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Prepared under the Editorship of
W. O. LUNDBERG

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PREFACE

This volume represents a collection of abstracts of papers dealing with the properties and behavior of fats, oils, and detergents. The material was originally published in 1957 in the outstanding journals in this and foreign countries, and therefore constitutes documentary evidence of progress in the fields of fats, oils, and detergents throughout the world.

It should be noted that although the information is presented in the form of abstracts, these abstracts differ from those conventionally used. They are far more complete and generally contain original data, graphs, charts, photographs, etc., so that in many cases workers will not find it necessary to refer to the original works. The abstracts were published originally in loose-leaf form. The bound and indexed volume will make them still more accessible in libraries for reference purposes.

The Editors

Subject:	Effect of polyoxyethylene-8-monostearate on liver function.	A:165

AUTHORS: Oscar R. Kruesi and Theodore B. van Itallie.

LOCATION: The Medical Service, St. Luke's Hospital, New York, N. Y.

PUBLICATION: Food Research, 21, 565-68, September-October 1956.

TITLE: Effect of polyoxyethylene-8-monostearate (MYRJ 45) on liver function in patients convalescing from hepatic disorders.

PURPOSE: To study the influence of polyoxyethylene-8-monostearate on convalesence from hepatic disease.

METHODS: Ten patients who were convalescing satisfactorily from hepatic disease were studied. Four had Laeunec's cirrhosis of the liver, four had infectious hepatitis, one had subacute hepatitis, and one had hepatitis associated with schistosomiasis.

The polyoxyethylene-8-monostearate (MYRJ 45) was administered orally in 0.5 g. capsules, three to 6.0 g./day in divided doses for periods ranging up to 66 days. Initially the MYRJ 45 was given in small amounts and the clinical course and liver function tests were followed weekly; later the amounts were increased and the duration of the period of observation extended.

The standard liver function tests ordinarily included measurement of the serum bilirubin concentration, the cephalic flocculation index and the thymol turbidity test, bromsulfalein retention, serum albumin and globulin concentrations, and the serum alkaline phosphatase level. Total serum cholesterol and esterified cholesterol levels were measured in some instances, and blood hemoglobin concentration and red cell count were followed in four instances.

RESULTS: The administration of MYRJ 45 had no effect on the course of the patient's recovery. From the clinical standpoint, convalesence continued normally in every case.

The results of the liver function tests are given in Table 1.

CONCLUSIONS: During and after the period of administration of polyoxyethylene-8-monostearate the patients continued to convalesce normally.

ABSTRACTER: E. Aaes-Jørgensen.

Continued

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TABLE 1

Liver function data in patients receiving polyoxyethylene-8-monostearate (Myrj 45)

	Patient	Diagnosis	MYRJ 45/day (g.)	Duration MYRJ 45 treatment (days)	Total MYRJ 45 consumed (g.)	Serum bilirubin (MG./100 Ml.)	Cephalin flocculation	Thymol turbidity (units) turbidity	Serum albumin (GM./100 Ml.)	Serum globulin (GM./100 Ml.)	Alkaline phosphatase (Bodansky units)	Serum total cholesterol (MG./100 Ml.)	Serum esterified cholesterol (MG./100 Ml.)	Bromsulfalein retention 15 min.	Bromsulfalein retention 45 min.	Hemoglobin R.B.C.
						(a) 3.6	Neg.	1.4	4.8	4.8	5.2	180	112	93	40	15.1/5.05
1.	A.G.	Hepatitis (Subacute)	6*	30	165	(b) 1.2	Neg.	....	5.1	3.9	....	.....	.....	51	21	15.6/4.99
		Laennec's				(a) 4.0	++++	13.7	3.8	4.9	7.6	.....	.....	....	....	.....
2.	H.B.	Cirrhosis	6*	5	24	(b) 3.7	++++	....	4.0	3.9	6.1	.....	.....	....	....	.....
		Laennec's				(a) 1.1	Neg.	1.3	4.9	3.0	3.9	143	102	....	....	9.9/3.10
3.	C.R.	Cirrhosis	6*	66	381	(b) 1.5	Neg.	3.6	5.8	3.8	2.7	155	115	....	....	11.4/4.45
		Infectious				(a) 12.5	Neg.	3.3	5.6	3.5	6.4	182	116	....	....	15.4/5.36
4.	N.G.	Hepatitis	3	6	18	(b) 8.6	Neg.	2.7	6.2	3.7	6.3	206	145	....	....	14.3/4.92
		Laennec's				(a) 2.3	+++	4.6	4.8	3.5	18.0	260	165	47	....	10.8/3.21
5.	R.E.	Cirrhosis	6*	45	255	(b) 2.2	++	5.3	4.8	3.8	12.1	236	128	35	11	12.8/4.29
		Laennec's				(a) 1.5	Neg.	....	3.8	3.0	4.5	244	174	25	15	.....
6.	F.B.	Cirrhosis	3	60	180	(b) 1.4	Neg.	....	....	....	....	.....	.....	21	15	.....
		Schistosomiasis-				(a) 1.0	Neg.	3.6	....	....	10.0	.....	.....	....	....	.....
7.	G.R.	Hepatitis	3	14	42	(b) 1.3	....	3.3	....	....	10.2	.....	.....	....	....	.....
		Infectious				(a) 5.7	Neg.	2.3	4.6	3.4	7.3	.....	.....	....	....	.....
8.	E.R.	Hepatitis	4	23	92	(b) 2.8	Neg.	3.3	4.9	3.1	2.8	.....	.....	....	....	.....
		Infectious				(a) 3.9	Neg.	11.0	....	....	....	.....	.....	....	28	.....
9.	P.L.	Hepatitis	3	16	48	(b) 2.5	Neg.	4.6	....	....	....	.....	.....	....	18	.....
		Infectious				(a) 3.3	++	....	4.8	4.0	13.2	.....	.....	....	14	.....
10.	J.C.	Hepatitis	4	21	84	(b) 2.1	Neg.	....	4.9	3.4	7.6	.....	.....	....	9	.....

