TABLE 6

Glyceride Composition of Solid Fractions Obtained by Crystallization of Lard, Hydrogenated Lard, and Tallow at 15° C. (25-g. samples). Calculations Are Based on Corrections for the Iodine Values of Di-Saturated Glycerides.

Sample		Fraction	Iodine Value of Fraction	Glyceride Composition of Fraction				Tri-Saturated Glycerides in Original Sample	
				Tri-Saturated		Di-Saturated		%	Average %
		g.		g.	%	g.	%		
Lard—A	a	0.7315	7.02	0.5603	76.6	0.1712	23.4	2.24	2.25
	b	0.7630	7.79	0.5648	74.0	0.1982	26.0	2.26	
Lard—B	a	0.8870	6.70	0.6889	77.7	0.1981	22.3	2.76	2.63
	b	0.8856	8.80	0.6258	70.7	0.2598	29.3	2.50	
Hydrog. Lard—B_1	a	2.3500	16.6	1.0500	44.7	1.3000	55.3	4.20	4.27
	b	2.4980	16.2	1.0840	46.2	1.2660	53.8	4.34	
Hydrog. Lard—B_2	a	8.8330	19.9	2.9740	33.7	5.8590	66.3	11.89	12.04
	b	8.7000	19.5	3.0460	35.0	5.6540	65.0	12.18	
Hydrog. Lard—B_3	a	18.1700	14.9	9.1460	50.3	9.0240	49.7	36.58	37.02
	b	18.2500	14.6	9.3680	51.3	8.8820	48.7	37.47	
Tallow	a	4.7434	7.56	3.5481	74.8	1.1953	25.2	14.20	14.20
	b	4.7124	7.40	3.5500	75.3	1.1624	24.7	14.20	

tion of tri-saturated glycerides from lard, hydrogenated lard, and tallow.

Based on the weight and analysis of the precipitate obtained, a practical method for calculating the amount of tri-saturated glycerides in lard and tallow is proposed. When applied to several hydrogenated lards the method gave constant and reproducible fractions, which contained, in addition to tri-saturated glycerides, considerable amount of "isooleins." Some uncertainty is attached to the direct application of the method of calculation to these materials because of possible presence of mono-saturated-di-"isooleins."

Several samples of commercial lard examined contained about 2.5% of tri-saturated glycerides whereas a sample of edible tallow contained about 14.0%. The proposed method, when applied to lard, gives results in good agreement with those obtained by the acetone-permanganate oxidation method of Hilditch and Lea. The chief advantage of the crystallization method is that much less time is required for the analysis.

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Committee On Food Research*

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WHEN the United States entered World War II, few food products and rations existed which had the necessary characteristics for military use overseas. Military characteristics include considerations of stability, utility, nutritional adequacy, and acceptability at the time of issue. During and since the war a large task has been accomplished in obtaining and applying to the needs of the Armed Forces the technical information available from industry, research institutions, and scientific literature. Already striking developments in rations have resulted and improvements continue but it is now evident that the available stockpile of technical knowledge requires considerable implementation to produce further information for necessary changes that are indicated.

The Armed Forces need foods which have the necessary military characteristics mentioned above. Many of the changes in commercial foods required for incorporating the military characteristics did not depend upon research but rather the application of common sense. Much time was consumed in acquiring the information which was needed and not available, such as shelf-life tests to determine the stability of rations for overseas use. During the war the rush of immediate problems and their translation into specifications of industrial and technological information taxed the capacity of the Institute and its staff.

Toward the end of the war it became apparent that certain questions were arising to which there were no immediate answers. For example, there was a need for canned meat that would look and taste like fresh meat; for powdered whole milk that would resemble fresh whole milk, when reconstituted; and bread in a form sufficiently stable to resemble fresh bread. These problems have the common characteristic of requiring fundamental investigations for their solution.

