

Raw onion consumption inhibits *in vitro* lipoprotein oxidation in plasma

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Lipoprotein oxidation is thought to be a process linked to atherosclerosis and coronary heart disease. Compounds found in onions (*Allium cepa*) and garlic (*Allium sativum*) have been shown to increase the overall antioxidant activity of plasma (1,2) as well as other putative health benefits. However, the effects of different onion varieties and level of intake have not been studied. The aim of the present study was to evaluate the potential antioxidant benefits of two onion varieties fed at two levels of intake, using the pig as a human model.

Twenty-five female (Large White x Landrace) pigs (initial weight 41.5 ± 4.23 kg) were used in a 2x2+1 factorial designed experiment. The treatments consisted of white onions (WO) grown in Queensland and brown onions (BO) grown in Tasmania, fed at 10 or 24 g/MJ DE and no onion, respectively. Onions were homogenised in a blender prior to being mixed with dry feed formulated to contain 16.7 MJ DE/kg and 10% (w/w) of tallow to simulate the saturated fatty acid content of a western human diet. Pigs were fed approximately 90–95% of *ad libitum* (1.67 MJ DE/kg^{0.75}) for 6 weeks. Blood samples were obtained by venipuncture immediately before feeding at weeks 1, 2, 4 and 6 and at three hours post-feeding at weeks 4 and 6. An *in vitro* assay, which measures oxidative modifications of lipoproteins, was used to assess plasma antioxidant levels from which the effective time (ET) taken to reach 25, 50 and 75% of maximum absorption at 234 nm were determined (in minutes).

	g/MJ DE of BW ^{0.75}	ET ₂₅	ET ₅₀	ET ₇₅
Control	0	107.2 ^a	209.4 ^a	406.0 ^{ab}
WO	10	104.4 ^a	192.3 ^a	330.0 ^a
	24	119.5 ^{ab}	217.9 ^a	380.0 ^{ab}
BO	10	137.0 ^b	278.0 ^b	479.0 ^b
	24	116.1 ^{ab}	207.9 ^a	477.0 ^b
LSD		23.5	41.3	110.6

^{a,b}means within the columns with different superscripts differ ($P < 0.05$).

BO at the lower intake (10 g/MJ) was a significantly ($P < 0.05$) better antioxidant than WO, and delayed the time taken to reach ET₂₅ and ET₅₀. Pre-feeding ETs across all treatments were significantly ($P < 0.05$) higher than post feeding values. This can be explained by the increase in circulating blood lipids post feeding (data not shown), which resulted in an overall higher lipoprotein oxidation. Significant ($P < 0.001$) week to week variation was seen but was not related to onion feeding. It is concluded that brown onion supplementation increased resistance of LDL to be oxidised in plasma. This suppression of oxidative damage may account for a reduction in atherosclerotic activity in animals or humans consuming onions.

1. McAnlis GT, McEneny J, Pearce J, Young IS. Absorption and antioxidant effects of quercetin from onions in man. *Eur J Clinical Nutr* 1999; 53: 92–96.
2. Lau BHS. Suppression of LDL oxidation by garlic. *J Nutr* 2001; 131: 985S–988S.