* 3 g. per day administered for several days at the outset.
(a) Immediately before MYRJ 45.
(b) At end of administration of MYRJ 45.

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Subject:	Assay of blood polyunsaturated fatty acids.	A:322

AUTHOR: F. Corsini.

LOCATION: Instituto di Clinica Pediatrica Dell'Universita di Bologna, Bologna, Italy.

PUBLICATION: Acta Vitaminol., 10, 64-69, April 1956.

TITLE: La determinazione degli acidi linoleico, linolenico e arachidonico nel latte e nel sangue. Nota III: La determinazione nel sangue.

PURPOSE: To develop a method for the assay of linoleic, linolenic, and arachidonic acids in milk and blood, the present communication dealing specifically with blood lipid analysis.

EXPERIMENTAL: 2 cc. of serum were extracted with 50 cc. of Bloor's solvent mixture. The serum was added to the Bloor mixture and held at the boiling point for 15 min. The mixture was filtered and the residue washed with an additional 10 cc. of Bloor's solvent.

The filtrate was saponified with 2 cc. of 10% KOH for 15 min. while agitating at the boiling point. The organic solvent was then evaporated. 2 cc. of distilled water and 4 cc. of 12% sulfuric acid were added to the residue and the fatty acids recovered with 50 cc. of ether by agitating the mixture for 2 min. This extraction was repeated a second time. The extract was washed with 100 cc. of water. The extract was dried with approximately 10 g. of anhydrous sodium sulfate and then concentrated to a volume of 50 cc. 40 cc. of the extract were then used for the isomerization. This was evaporated to 10 cc. and transferred to a glass tube of 16 x 160 mm. To the mixture was added 0.35 cc. of the isomerization reagent (7.5 g. KOH dissolved in ethylene glycol and heated for 10 min. at 190° and stored at low temperature). The fatty acids were isomerized for 30 min. at 180°. The isomerized mixture was then diluted to 25 cc. and the absorptions measured on a Beckman spectrophotometer at 234, 268, and 316 mμ. In order to read at 234 mμ, the mixture was further diluted 4 or 5 times with absolute methanol. The remaining 10 cc. of the extract was rapidly evaporated and the fatty residue taken up in 10 cc. of alcohol for background readings.

The specific absorption coefficients were calculated on the basis of the report of Beadle and Kraybill (J. Am. Chem. Soc., 66, 1932, 1944) for the different fatty acids as shown in Table I.

TABLE I.

Absorption coefficient	234	268	316
Linoleic acid	86.0		
Linolenic acid	60.9	53.2	
Arachidonic acid	59.3	53.4	22.6

RESULTS: The absorption curve for the isomerized fatty acids from blood serum is illustrated in Fig. 1.

