough interest to establish Subcommittees on Alkyd Resins, Dibasic Acids and Hydrogenated Oils.

Francis Scofield reported that the methods already published in the Oils and Derivatives Sections of AOCS Official Methods are apparently adequate for the analysis of alkyd resins and there is little interest among Society members for the establishment of an Alkyd Resin Subcommittee. Mr. Scofield was requested to write a Recommended Practices Method for the testing of alkyd resins to be included in the Industrial Oils and Derivatives Section.

Don Roblin reported considerable interest in the establishment of a Dibasic Acid Subcommittee, also, that a similar Committee is being established in ASTM E-15. Mr. Roblin was requested to proceed with the organization of a Dibasic Acid Subcommittee to work as a liaison group with the ASTM D-15 Committee.

Ross Walker reprted that there is sufficient interest in a Subcommittee on Hydrogenated Oils to establish a Subcommittee. Mr. Walker was requested to proceed with the organization of a Hydrogenated Oils Subcommittee and Society members interested in Hydrogenated Oils should contact Mr. Walker.

Hydrogenation of Linolenate. X. Comparison of Products Formed with Platinum and Nickel Catalysts[1]

C. R. SCHOLFIELD, R. O. BUTTERFIELD, V. L. DAVISON and E. P. JONES,
Northern Regional Research Laboratory,[2] Peoria, Illinois

Abstract

One mole of hydrogen/mole of ester was added to methyl linolenate over a platinum catalyst at 20C and atmospheric pressure. The product was separated into trienoic, dienoic and monenoic esters by countercurrent distribution (CCD) with acetonitrile and hexane. Each of these ester fractions was further separated by CCD with methanolic silver nitrate and hexane.

Comparison with hydrogenations, in which a commercial nickel catalyst at 140C and atmospheric pressure was used, shows that with platinum more stearate is formed; i.e., the platinum hydrogenation was less selective. Also, a smaller amt of *trans* esters was formed with platinum, and there was less shift of double bonds from the original 9, 12 and 15 positions.

Introduction

IN A PREVIOUS PAPER (14) a study was described of the products formed by partial hydrogenation of methyl linolenate with a nickel catalyst. The reduced fatty acid methyl esters from three hydrogenations were separated into triene, diene and monoene fractions by CCD between acetonitrile and hexane. Some of these fractions were further separated by CCD with an argentation system previously described (15). To compare these products with those formed when linolenate was reduced with a different catalyst and under different conditions, a hydrogenation was made at 20C with a platinum catalyst, and the product was fractionated by CCD in the same way as had been done with the nickel-catalyzed products. The composition of products obtained with platinum is compared here with those from nickel discussed previously (14).

Experimental

Methyl linolenate (50 g) was reduced at 20C by stirring under hydrogen at atmospheric pressure with a magnetic stirrer and using 0.25% platinum as a 5% platinum-on-carbon catalyst. One mole of hydrogen/mole of sample was added in 4.25 hr. Analytical data on the product are compared with the nickel-catalyzed products in Table I.

The nickel-catalyzed hydrogenations are numbered in the same way as in the previous paper (14). Although they were all performed at 140C, at atmos-

TABLE I

Analysis of Reduced Methyl Linolenates

Run	Time of reaction, hr	Wijs IV	*trans*,[a] %	Diene conjugation $a_{231-234}$	Composition by CCD			
					Triene, %	Diene, %	Monoene, %	Stearate, %
1 (Ni)	0.5	153.5	37.2	0.5	21.1	40.8	37.2	0.9
2 (Ni)	13	.....	61.8	1.1	39.2	38.7	20.4	1.7
3 (Ni)	11	138.2	62.7	0.4	6.9	59.9	32.8	0.4
Pt	4	170.9	16.2	3.7	43.4	27.2	22.5	6.6

[a] Methyl elaidate standard.

[1] Presented at AOCS Meeting, Atlanta, 1963.
[2] A laboratory of the No. Utiliz. Res. & Dev. Div., ARS, USDA.