

TABLE V.—IN THE WATER- AND FAT-FREE SUBSTANCE.

	Mustard flour.	Mustard hulls.	Whole seed.	
	Per cent.	Per cent.	Per cent.	
Total nitrogen	Maximum	9.61	5.00	7.73
	Minimum	8.27	3.40	6.00
	Mean	9.09	4.14	7.09
Crude fiber	Maximum	4.26	22.20	10.33
	Minimum	2.31	13.74	7.24
	Mean	3.24	18.11	8.05
Reducing matter as dextrose, by diastase	Maximum	0.93	7.06	3.13
	Minimum	0.00	1.51	1.39
	Mean	0.37	4.27	2.40

One sample of commercial mustard flour comparatively free from starch, but condemned by the writer on account of added hulls, as shown unmistakably by the microscope, exhibited the following constants in the water- and fat-free substance:

	Per cent.
Total nitrogen	6.97
Crude fiber	7.69
Reducing matter as dextrose by diastase.	2.20

In this sample the microscope showed the fragments of hull to clearly form the chief feature of the mass, largely exceeding the material of the seed tissue.

Suggested Standards.—Based on the above analyses, the following standards are suggested for ground mustard, expressed on the moisture- and fat-free substance: Reducing material by diastase treatment should not exceed 2.5 per cent., expressed as dextrose; crude fiber should not exceed 5 per cent.; and total nitrogen should not be less than 8 per cent. As shown by the microscope, the sample should be free from more than minute traces of starch, and should not exhibit an excess of hulls over seed tissue.

THE COMPOSITION OF TURMERIC.

BY ALBERT E. LEACH.

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TURMERIC (*Curcuma longa* of the family *Zingiberaceae*), while of chief interest to the analyst as an adulterant of other spices, possesses some value as a condiment in itself, forming, as it does, the chief ingredient of curry powder. Turmeric is a material especially adapted by its deep yellow color to intensify the color of mustard and ginger, especially when these spices are also



Fig. 1.—Dakota mustard flour, X 110. Dark spots show starch grains of foreign weed-seed, stained with iodine.

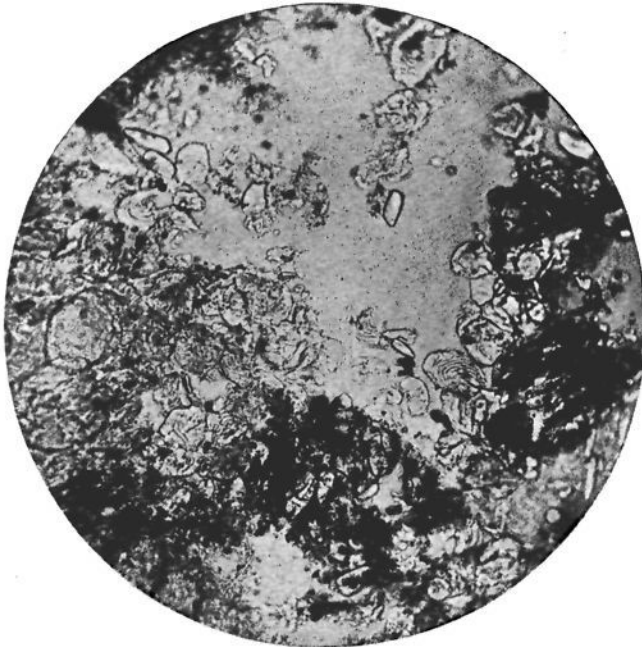


Fig. 2.—Powdered turmeric, X 110. Showing starch grains, fragments of cell tissue, coloring-matter, etc.

adulterated with the lighter colored cereal starches; hence it is very commonly found in these spices, both with and without other adulterants.

It is sometimes used, moreover, in small quantities in adulterated cayenne, mace, and various other spices, to counteract the colors of other dyestuffs, such, for instance, as ground redwood, which in itself would be too intense, if used as the sole artificial coloring agent in cayenne.

The chief ingredients of turmeric are starch, a slightly fluorescent, orange-yellow, volatile oil, a deep yellow coloring-matter (curcumin), soluble in alcohol, but insoluble in cold water, cellulose and a gum.

There are few, if any, records of the satisfactory analysis of turmeric, with the exception of two varieties of Bengal and Madras turmeric recorded in the recently issued 4th edition of König's *Nahrungs und Genussmittel*.¹

The following are results of analyses made in the writer's laboratory of three varieties of turmeric commonly used in this country, the samples being ground in each case from large fragments of the root-stock.

Variety.	Moisture.	Total ash.	Ash soluble in water.	Ash insoluble in hydrochloric acid.	Total nitrogen.	Protein. N X 6.25.	Total ether extract.	Volatile ether extract.	Non-volatile ether extract.	Alcohol extract.	Crude fiber.	Reducing matters by acid conversion in starch.	Starch by diastase method.
China . .	9.03	6.72	5.20	0.11	1.73	10.81	10.86	2.01	8.84	9.22	4.45	48.69	40.05
Pubna . .	9.08	8.52	6.14	...	0.97	6.06	12.01	4.42	7.60	7.28	5.84	50.08	29.56
Alleppi .	8.07	5.99	4.74	...	1.56	9.75	10.66	3.16	7.51	4.37	5.83	50.44	33.03
Average	8.73	7.07	5.36	...	1.42	8.88	11.17	3.19	7.98	6.96	5.37	49.73	34.21

MALT ANALYSIS.

BY H. AUG. HUNICKE.

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I. DETERMINATION OF EXTRACT.

WHILE great quantities of malt are evaluated by inspection, it cannot be said that any considerable amount is purchased by analysis. The purchaser, while largely guided by the color, justly