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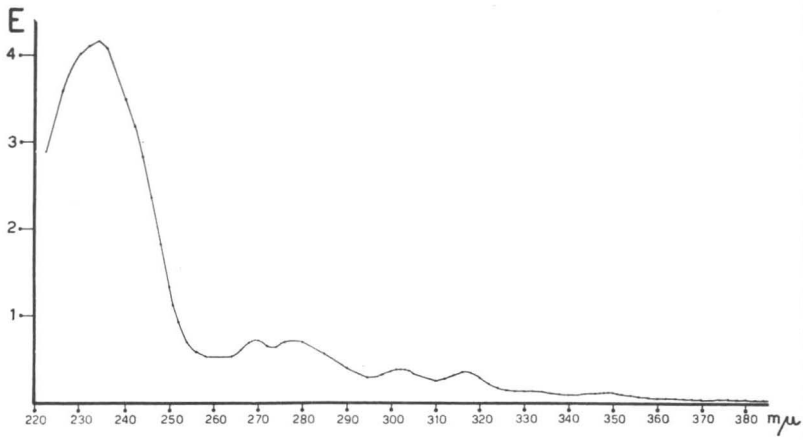

Fig. 1. Ultraviolet absorption curve of the isomerized fatty acids extracted from blood serum.

The mean error of five determinations is shown in Table II.

TABLE II.

	Linoleic acid	Linolenic acid	Arachidonic acid
1	58.6	-10.5	24.7
2	54.5	-5.9	24.2
3	62.5	-5.3	29.3
4	50.1	-4.0	20.7
5	52.2	-5.6	24.5
	55.6±4.99	-6.3±2.48	24.7±3.06

The analytical method was then applied to the study of human serum lipids from different patients.

ABSTRACTER: J. J. Peifer.

AUTHORS: Ralph F. Anderson, Erik G. M. Törnqvist, and William H. Peterson.

LOCATION: Department of Biochemistry, University of Wisconsin, Madison, Wis.

PUBLICATION: J. Agr. Food Chem., 4, 556-59, June 1956.

TITLE: Effect of oil in pilot plant fermentations.

PURPOSE: To study the effect of oils used as antifoaming agent on the production of penicillin.

METHOD: Fermentation was carried out at 25°C. in 50 gal. tanks with Penicillium chrysogenum Wis. 49-133, using the medium shown in Table I.

Table I. Composition of Media Used in Pilot Plant Experiments

Components	% in Medium: 30-liter seed tank	50-gallon tank
Corn-steep liquor (solids basis)	2.5	3.0
Lactose	3.0	4.0
Calcium carbonate	0.1	0.4
Sodium sulfate	...	0.1
Cerelose	0.2	...
Potassium monobasic phosphate	0.025	...
Magnesium sulfate heptahydrate	0.01	...
Lard oil containing 6% Alkaterge C	0.1	0.05

Source of raw materials.
Corn-steep liquor. A. E. Staley & Co., Decatur, Ill.
Lactose. Western Condensing Co., Appleton, Wis.
Alkaterge C. Commercial Solvents Corp., Terre Haute, Ind.
Cerelose (commercial grade glucose). Corn Products Refining Co., Argo, Ill.

The lard oil-Alkaterge C was necessary to prevent foaming during sterilization and cooling of the medium before inoculation. The control batches received lard oil antifoam only as necessary to control foaming during the first part of the fermentation. This addition was never extended beyond the first 40 hr. The experimental batches received lard oil throughout the fermentation process.

RESULTS: The results are summarized in Table II.

Figs. 1 and 2 show the effects of added oil on chemical changes taking place during fermentation.

The highest yields of penicillin were obtained when lard oil was added at regular intervals beginning 20 hr. after inoculation. The productive phase of the fermentation was lengthened by about 6 hr. Nearly all the oil added (below 0.1%) was catabolized by the mold. The unsaturated fatty acids disappeared from the medium at a faster rate than the saturated acids, although there was no significant increase in the iodine value of the mycelium fat.

