A HIGHLY DIGESTIBLE (IN-VITRO) STARCH IS POORLY UTILISED IN RATS

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Some starches contain significant levels of non-starch polysaccharides (NSP,1-3%) which renders them inappropriate as ingredients in studies of the nutritional roles of dietary fibre. Ideally starches for use in experimental diets should be highly purified, highly soluble, and (due to the present uncertainty of its role) contain no resistant or retrograded starch. In a recent study examining the effect of some soluble NSP (guar gum, *Acacia pycnantha* gum) on plasma cholesterol and triglycerides in the rat a highly purified potato starch (Sigma Chemicals) was used in the experimental diets (see Table). This starch is used as a reagent for amylase activity determinations and therefore has a very high in-vitro digestibility (>99%).

Diet[1]	Caecal Starch (%DM)	Total starch (g)	Plasma Cholesterol (mmol)	Plasma Trigylcerides (mmol)
A. control	52.53^{a}	1.84^{a}	3.56^{a}	1.32^{a}
B. *A.pyc.* gum	73.77^{b}	5.32^{b}	3.55^{a}	0.76^{b}
C. guar gum	76.46^{b}	4.60^{b}	2.92^{b}	0.31^{c}
Sig. effects[2]	P<0.0001	P<0.001	P<0.01	P<0.01
differences	P<0.05	P<0.05	P<0.05	P<0.05

[1]Diet ingredients (g/kg):- Starch (600); sucrose (57.8); casein (200); corn oil (50); mineral mix (35); methionine (3); vitamin mix (10); choline (2); cholesterol (2); cholic acid (0.2) and NSP (40; cellulose, Diet A; *Acacia pycnantha* gum, Diet B; Guar gum, Diet C). [2] n=6.

All rats, including those on the control diet had very high levels of starch in their caeca indicating digestibility of the starch was low (Table 1). Levels of this "resistant" starch were highest in rats fed the soluble NSP indicating that the gums caused some inhibition of starch digestion. The "resistant" starch does not have the biological activity of the gums which depressed plasma cholesterol and/or triglycerides levels. The reason for the very low digestibility of the starch is unclear as it is highly digestible in vitro. It is possible that gelatinising the starch prior to diet formulation would have improved the digestibility.

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