

EFFECTS OF QUILLAJA AND SOYA SAPONINS ON PLASMA CHOLESTEROL
AND FAECAL STEROID EXCRETION IN THE RAT

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Saponins are surface active sterol or triterpene glycosides which are found in a large number of plants, some of which are used as human food. It has been known for a considerable time that saponins can have a plasma cholesterol lowering effect, (Griminger and Fisher 1958) - apparently by adsorbing bile acids in the gut (Oakenfull and Fenwick 1978). The consequent increase in faecal excretion of bile acids is then offset by enhanced catabolism of cholesterol by the liver. Thus, a purified commercial saponin (Saponin white) has been shown to increase faecal bile acid excretion in both rats (Oakenfull *et al.* 1979) and pigs (Topping *et al.* 1980). We report here a comparison of two saponins found in normal human diets - either as an allowable food additive (Quillaja) or as a component of a traditional foodstuff (soya).

Purified saponins were extracted from Quillaja bark or soya flour and fed at a level of 1% of the diet to rats on diets low or high (1%) in cholesterol. In rats given soya saponins, faecal bile acids and neutral sterols were raised from 6.37 and 4.92 mg/g of dry matter to 6.56 and 8.13 mg/g of dry matter, respectively. On the high cholesterol diet soya saponins raised the excretion of bile acids from 11.64 to 13.36 mg/g of dry matter. Neutral sterols rose from 11.80 to 16.69 mg/g of dry matter. No effect of soya saponins was observed on the proportions of cholesterol to coprostanol, but there was a marked increase in the contribution of primary bile acids to faecal excretion, particularly the trihydroxylated ones. These results were similar to those obtained previously with Saponin White, except that in those studies binding was more specific for chenodeoxycholate.

When rats were fed Quillaja saponins, bile acid excretion was slightly increased, and neutral sterols rose from 4.93 to 12.83 mg/g of dry matter. On the high cholesterol diet addition of saponins slightly lowered faecal excretion of bile acids, but total steroid excretion rose, as neutral sterols were increased from 17.13 to 23.78 mg/g of dry matter. No consistent effect of Quillaja was observed on bile acid composition, but in contrast to soya the proportion of cholesterol rose from 54% to nearly 90% of excreted neutral sterols. This appears to be because quillaja saponins form a complex with cholesterol and restrict its absorption. Soya bean saponins and saponin white do not form this complex.

Both saponins prevented the increase in plasma cholesterol due to the high cholesterol diet.

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