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Novel weight reducing activity of ethanol–water extract of *Galega officinalis*

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The hypoglycaemic effect of galega (*Galega officinalis*) is due to galegine, a guanidine derivative found in the aerial parts of the plant (Einhorn (1962); Lapinina & Sisoeva (1964); Petricic & Kalodera (1982). The weight reducing activity of galega is a novel effect which was reported by Palit et. al. (1998). The aim of the present study was to investigate the weight reducing action of various extracts of galega.

Powdered aerial parts of the plant (50g samples) were extracted by cold percolation using ethyl acetate followed by either ethanol or water or a 50% ethanol-water mixture. These different extracts were incorporated into the diets of normal mice in an amount equivalent to 10% w/w of the powdered plant in the diet. Groups of mice were freely fed on extract-containing or control diet for 7 days.

Only the ethanol-water extract contained compounds which caused significant and sustained weight loss (e.g. day 7: control 30.9 $\pm$ 0.8g, ethanol-water extract 21.3 $\pm$ 1.2g, n = 7-8, $P < 0.01$). A significant hypoglycaemic effect was also observed at the end of the treatment period (control 9.1 $\pm$ 0.2 $mmolL^{-1}$, ethanol-water extract 6.3 $\pm$ 0.5 $mmolL^{-1}$, $P < 0.01$). Food intake in the treated group was initially reduced but had increased to control level by day 3. Galega produced no apparent change in faecal mass or consistency.

400.14 MHz ^1H NMR and ^1H-^1H-cosy-45 spectroscopic analysis of the active ethanol-water extract was performed. It was found to contain glycose-type compounds (c.a. δ 3.5-5.0) and also aromatic-type compounds (c.a. δ 6.8-8.0). There was also evidence of the presence of galegine (3-methyl-2-butenylguanidine). Thus there was a broad triplet at c.a. δ 5.24 (olefinic proton of galegine) which was correlated with a set of methylene protons at c.a. δ 3.78 (broad doublet). The position of these protons indicated attachment of the methylene group to a strong electron withdrawing atom, such as a nitrogen of guanidine found in galegine. Broad singlets (c.a. δ 1.69 & δ 1.75) could be assigned to the allylic methyl protons of the 3,3-dimethylallyl moiety in galegine and they also appeared to have correlation with the methylene protons at c.a. δ 3.78. Thin layer chromatography of the ethanol-water extract also indicated the presence of galegine. This was performed using a chloroform-methanol-water solvent system (6.5:3.5:1) and the chromatogram was developed using modified Sakaguchi reagent (Petricic & Kalodera (1982). Pure galegine gave a strong reddish-orange spot (Rf 0.68) and the extract gave a paler spot of the same colour (Rf 0.67).

In summary, the effects of the ethanol-water extract in normal mice were largely similar to those of the powdered herb shown in previous studies (Palit et. al. (1998). Thus, although initial weight loss in treated mice was at least partly due to reduced food intake, it then continued despite increasing food consumption. No separation of weight reducing and hypoglycaemic activities was observed. The compound(s) producing these effects were highly polar and it is probable that galegine was one of them. Further studies with pure galegine will determine conclusively its contribution to the weight reducing effect of galega.

REFERENCES

Einhorn, J. (1962). Acta. Polon. Pharm., 19 (4): 313-5. In: Chemical Abstracts, 60: 15012e.

Lapinina, L.O. & Sisoeva, T.F. (1964). Farmatsevt. Zh. (Kiev), 19 (4): 52-8. In: Chemical Abstracts, 66: 1451x, 1967-71.

Palit, P., Gray, A.I., & Furman, B. L. (1998). Novel Weight Reducing Properties of *Galega officinalis* (galega). Diab. Med.: 15 (suppl. 1), S18.

Petricic, J. & Kalodera, Z. (1982). Acta. Pharm. Jugosl., 32 (3): 219-23.