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POTENTIAL OF GRAIN AMARANTH AS A NUTRIENT FOR THE AUSTRALIAN FOOD INDUSTRY

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Amaranth was a staple crop of the Aztec Indians and other pre-Columbian peoples. There are many species of *Amaranthus,* however the grain type (eg *Amaranthus hypochondriacus)* is a tall willowy plant with a large seed head. Although not a true cereal, amaranth grain has properties and characteristics similar to those of cereal grains. The seed can be milled, extruded or popped for use in soups, snack foods or blended with existing commercial grains. Amaranth oil is unusual in that it contains 8% squalene; a compound not typically found in plant material.

Rats (six per group) were fed diets, for two weeks, containing (per kg) either barley, wheat or amaranth (600 g), casein (100 g), sucrose (105 g), corn/coconut oil (100 g), o-cellulose (100 g) mineral mix (40 g) and vitamin mix (5 g). In addition, another group of rats were fed a diet based on amaranth with 2% added squalene.

Amaranth-fed rats had plasma cholesterol concentrations lower than those fed wheat, but the hypocholesterolaemic response was not as great as that for the barley-fed rats. The activity of HMGCoA reductase, the role limiting enzyme in cholesterol synthesis, was highest in amaranth-fed rats. This was significantly reduced ($P<0.01$) when two percent squalene was added to the diet.

Diet	Plasma cholesterol (mM)	Hepatic HMGCoA reductase activity (mev./hr/g liver)	Caecal pH	Caecal wt (g)
Barley	2.60	24.0	6.59	6.3
Wheat	3.17	21.2	6.91	4.8
Amaranth	3.07	33.8	6.60	5.8
Amaranth + 2% squalene	3.05	15.7	6.74	4.6

Amaranth ferments in the large bowel, resulting in a low caecal pH and an increased weight of the caecum and its contents. The addition of squalene to the diet caused a 14% decrease in volatile fatty acid production and caecal characteristics were then similar to those observed when wheat, an insoluble-fibre, was fed. Amaranth starch has different physical properties to commercial starches available in Australia. Amaranth is a drought resistant crop with a rapid growth rate and the seeds have a high protein and lysine content. The functional and nutritional properties of grain amaranth blend well with existing commercial grains and its potential for multiple use, may enable a future food role for this crop.

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