
Abstract
1. The in vivo hypoglycaemic activity of a dialysed fenugreek seed extract (FSE) was studied in alloxan (AXN)-induced diabetic mice and found to be comparable to that of insulin (1.5Ukg⁻¹). FSE also improved intraperitoneal glucose tolerance in normal mice.
2. The mechanism by which FSE attenuated hyperglycaemia was investigated in vitro. FSE stimulated glucose uptake in CHO-HIRc-mycGLUT4eGFP cells in a dose-dependent manner. This effect was shown to be mediated by the translocation of glucose transporter 4 (GLUT4) from the intracellular space to the plasma membrane.
3. These effects of FSE on GLUT4 translocation and glucose uptake were inhibited by wortmannin, a phosphatidylinositol 3-kinase (PI3-K) inhibitor, and bisindolylmaleimide 1, a protein kinase C (PKC)-specific inhibitor.
4. In vitro phosphorylation analysis revealed that, like insulin, FSE also induces tyrosine phosphorylation of a number of proteins including the insulin receptor, insulin receptor substrate 1 and p85 subunit of PI3-K, in both 3T3-L1 adipocytes and human hepatoma cells, HepG2. However, unlike insulin, FSE had no effect on protein kinase B (Akt) activation.
5. These results suggest that in vivo the hypoglycaemic effect of FSE is mediated, at least in part, by the activation of an insulin signalling pathway in adipocytes and liver cells.