

STARCH DIGESTION IN AND GLYCAEMIC RESPONSES TO RICE, CORN AND POTATO
PROCESSED IN DIFFERENT WAYS

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Recent studies have found that equivalent carbohydrate portions of different foods elicit different post-prandial blood glucose responses (Jenkins et al. 1981). The reduction of hyperglycaemia in diabetics is one of the primary objectives of medical management. This can be partly achieved through dietary advice based on a knowledge of effects of different foods on blood glucose. We have studied the rate of carbohydrate digestion in traditional starchy foods (rice, corn and potato) and compared this with the rates in the same foods in processed forms to see whether processing can affect digestibility of the starch or glycaemic response.

An in vitro technique based on that of Jenkins et al. (1980) was used to measure the rates of starch digestion; the results were compared with the in vivo plasma glucose response. In the in vitro study, 2 g carbohydrate portions of nine foods were incubated for 3 h with digestive juices (pancreatin (Sigma) and human saliva). The foods were 3 rice products, 3 corn products and 3 potato products. The amount of starch digested and released as glucose plus oligosaccharides was:

boiled white rice, 18%;	instant rice, 24%;	'Rice Bubbles', 30%
boiled sweet corn, 15%;	corn flakes, 24%;	corn chips, 30%
boiled potato, 22%;	instant potato, 34%;	potato crisps, 50%

In the in vivo study, nine healthy volunteers ate 50 g carbohydrate portions of each of the foods and of glucose on separate mornings after an overnight fast, and plasma glucose was measured by the hexokinase method at 0, 15, 30, 45, 60, 90 and 120 min. The areas (above fasting) under the glucose curves, taking glucose as 100%, were:

boiled white rice, 62%;	instant rice, 90%;	'Rice Bubbles, 104%
boiled sweet corn, 52%;	corn flakes, 92%;	corn chips, 77%
boiled potato, 73%;	instant potato, 104%;	potato crisps, 70%

There was a positive correlation between the in vitro and in vivo results which was significant if corn chips and potato crisps were excluded. The dissociation between the in vitro and in vivo results for these two foods may be due to their high fat content affecting gastric emptying.

These results show that the type of processing affects carbohydrate digestion in these three major starchy foods. Digestion was significantly slower in boiled foods than in the same foods processed by heat drying, flaking, puffing or frying. More traditional methods of food preparation may therefore be preferable for diabetic patients' diets.

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