

SENSITIVITY TO CORNSTARCH

A CASE REPORT

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RANDOLPH and Yaeger¹ have stressed the importance of corn and its refined derivatives as sources of allergic symptoms, placing it near the top of the list of important food allergens along with wheat, milk, and eggs. They claim that corn sugar can also act as an excitant, stating: "In fact, the highly sensitive patient, otherwise controlled as far as his corn allergy is concerned, will usually react with more immediate symptoms following the ingestion of corn sugar than he will from eating cornstarch, corn as such, or corn oil."

Bernton² was unable to confirm the high incidence of corn allergy reported by the above workers, finding only one-fifth as many cases in spite of employing Randolph's diagnostic procedure accurately. Bernton could find no evidence for sensitivity toward corn syrup or sugar. Loveless,³ in a survey of American allergists, encountered only 0.16 per cent of some 45,000 patients who gave clinical reactions to ingested corn. This figure stood in marked contrast to the figures of 16 to 30 per cent reported by Rinkel, Randolph, Rowe, and Crandall.² When blindfold ingestion tests were carried out in association with placebo meals for twenty-five individuals who gave histories suggestive of corn allergy, no instance of susceptibility for corn syrup, sugar, or oil could be found by Loveless and a number of cases of psychogenic response were uncovered. It was of interest that a few of these subjects reacted convincingly to one or more of the three starches employed in the masked feedings. The purpose of the present article is to report the findings on another such patient who was studied with the Loveless technique and was shown to be allergic to cornstarch but fully tolerant of corn sugar.

CASE REPORT

Miss A, aged 40, gave a history of atopic eczema during a ten-year period ending at the age of 18 years. She had also suffered migraine attacks since early childhood. At 22 she began to have symptoms suggestive of ulcer and colitis, which responded to antihistamines given when she was 36 years of age. At 40 the skin was found to respond to tests with lemon, rye, onion, and corn meal. Omission of these foods from the diet resulted in marked relief of all symptoms.

With reference to corn, she had noted that even small amounts of cornstarch provoked a tingling and burning sensation of the tongue promptly. Nausea, abdominal colic, and diarrhea soon ensued. Marked fatigue and a sense of mental dullness were accompanying complaints and were associated with difficulty in focusing the patient's vision. The patient believed that corn syrup led to mild symptoms of similar nature.

Blindfold ingestion tests with the Loveless coded puddings* were given this patient on five separate occasions; the contents of the indistinguishable meals were unknown to both

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*The puddings were kindly supplied by the National Starch Products through the courtesy of Mr. Vincent Marsilia.

TABLE I

DATE OF INGESTION TEST	COMPOSITION OF PUDDING		ALLERGIC SYMPTOMS	TIME OF ONSET P. C.
	STARCH	SWEETENER		
10/6/51	Tapioca	Cane sugar	None	
10/12/51	Corn	Cane sugar	(1) Tingling and burning of tongue +++ (2) Nausea +++ (3) Abdominal cramps ++ (4) Fatigue +++	Immediate ¼ hr. ¼ hr. ¼ hr.
10/26/51	Arrowroot	Cane sugar	Tingling sensation of tongue +	¼ hr.
11/9/51	Corn	Corn syrup	(1) Tingling and burning of tongue +++ (2) Nausea +++ (3) Abdominal cramps ++ (4) Fatigue +++	Immediate ¼ hr. ¼ hr. ¼ hr.
11/16/51	Tapioca	Corn syrup	None	

the patient and myself until all five experiments had been fully recorded. The outcome can be seen in Table I.

It will be noted that tapioca starch pudding caused no discomfort, whether its sweetening agent had been derived from corn or from cane, whereas cornstarch provoked clear-cut and prompt symptoms on both occasions, regardless of the origin of the sweetener. There were very mild, suggestive responses to arrowroot starch (cane sugar was used as its sweetener).

At the finish of these blindfold ingestion studies, the patient was given a large feeding of corn oil (30 c.c.) with no ensuing reaction. The patient's sensitivity to whole corn was not tested by the blindfold ingestion test. She was, however, sensitive to corn on skin test and reported a violent reaction developed when she attempted to eat five kernels of corn.

The conclusion was drawn that the patient was hypersensitive to whole corn (by skin test and history), to cornstarch, and questionably to arrowroot starch, whereas she tolerated full feedings of corn sweetener in the form of syrup when it was included in a tapioca starch pudding. Corn oil was well tolerated. The mild symptoms she reported to have resulted from ingesting corn syrup in the past were probably psychogenic.

It is my general feeling that allergy toward starch is rarely encountered. The infrequency of allergy to cornstarch may very well be due to the manufacturing process which cleans away most of the soluble proteins, minerals, and oil-containing germ centers of the original whole corn. Even after this thorough cleansing process, the starch is further separated by repeated washings and filterings and is left practically free of protein.

In the same manner when one considers how corn syrup is made from this pure cornstarch, it is very conceivable that this further chemical change in the cornstarch may account for the lack of clinical hypersensitivity to corn syrup. Corn syrup is made by pressure cooking an acidified solution of water and cornstarch. In this process, the starch, water, and acid are heated under pressure with steam. A series of chemical reactions thus take place with which the starch is subdivided into the simpler carbohydrates: dextrose, maltose, higher sugars, and dextrans. This latter chemical process probably further diminishes the antigenic property of the original cornstarch to the vanishing point.

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