# Gastric emptying and plasma glucose response in men following ingestion of milk from different species

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## Abstract

The $^{13}C$ Octanoic acid breath test (OABT) was used to measure the rate of gastric emptying of whole goat's milk (WG), whole cow's milk (WC), goat's milk infant formula (GIF) and cow's milk infant formula (CIF) in healthy, adult men.

Prior to the gastric emptying study, the integrity of the vacuum in two commonly used gas collection tubes was tested. The experiment showed that the Exetainer® brand of tube was more suitable for collecting expired air compared to the Vacutainer® brand based on the fact that it had less residual dead-space which could dilute expired air samples.

Fifteen healthy men were given one of the four test milks containing 100µg $^{13}C$ octanoic acid after an overnight fast. Breath samples were collected at regular intervals for four hours. Following analysis by ratio isotope mass spectrometry, gastric emptying parameters were calculated.

The gastric emptying half time ($t_{1/2}$) of CIF was significantly shorter ($P<0.05$) than that of GIF (120 min vs. 159 min), but there were no differences in the rate of emptying between WC (141 min) and WG (150 min). There were no significant differences between either of the infant formulas and the whole milks.

Blood samples were taken concurrently with the expired air samples. The samples were analysed to determine plasma glucose concentration. The results of showed that the timing of the peaks of plasma glucose levels and subsequent drop to below baseline concentration may be associated with the rate of gastric emptying.

The manner in which the four test milks coagulated was also tested. Milks were incubated *in vitro* at 37.5°C after acidification with 1 molar HCl (to gastric pH 3) and addition of the enzyme pepsin. Vastly different coagulation properties were observed. The WC formed large curds with a clear separation between the whey-containing liquid and the curd whereas the WG and GIF were more homogenous with finer curds and considerably less clear fluid. The CIF exhibited very fine curds.

Differences in composition between whole goat's milk and whole cow's milk did not appear to be sufficient to elicit different rates of gastric emptying. Thus any nutritional differences between milk from the two species may not be related to the rate at which they are emptied from the stomach.

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