Raw brown onion consumption reduces plasma triglycerides in pigs

NK Gabler[1], E Ostrowska[1], BG Tatham[1], SJ Sterling[2], RB Jones[2], DR Eagling[2], FR Dunshea[1]

Natural Resources and Environment, [1]Werribee, VIC, 3030
[2]Knoxfield, VIC, 3176

Organosulphur compounds present in garlic and onions have been shown to inhibit cholesterol synthesis in vitro and potentially reduce the risk of heart disease (1). Consumption of onions has been also inversely correlated to coronary heart disease mortality in man (2). The aim of the present study was to evaluate the potential health benefits of brown onions fed at two levels of intake, using the pig as a human model.

Fifteen female and fifteen male crossbred (Large White x Landrace) pigs (initial weight 24.4 ± 0.85 kg) were selected and pre-fed with a wheat-based control diet containing 25% (w/w) of total fat for three weeks. At the end of the three weeks period the pigs (39.9 ± 0.97 kg) were randomly allocated to one of the three dietary treatments and were maintained in individual pens throughout the study. The treatments consisted of brown onions fed at 16 or 40 g/kg body weight (BW) $^{0.75}$ and no onion. Onions were homogenised in a blender prior to being mixed with dry feed formulated to contain 19.5 MJ DE/kg, 8% (w/w) of canola oil and 15% (w/w) of tallow to simulate the saturated to unsaturated fatty acid ratio of a western human diet. Pigs were fed approximately 80% of ad libitum for 6 weeks. Blood samples were obtained by venipuncture three hours post-feeding at weeks 1, 2, 4 and 6. Plasma or serum, were analysed for total cholesterol (TC), HDL-cholesterol, LDL-cholesterol, triglycerides (TG), clotting factors such as prothrombin (PT), activated prothrombin (APPT) and thromboxane B_2 (TXB_2) and cell counts.

Onion g/kg BW $^{0.75}$	Female			Male				Significance[2]		
	0	16	40	0	16	40	SED[1]	O	S	SxOxD
TG (mmol/L)	1.02	0.87	0.83	1.02	0.81	0.94	0.071	0.032	0.81	0.31
TC (mmol/L)	2.40	2.33	2.32	2.21	2.38	2.75	0.130	0.30	0.44	0.22
HDL (mmol/L)	1.32	1.32	1.45	1.20	1.25	1.34	0.075	0.25	0.23	0.95
LDL (mmol/L)	1.78	1.81	1.98	1.59	1.62	1.82	0.103	0.23	0.077	0.91
Platelets (10^9/L)	419	353	419	498	421	449	30.8	0.14	0.061	0.59
PT (seconds)	13.1	13.1	13.3	13.0	13.3	13.4	0.16	0.15	0.62	0.82
APTT (seconds)	16.9	15.9	17.1	15.6	16.6	16.4	0.56	0.65	0.44	0.27
TXB_2 (ng/mL)	19.2	22.2	11.3	14.9	14.7	17.5	2.17	0.79	0.37	0.012

[1]SED – Standard error of differences of means for onion vs control pigs. For SED of the effect of sex divide by 1.06.
[2]O – Onion vs control pigs; S – Sex; SxOxD – Sex x onion x dose interaction.

Consumption of brown onions reduced plasma TG concentrations (15.8%, P = 0.032) regardless of sex and the amount of onion fed. TC, HDL and LDL levels were not affected by onion supplementation, while LDL concentrations tended (P = 0.077) to be higher in female compared to male pigs. While consumption of onions have been shown to have anticoagulant effects (3), blood clotting measures were largely unaffected by onion supplementation in pigs. Onion consumption did not elicit any overall inhibitory effect on serum TXB_2 concentrations, although there was a significant interaction between onions, sex and dose of onion (P = 0.012) such that TXB_2 was reduced at the highest dose of onion supplementation in females but not in males. In conclusion, consumption of raw brown onion is effective in lowering plasma lipid levels and hence may be of health benefit.

References

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