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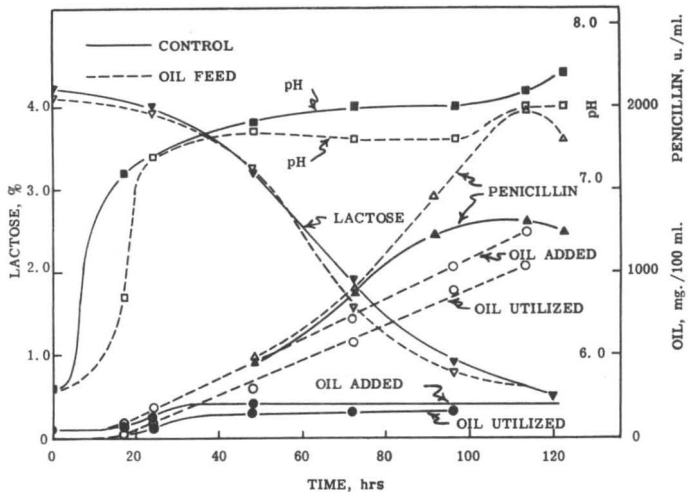

Table II. Summary of Data from Oil-Feed and Control Fermentations in 50-Gallon Tanks

Run No.[a]	Type of Fermentation	Oil Feed Started, Hours after Inoculation	Oil Added, Mg./100 Ml.	Penicillin Maximum U./Ml.	Time to Maximum Hours	pH at Pen. Max.
1	Oil for foam control		210	1335	113	7.5
	Oil feed	21	1250	1980	114	7.4
2	Oil for foam control		500	1450	114	7.7
	Oil feed	20	1220	1960	120	7.4
3	Oil for foam control		800	1325	112	7.4
4	Oil for foam control		350	1320	112	7.7
5	Oil for foam control		450	1560	112	7.9
6	Oil for foam control		270	1230	96	7.8
7	Oil for foam control		200	1630	120	7.7
8	Oil for foam control		200	1260	113	7.9
12	Oil for foam control		560	1500	139	7.7
9	Oil feed	19	1090	1990	114	7.2
10	Oil feed	21	1450	2100	120	7.2
11	Oil feed	21	1080	2200	120	7.5
12	Oil feed	22	1900	1960	139	7.1
Av. 9 expts.	Oil for foam control		393	1401	115	7.7
Av. 6 expts.	Oil feed	21	1332	2022	121	7.3

[a] Runs 1 and 2 are pair runs with same inoculum. Others are individual runs.

Fig. 1. Chemical changes in an oil-feed fermentation and its control. Run 1, Table II.

The effect of oil may be partly physical, because of changes in surface tension, and partly nutritional, since the oil is an additional source of energy and may also furnish fatty acids which the mold cannot synthesize at a sufficiently rapid rate for optimum growth.

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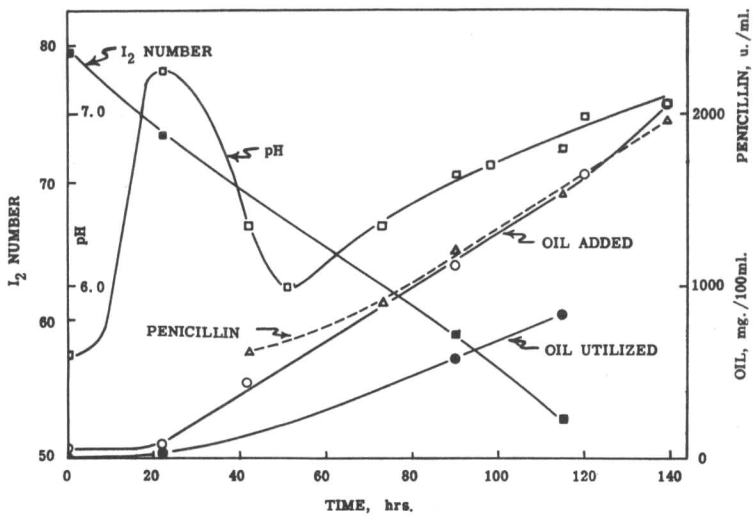

Fig. 2. Effect of excess oil on pH, penicillin production, oil utilization, and iodine number of residual oil. Run 12, Table II.

ABSTRACTER: J. R. Chipault.

AUTHORS: Rama Kanth Rao and Lionel K. Arnold.

LOCATION: Iowa Engineering Experiment Station, Iowa State College, Ames, Iowa.

PUBLICATION: J. Am. Oil Chemists' Soc., 33, 389-91, September 1956.

TITLE: Alcoholic extraction of vegetable oils. III. Solubilities of babassu, coconut, olive, palm, rapeseed, and sunflower seed oils in aqueous ethanol.

PURPOSE: To report solubility data for several common vegetable oils in aqueous ethanol.

