discussion of the theoretical aspect of this question will, however, be made elsewhere.

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Uptake of Hydrochloric Acid by Cottonseed and Cotton Fiber During "Fuming" of Analytical Samples

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IN collaborative work on the determination of residual lint on cottonseed by the official method of the American Oil Chemists' Society some workers obtained negative values ranging from —0.1 to —0.4% on bald seed with practically no lint. On the supposition that this was because of increase of weight of the fumed sample due to combination of the hydrochloric acid with the seed, some experiments were made to determine the amount of hydrochloric acid taken up by cottonseed during fuming.

Various cottonseed samples were fumed according to the official method using 1.5 ml. of concentrated hydrochloric acid to each fuming pot which contained about 60 g. of seed. In one experiment the cottonseed was ground and analyzed whole; in another, the fumed cottonseed was separated by hand into lint, hulls, and meats, each of which was analyzed separately. In order to see whether all parts of the seed were capable of taking up hydrochloric acid, hand-separated hulls, meats, and raw cotton fiber were fumed. For comparison with the raw fiber a sample of cotton fiber that had been purified by the method used for production of "chemical cotton" was included. Samples of raw cotton fiber that had been extracted with water, as well as with alcohol in Soxhlet extractors were also fumed. Prior to analysis, all samples were heated for two hours at 101° C. in order to drive off any hydrochloric acid that would be removed in the official moisture determination. Samples of 10 g. each were burned in 2-g. portions in a Parr oxygen bomb and chlorine determined gravimetrically as silver chloride. The results are shown in Table I. It will be noted that cottonseed takes up 0.4 to 0.5% total chlorine when fumed with hydrochloric acid. This is not driven off in the moisture determination. All parts of the seed are capable of taking up hydrochloric acid although when whole seed is fumed, the hydrochloric acid may not reach the meats. The calculated effect of the uptake of hydrochloric acid by cottonseed is a lowering of the percentage of oil by about 0.1% and of the total nitrogen by about 0.02%. This is probably of little significance in view of the usual errors of oil and nitrogen determinations. In the case of lint determinations the calculated error due to the uptake of hydrochloric acid is —0.3 to —0.4%. This is probably compensated for to a large extent in the official lint method by errors in the other direction such as the somewhat longer heating time of the fumed samples and the fact that small hull particles may be broken from the seed when the lint is removed by brushing.

In the case of raw cotton fiber one or more of the noncellulosic constituents appears to be largely responsible for the uptake of hydrochloric acid since cotton fiber purified to remove these constituents takes up and retains very little hydrochloric acid although it is made brittle by the treatment. Since extraction with hot water removes about 80% of the ash constituents of raw cotton fiber and extraction with alcohol removes the wax, the results indicate that neither the ash constituents nor the wax are responsible for the major part of the uptake of hydrochloric acid. However, since neither water nor alcohol extracts much protein from the fiber, it seems likely that protein is the constituent of raw cotton fiber that takes up hydrochloric acid.

TABLE I.

Uptake of Hydrochloric Acid by Cottonseed and Cotton Fiber When Fumed as Shown by Analysis for Total Chlorine.

Material Fumed	Material Analyzed	Total Chlorine	
		Fumed	Control Not Fumed
		%	%
Cottonseed, 12.8% linters	Whole seed	0.41	0.03
Cottonseed, 2.0% linters	Whole seed	0.49	0.05
Cottonseed, 12.8% linters	Linters	0.58	0.05
Cottonseed, 0.04% linters	Hulls	0.57	0.07
Cottonseed, 0.04% linters, No. 1	Meats	0.04	0.03
Cottonseed, 0.04% linters, No. 2	Meats	0.05	0.03
Cottonseed hulls	Hulls	0.62	0.05
Cottonseed meats, No. 1	Meats	0.58	0.05
Cottonseed meats, No. 2	Meats	0.81	0.05
Cotton fiber, raw	Fiber	0.53	0.05
Cotton fiber, purified	Fiber	0.13	0.02
Cotton fiber, water-extracted	Fiber	0.37	0.01
Cotton fiber, alcohol-extracted	Fiber	0.45	0.01
Cotton linters, purified	Linters	0.06	0.01

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