CHEMICAL COMPOSITION OF OKRA SEED

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The resemblance of the Okra plant (Hibiscus esculentus, (L.), Malvaceae) to the cotton plant, both of which belong to the same botanical family, suggested that the analysis of the seed may show similar composition.

The oil has been analyzed[1] but not the seed so far as the authors are aware. It seemed desirable to ascertain also its chemical composition.

Table I—Composition of Okra Seed, Meats and Hulls

No.	Variety	Ash	Calcium	Moisture	Crude Fat	Crude Fibre	Nitrogen*	Protein (x6.25)
1	Tall green-long pod	3.93	0.155	9.05	17.79	24.83	3.45	21.56
2	Tall green-long pod	4.28	0.207	8.05	14.66	26.96	3.17	19.81
3	Dwarf—thick pods	2.90	0.224	6.15	22.03	19.68	4.17	26.06
4	Dwarf—thick pods	4.16	0.189	9.65	17.66	25.75	3.29	20.56
5	White Velvet—white pods	2.11	0.276	9.28	15.31	25.35	3.62	22.63
6	White Velvet—white pods	4.94	0.197	5.67	16.53	27.62	3.20	20.00
7	Meats of Dwarf Okra seed, hulls removed...	5.99	0.174	4.63	32.48	4.78	5.53	34.56
8	Hulls of Dwarf Okra seed, meats removed ..	1.69	0.214	7.28	4.33	45.66	1.31	8.19

The analysis of 7 samples show a high calcium content in the ash. The seeds also contain considerable crude fat and crude protein, both being of the same magnitude as that of the seed of the cotton plant. This is brought out more clearly in Table II where the chemical composition of the seeds of the cotton and okra plants are given on the moisture-free basis.

Table II—Average Analysis of the Seed of Cotton and Okra Plants Compared (On Moisture-free Basis)

	No. of Analysis	Ash	Calcium	Moisture	Crude Fat	Crude Fibre	Crude Protein
Cottonseed (Henry and Morrison)[2]	38	4.9	...	..	20.21	24.04	20.74
Okra Seed (Halverson and Naiman)	6	4.7	.261	..	21.72	31.37	27.28

The average protein of the six samples of okra seed is 6.54 per cent higher than for the seed of the cotton plant while the per cent of fat is about the same.

It is interesting to note the similarity of composition of the seeds although the plants belong to different genera of the same family. A further relationship is shown in the oil, both of which give the Halpen Color Test.[3]

The mature seed of the okra plant possesses good feeding value in

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[1] Okra Seed Oil, George S. Jamieson and Walter F. Baughman, Jr. Am. Chem. Soc., Vol. 42, 166, 1920.

[2] Feeds and Feeding, W. A. Henry and F. B. Morrison, 18th Ed. 709, 1923.

[3] George A. Jamieson and Walter F. Baughman, Jr. Am. Chem. Soc., Vol. 42, 166, 1920.

that it consists of ¼ protein and ⅕ oil. This plant being prolific and a vigorous grower in the Cotton Belt has possibilities of economic importance due to its high oil content and to the feeding value for animals of the high protein meal remaining after the oil is extracted.

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OUR TRADE IN VEGETABLE OIL INCREASES

United States trade in the consumption of vegetable oils for the year 1925 is characterized by a substantial increase over that of 1924, there having been a fairly steady increase since 1922, which year marked a low point, due largely to the drop in exports of cottonseed oil.

The increase in production of vegetable oils from 1912 to 1919 was 242,568,000 pounds. During the period of deflation the production fell off considerably, but since 1922 the quantity produced annually has been steadily increasing, reaching a production in 1925 of 2,642,904,000 pounds, which is the largest in the history of the industry.

The crushing of peanuts and soy beans shows the largest percentage increases. Prior to the war but 454,000 pounds of peanut oil were produced, whereas in 1925 the amount was 15,852,000 pounds. Production of soy bean oil was of no consequence before 1922, most of the oil coming from Manchuria and Japan. The growing of soy beans has greatly increased, and consequently the expression of bean oil in this country on a small scale has been brought about, products in 1925 amounting to 1,405,000 pounds. The only oils which show a decrease in production are olive, palm kernel and rapeseed.

The Netherlands is the largest European consumer of American vegetable oils. Practically all of the product taken by that country is refined cottonseed oil, which is used principally in the manufacture of oleomargarine. The only other European countries that import any appreciable amount of American oils are Germany and Norway. The bulk of our export trade is carried on with our North American and West Indian neighbors, principally Canada, Mexico, Cuba and the Dominican Republic.

Canada is by far the largest consumer, and its principal importation is crude cottonseed oil, most of which is used in the manufacture of lard compounds and soaps. The trade with Mexico in cocoanut and cottonseed oil fell off 237,595 pounds in 1925, compared with 1924, while the trade with Cuba and the Dominican Republic increased. There was also a substantial increase in the shipment of these oils to other countries.