RESULTS: The concentrations of the alcoholic solutions were measured by determining the densities by the pycnometer method. All values are reported as weight percentages. The apparatus and method used have been described previously (J. Am. Oil Chemists' Soc., 32, 420-23, 1955). The characteristics of the oils studied are as follows:

Oil	Acid value	Iodine value Wijs	Sap. value
Babassu	2.82	12.86	248.62
Coconut	2.76	8.82	257.20
Olive	1.12	84.62	190.40
Palm	3.42	53.86	199.64
Rapeseed	2.66	105.62	171.65
Sunflower seed	1.72	123.84	190.76

The solubility data are presented in Figs. 1 through 6.

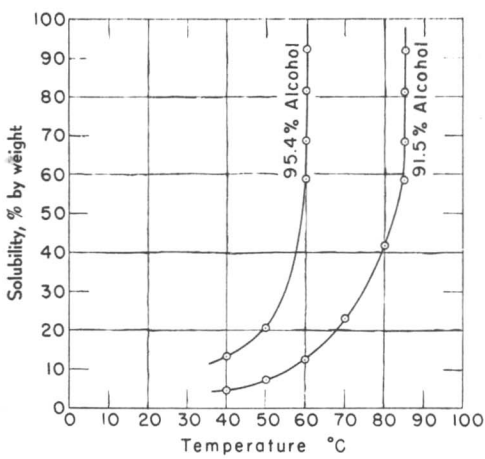

Fig. 1. Solubility curves for babassu oil.

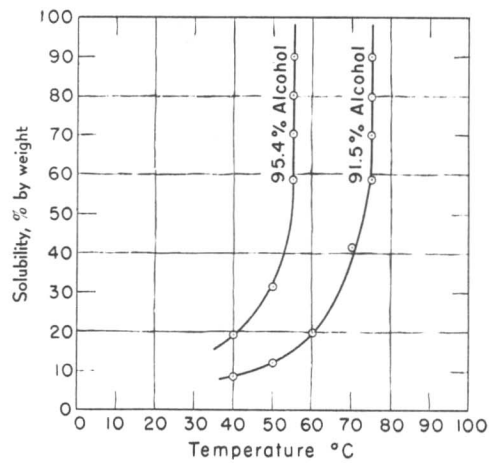

Fig. 2. Solubility curves for coconut oil.

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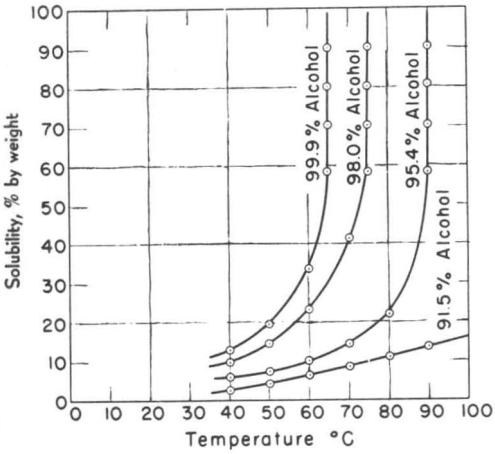

Fig. 3. Solubility curves for palm oil.

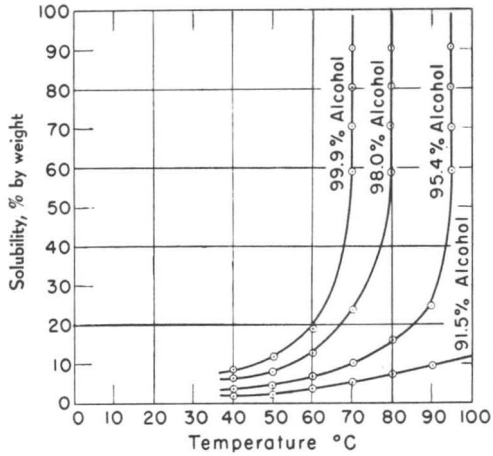

Fig. 4. Solubility curves for sunflower oil.

