

THE GLYCAEMIC INDEX OF TRADITIONAL PIMA INDIAN STAPLES :
A POPULATION AT HIGH RISK OF DIABETES

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During this century the urbanisation of many indigenous populations has been associated with a dramatic rise in the prevalence of noninsulin-dependent diabetes mellitus (NIDDM). The Pima Indians of southern-central Arizona currently have the highest prevalence of diabetes in the world, up to 35% of the population developing the disease. Historically, the Pima diet was based on legumes, but urbanisation has resulted in a shift to Western foods such as flour and other processed cereal products. Thorburn et al. (1987) have hypothesised that traditional foods produce significantly lower glycaemic and insulin responses than Western starchy staples, thereby protecting susceptible populations from developing diabetes. The aim of the present study was to determine whether traditional Pima Indian staples were slowly digested and absorbed.

Six staple foods were studied : corn, lima beans, white teparies, yellow teparies, mesquite beans and acorns. They were collected in Arizona, USA by an ethnobotanist (G.N.) and airfreighted to Sydney where they were prepared according to traditional recipes. The meals and glucose (as 25 g carbohydrate portions) were given to eight, healthy Caucasian volunteers in random order on separate mornings after an overnight fast. Fingerprick blood samples were taken at intervals over 2 h and analysed for plasma glucose and insulin. The glycaemic response to each meal was expressed as the 'glycaemic index' as defined by Jenkins et al. (1981). The meals were also digested over 4 h in vitro with saliva and porcine pancreatin to seek a relationship between the percentage starch digested in vitro and the glycaemic response.

The mean glycaemic indices (\pm SE) of the above six meals were found to be, 40(\pm 5), 36(\pm 3), 31(\pm 3), 29(\pm 3), 25(\pm 4) and 16(\pm 2) respectively. The value for corn was significantly higher ($P = 0.05$, Tukey HSD method) than the rest of the foods but lower than that of commercially cultivated sweet corn (59 ± 11 , $P < 0.05$). There was a positive correlation between in vitro digestibility of the foods and glycaemic index ($r = 0.9$, $P < 0.01$).

These results provide further support for the hypothesis that traditional foods protect indigenous populations from developing diabetes, the mechanism being the slow digestion and absorption of the starch in the staple foods. The low responses to Pima Indian foods are in contrast to the rapid and high glycaemic responses to Western staples such as potatoes, bread and other cereal products.

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