In 1942 the glaring deficiencies of powdered whole eggs were apparent. Preliminary investigations indicated that serious deterioration would occur in six days at 100° F. After a cooperative program was initiated, with 22 research organizations participating, progress was made in determining the mechanism of powdered egg deterioration, and a product was developed which now remains stable for more than six months at 100° F.

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The powdered egg program served as a pattern for cooperative research and indicated the feasibility and desirability of expanding the operation to all subsistence activities. Accordingly, in February, 1945, the Military Planning Division of the Office of The Quartermaster General authorized the establishment of the Committee on Food Research. *(See Appendices One and Two for a statement of the mission, function, objectives, and organization of the Committee on Food Research.)*

At the beginning of the war the Institute placed major emphasis on nutritional adequacy, nutritionally balanced rations, but the real need was for an integrated program built on the four cornerstones of military necessity. That is, acceptability, nutritional adequacy, stability, and utility. The food acceptance research program now under way comprises four main divisions:

1. Food habit studies on the optimum frequency rates with which foods can be eaten, national versus regionally preferred foods, food variety preferences, food preparation preferences, racial, sexual, and age differences, food idiosyncrasies, and food patterns.
2. Psycho-physiological studies on investigations of how thirst and appetite function, foods that inhibit or accelerate thirst and appetite, belly-filling properties, satiety, taste and odor thresholds, the significance of spicing and blandness and the separation and delineation of the psychological and physiological factors affecting acceptability.
3. Organoleptic studies under controlled laboratory conditions for the purpose of working out rapid and reliable methods for screening products to ascertain food preferences, and to assist in product development and improvement.
4. Statistical theory for the design and interpretation of experiments.

Nutritional adequacy includes the design of various types of rations for military use under varying conditions and in extremes of weather and environment. An example is the low caloric and low water intake ration intended for use under life raft conditions. Stability involves consideration of chemical, physical, microbiological, and insect infestation factors. Utility investigations of military food and rations are concerned with space and weight-saving developments, ease of preparation and handling, and products with exceptional keeping quality, such as chocolate that does not melt in the sun's heat, spreads for bread that do not require refrigeration, and cocoa beverage powder that can be reconstituted readily with cold water.

By July, 1945, the Committee's activities were well under way. An appropriation of more than $750,000 had been allocated. During the first year of operation 125 research projects were established in 84 laboratories. Seven technical conferences were held: On the Deterioration of Fats and Oils, Food Habit Studies, Developing Concepts of Protein Metabolism, Metabolism of Low Caloric Intake, Bread Staling, Microbiology, and Dairy Chemistry. A conference bulletin was published on the Deterioration of Fats and Oils, QM 17-7. A second publication was the Research Program for 1945-1946, QM 17-8, which is an abstract of the 125 research projects. A third publication is in preparation, a conference bulletin on Food Acceptance Research. Plans for the current fiscal year include conferences on the Browning Reaction and the psycho-physiology and laboratory phases of the Food Acceptance Research program.

A coordinated food research program has significance above and beyond military activities. The investigations of this program are of civilian concern as well as the military. The problems under investigation will not be solved without special effort to sustain such a program. The Committee's program has many implications to industry, to colleges and universities, foundations, government agencies, the Armed Forces, and civilian populations of the world.

By avoiding product development research and emphasizing fundamental investigations, the Committee will provide a backlog of information for application by industrial laboratories in improving and developing food products. The Committee offers to industry informal agreements to undertake cooperative investigations. It will disseminate and exchange technical information with industry and industrial organizations. Because the Quartermaster Food and Container Institute is responsible for the preparation of Quartermaster Corps Tentative Specifications, it is in a unique position to ascertain the basic problems of the food industries.

This military program in food research offers to colleges and universities a means of coordinating research projects and facilitating research through the transfer of information, which in turn will stimulate other investigators to undertake new projects. The Committee will endeavor to define the problems only while direction and supervision will remain with the institutions in which the work is being done. Other government laboratories and agencies responsible for food research will be consulted. The Committee offers to subsidize research in government laboratories along lines involving food problems of the Armed Forces when such laboratories have facilities not available elsewhere.

