Effect of an aqueous extract of *Ajuga iva* on glycaemia, reverse cholesterol transport and atherogenic ratios in rats with streptozotocin-induced diabetes

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Experimental evidence suggests that hyperglycaemia is commonly associated with hyperlipidaemia. The present study was undertaken to investigate the effect of an aqueous extract of *Ajuga iva* L. Schreiber (Lamiaceae; *Ai*) on blood glucose, serum and lipoprotein lipid profiles and lecithin:cholesterol acyltransferase (LCAT) activity in rats with streptozotocin-induced diabetes.

Twelve rats with diabetes were divided into two groups that were fed a casein diet either with or without an *Ai* supplement (5 g/kg diet) for 4 weeks. Experimental diabetes was induced by intraperitoneal injection of streptozotocin as a single dose of 60 mg/kg body weight. HDL subfractions were separated by differential dextran sulphate–MgCl₂ precipitation and LCAT activity was determined by conversion of [³H]cholesterol (unesterified; UC) to [³H]cholesterol esters (CE).

*Ai* treatment significantly decreased glycaemia (−41%) and liver total cholesterol (TC; −33%), TAG (−30%) and phospholipids (PL; −47%). In the *Ai*-treated rats compared with the untreated rats hypocholesterolaemia (−33%) and hypotriacylglycerolaemia (−72%) were observed with a concomitant reduction in LDL-HDL₁-cholesterol (−50%), VLDL-cholesterol (−56%) and VLDL-TAG, whereas HDL-cholesterol remained unchanged for both groups. Moreover, plasma apoB concentration was 2-fold lower, while that of apoA was 2.4-fold higher.

| Group            | Untreated Mean (sd) | *Ai*-treated Mean (sd) | Differences
|------------------|---------------------|------------------------|--------------
| LCAT (nmol/ml per h) | 10.0 (1.93)         | 14.86* (1.29)          | *P<0.05      |
| ApoA (g/l)       | 0.98 (0.12)         | 2.31*** (0.24)        | **P<0.01     |
| HDL₃-PL (mmol/l) | 0.90 (0.12)         | 0.27*** (0.08)        | ***P<0.001  |
| HDL₃-UC (mmol/l) | 0.21 (0.02)         | 0.09** (0.03)         | **P<0.01    |
| HDL₃-CE (mmol/l) | 0.39 (0.03)         | 0.56 (0.19)           |              |

Mean values were significantly different from those for the untreated group: *P<0.05, **P<0.01, ***P<0.001.

LCAT activity was 1.5-fold higher in the *Ai*-treated rats than in the untreated rats. Moreover, HDL₃-PL and HDL₃-UC were decreased by 57% and 70% respectively, whereas HDL₃-CE was similar for both groups. Also, the atherogenic ratios TC:HDLS-cholesterol, VLDL-LDL-cholesterol:HDLS-cholesterol and apoB:apoA were decreased by 31%, 46% and 79% respectively in *Ai* treated rats vs. untreated rats.

These results suggest that *Ai* treatment is effective in decreasing the level of glycaemia and attenuating dyslipidaemia in rats with streptozotocin-induced diabetes by reducing plasma lipids and inversely increasing reverse cholesterol transport.