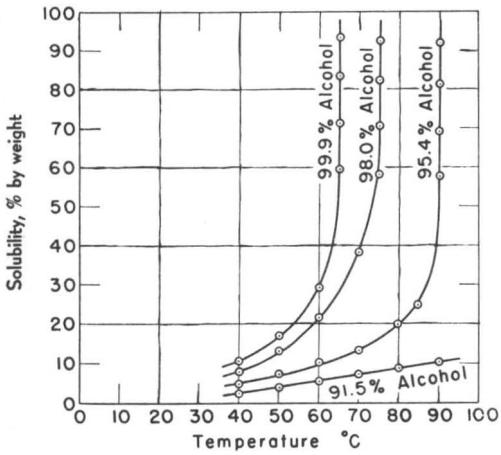

Fig. 5. Solubility curves for olive oil.

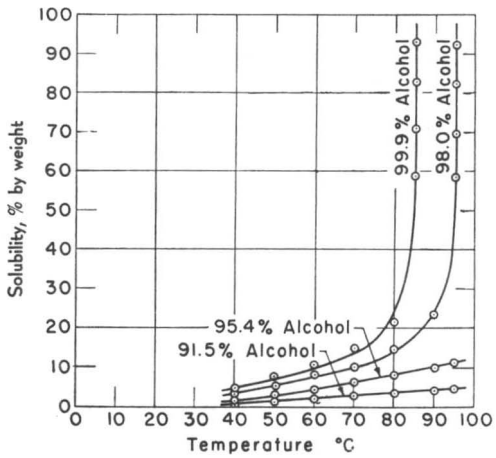

Fig. 6. Solubility curves for rapeseed oil.

Fig. 7 shows the results of observations on the critical solution temperatures of the six oils with alcohol composition.

The critical solution temperatures increased with the water content of the alcohol, and in each case the relationship was linear. The pressure in the system also varied with the temperature, the maximum being about 20 psig.

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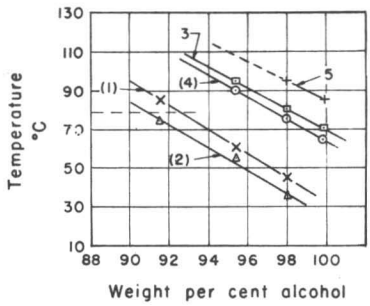

Fig. 7. Variation of critical solution temperature of the six oils with alcohol composition. (1) Babassu oil. (2) Coconut oil. (3) Olive oil. (4) Palm and sunflower oils. (5) Rapeseed oil.

ABSTRACTER: O. S. Privett.

AUTHOR: J. Poliakoff.

LOCATION: Institut de Recherches pour les Huiles et Oléagineux, 8 Square Petrarch, Paris (XVI), France.

PUBLICATION: Oléagineux, 11, 653-59, October 1956.

TITLE: Les oléagineux du Brésil.

PURPOSE: To review the production of vegetable oils in Brazil.

RESULTS: Approximately 30 plants growing in Brazil could be used to produce oils. Of these, about 15 are commercially exploited. In 1953, oil seed production was in fifth place in tonnage and in eighth place in value in Brazilian agriculture. Table I shows the amounts of various oil seeds produced during several years.

TABLE I. PRODUCTION OF OIL SEEDS IN BRAZIL (METRIC TONS).

	1935-39	1952	1953	1954
Cotton	895,600	669,800	619,800	720,200
Castor	154,200	158,000	160,800	180,800
Babassu	42,000	70,700	60,000	49,900
Peanut	13,400	144,900	146,500	159,600
Oiticica	21,700	29,300	25,000	22,000
Linseed	--	22,400	21,800	--
Sesame	--	3,500	4,000	5,000
Soybean	--	77,900	88,200	100,000
Tung	400	6,500	6,400	6,450
Total	1,127,300	1,183,000	1,132,500	1,243,950

To this table should be added several other minor vegetable oil sources such as olives, rubber, coconut, palm, and cocoa butter.

Although oil seeds comprise only 3% of Brazilian exports, they are in the fourth place after coffee (73%), cotton fibers (7%), and cocoa (5%).

Brazil and India produce approximately equal amounts of castor beans and together account for 80% of world production. About half the crop is used for oil production and 90% of the exports goes to the U.S. The four states of Bahia, Sao Paulo, Ceara, and Pernambuco are responsible for about 85% of the national production.

Most of the cotton is produced by Sao Paulo (60%). Cottonseed oil production has increased from 67,700 tons in 1938 to 95,300 tons in 1953, derived from 1/4 of the cottonseed crop. Sao Paulo also produces about 85% of the peanut crop and most of it is used for oil production.

Flax is not cultivated to any great extent in Brazil, and soybean culture has been introduced only recently.

ABSTRACTER: J. R. Chipault.