The implications of this program to the Armed Forces are that fundamental information will be applied by the Quartermaster Food and Container Institute for the Armed Forces to the improvement and development of rations and food products for present and future military use. It is hoped that the results of this program will be far reaching and sufficiently fundamental to be helpful in solving world food problems so that foods will be more acceptable, more nutritious, more stable, and more useful. Thus the civilian populations of the world will benefit, and the present huge task of feeding the people in war-torn countries can be accomplished on a scientific basis.

APPENDIX ONE

The Committee has for its mission the fostering of scientific investigations which will provide a bulwark of technical information for the solution of current feeding problems of the Armed Forces and a reserve for national security in times of emergency. The specific objectives are to:

Insure the development of information on methods for improving and evaluating the acceptability of foods used under various operational conditions;

Improve and evaluate the nutritional and physiological adequacy of rations for use under various operational conditions;

Improve the functional properties of food;

Investigate the chemical and microbiological factors, and methods for their control, affecting the stability of foods and rations.

The general objectives are to:

Augment and spearhead the work of the Quartermaster Food and Container Institute for the Armed Forces;

Support only basic food research of military significance in areas which might not otherwise be investigated;
Ascertain and delineate the military problems in food research;
Arrange for critical literature surveys and bibliographies;
Provide for the integration of the related sciences that comprise food research;
Encourage the early publication of papers and monographs to facilitate the development of areas in food research;
Insure the dissemination of scientific food information to interested agencies;
Serve as a clearing house for technical information;
Provide for the training of graduate students in food research;
Bring together the workers in scientific fields bearing on food research through conferences, meetings, seminars, and advisory boards.

To accomplish its missions and objectives, the Committee on Food Research undertakes the following functions:

To reflect the food problems of the Armed Forces into technical objectives;
To ascertain the nation's research and development facilities available for undertaking specific investigations;
To recommend the placing of contracts with research and development agencies;
To hold frequent meetings, conferences and seminars;
To channel technical information to the Quartermaster Food and Container Institute for the Armed Forces and other agencies of the Armed Forces for application to military problems.

In the order establishing the Committee on Food Research, the Office of the Quartermaster General defined its general functions:

The Committee will maintain technical liaison with government, quasi-government, and allied government agencies, research institutions, foundations, industrial associations and companies. It will initiate, channel, and exchange information with these institutions on subjects relating to fundamental food research and development activities and ascertain the Army's present and future technical food problems.

APPENDIX TWO

The Committee on Food Research is an integral part of the Quartermaster Food and Container Institute for the Armed Forces and is composed of the Committee proper and advisors.

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Abstracts

Oils and Fats

Edited by
M. M. PISKUR and SARAH HICKS

GRAIN STORAGE STUDIES. IV. BIOLOGICAL AND CHEMICAL FACTORS INVOLVED IN THE SPONTANEOUS HEATING OF SOYBEANS. M. Milner and W. F. Geddes (Univ. Minnesota, St. Paul). *Cereal Chem. 23,* 449-70 (1946). Surface sterilization of the seeds failed to eliminate mold infection, whereas inoculation of autoclave-sterilized soybeans with spores of *Aspergillus flavus* yielded heating and respiration curves virtually identical to those of normal seeds. Spontaneous heating of sterile seeds in which no microfloral activity had occurred was demonstrated. Chemical changes in the heating seeds assayed at intervals in the course of the trials indicated a disappearance of total sugars in the initial biological phase of heating and an increase in reducing substances in the initial spontaneous chemical heating phase. The petroleum ether-soluble fraction remained virtually unchanged in the biological heating stage but decreased markedly in the chemical heating phase, without a corresponding loss in dry matter content of the seeds. Respiratory quotients associated with the gas exchange during the spontaneous chemical heating phase suggest the occurrence of thermally induced oxidative cleavage of carbohydrates as well as oxidative polymerization of the seed oils.

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