

A CHEMICAL ANALYSIS OF *JATROPHA STIMULOSA*¹

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The seed of *Jatropha stimulos*a, commonly called the spurge nettle, are regarded by those who have the courage and patience to gather them, as an excellent article of food. A chemical examination will give a clearer understanding of their nutritive properties.

In appearance the seeds resemble those of the castor bean. Each is composed of 39 per cent hull and 61 per cent kernel. An analysis of the kernel yields the following results:

	Per cent.
Water.....	1.58
Ash.....	3.50
Protein.....	33.3
Fiber.....	2.9
Nitrogen free extract.....	7.81
Fat.....	50.91

The oil was extracted by pressure. It is a clear yellowish, semi-drying fluid of somewhat less viscosity than castor oil, and the taste is mild and pleasant.

An analysis of the oil gives the following results:

Specific gravity.....	0.9257 at 15.6 °C.
Refractive index.....	1.4765 at 15.6 °C.
Solidifying point.....	Below—15 °C.
Iodin No.....	124.65 to 129.47.
Saponification No.....	186.4 to 186.56.
Volatile fatty acids.....	None.
Free fatty acids.....	Trace.
Fatty acids.....	95.6 per cent.
Glycerin (about).....	4.2 per cent.

When separated by the solubility of their lead soaps in cold benzene, the fatty acids of the oil were found to consist of saturated fatty acid 15.4 per cent and of unsaturated fatty acid 83.6 per cent. After the oil was completely extracted from the meal by ether the character of the protein was examined. The solubility of the protein in various solvents is shown in the following table. The meal was ground to 100 mesh and extracted with the various solvents in the proportion of ten cc. of solvent to one gram of meal. These mixtures were allowed to stand for five hours with frequent shaking. Nitrogen determinations were made on the clear filtrates.

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Extraction of protein by various solvents

Solvent.	Total protein extracted.
	Per cent.
Distilled water.....	0
5 per cent NaCl.....	24.2
10 per cent NaCl.....	32.68
15 per cent NaCl.....	12.11
2.5 per cent HCl.....	73.3
2 per cent Na ₂ CO ₃	78.72

The protein is precipitated from its saline extract by dialysis. Analyses of the protein by the Van Slyke method were made, using the protein extracted by 10 per cent NaCl and also the protein prepared by extracting with alkali and precipitating by the addition of acid—a method previously suggested by Dowell and Menaul.²

Distribution of the nitrogen in *Jatropha stimulos*a as determined by the Van Slyke method

Form in which nitrogen was found.	Nitrogen extracted with solvent named.			
	NaCl Sol.	0.2 per cent NaOH.	NaCl Sol.	0.2 per cent NaOH.
	Mgm.	Mgm.	Per cent.	Per cent.
Total nitrogen.....	520	445
Amid N.....	58.60	48.95	11.27	11.00
Humin N.....	10.97	10.5	2.11	2.36
Cystin N.....	Trace.	Trace.	Trace.	Trace.
Arginin N.....	74.88	64.04	14.4	14.39
Histidin N.....	64.48	56.12	12.4	12.61
Lysin N.....	23.97	20.00	4.61	4.5
Total N of amino acids.....	287.72	243.69	55.33	54.76
Total.....	520.62	443.3	100.12	99.62

Tryptophan—present.

The seeds of *Jatropha stimulos*a are composed largely of fat and protein. The fat contains a high percentage of unsaturated fats and the protein contains a high percentage of histidin.

² DOWELL, C. T., and MENAUL, Paul. NITROGEN DISTRIBUTION OF THE PROTEINS EXTRACTED BY DILUTE ALKALI FROM PECANS, PEANUTS, KAFIR, AND ALFALFA. *In Jour. Biol. Chem.*, v. 46, p. 437-441. 1921.