

A NOTE ON THE DIGESTIBILITY OF THE STARCH OF HIGH-AMYLOSE CORN BY RATS¹

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During the course of studies on various starches in this laboratory, Sandstedt *et al.* (6) observed that the starch of high-amylose corn was resistant to amylolytic enzymes. The following study was, therefore, undertaken to determine whether these observations applied in the animal, the rat being used as a matter of convenience.

The *in vivo* digestibility of a number of starches has been investigated by Booher *et al.* (2), who have reviewed the prior literature. In their studies, isolated corn starch was reported to have a digestibility of 98% by the rat.

The starch and amylose contents of the corn samples used in the following study are listed in Table I. Starch was determined on the corn and feces samples by an acid-hydrolysis method (1), modified as follows. The initial wash with water was omitted, the sample being refluxed directly with hydrochloric acid, neutralized, diluted to volume, and filtered. Another sample was refluxed with water only. Reducing sugar was determined on a suitably diluted aliquot of the filtrate by the Folin-Wu method (4). Glucose value from the acid-hydrolyzed sample minus the water-refluxed sample times 0.9 gave the starch value.

The rations contained the following in g. per 100 g.: corn, 75; casein, 8; salt mixture (5), 2; cerelese vitamin supplement (3), 5; and hydrogenated fat, 10. The rations were fed to weanling rats of the Holtzman strain. The animals were individually housed in screen-bottomed cages with food and water available *ad libitum*. Each ration was fed to 8 animals. Fecal collections were made during a 10-day period. The feces were collected on filter paper, retrieved daily, and dried at 100°C. The 10-day excretion of each animal was composited and analyzed for starch.

The starch of normal corn was found to have a digestibility of 95%, of high-amylose corn from 66 to 77%. The several digestibility values are listed in Table I. On the basis of the limited number of samples, there does not appear to be a relationship between the percent of amylose in the high-amylose corn and the *in vivo* digestibility of the starch. These results on the *in vivo* digestibility of high-amylose corn starch confirm those of Sandstedt *et al.* (6), who first observed the

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TABLE I
DIGESTIBILITY OF THE STARCH OF NORMAL AND HIGH-AMYLOSE CORN BY RATS

CORN	STARCH	AMYLOSE ^a	DIGESTIBILITY ^b
	%	%	% + S.E.
Normal	72	25	95.1±0.3
High-amylose	64	50	71.3±1.6
	67	63	76.9±1.5
	64	77	66.0±0.9

^aAmylose content as percent of the corn starch. Values supplied by Charles L. Ford, American Maize-Products Co., Roby, Indiana.

^bDigestibility of starch = (starch consumed - fecal starch) / starch consumed × 100.

resistant character of such starch to amylolytic enzymes. The nature of this resistance remains obscure. Presumably, the genetic selection for high-amylose content has resulted in simultaneous selection for starch having altered properties with respect to susceptibility to amylolytic attack.

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