

The Hypoglycaemic and Antioxidant Effects of Ethanolic Extract of Curcuma Longa Rhizomes Alone and with Two Pepper Adjuvants in Alloxan-Induced Diabetic Rats

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Abstract : Diabetes mellitus is a carbohydrate metabolism disorder due to an absolute or relative deficiency of insulin secretion, action or both. Many known hypoglycaemic drugs are known to produce serious side effects. However, the search for safer and more effective agents has shifted to plant products, including foods and spices. One of such is the rhizome of Curcuma longa or turmeric, which is a spice with high medicinal value. A drawback in the use of C. longa is the poor bioavailability of curcumin, the active ingredient. It has been reported that piperine, an alkaloid present in peppers increases the bioavailability of curcumin. This work therefore investigated the hypoglycaemic and antioxidant effects of ethanolic extract of C. longa rhizomes, alone and with two pepper adjuvants in alloxan-induced diabetic rats. A total of 48 rats were divided into 6 groups of 8 rats each. Groups A-E were induced with diabetes using 150mg/kg body weight of alloxan monohydrate, while group F was normoglycaemic: Group A: Diabetic; fed with 400 mg/g body weight of turmeric extract; group B: Diabetic, fed with 400 mg/kg b. w. and 200mg/kg b. w of ethanolic extract of seeds of Piper guinensee; group C: Diabetic, fed with 400 mg/kg b. w. and 200 mg /kg b. w. of ethanolic extract of seeds of Capsicum annum var cameroun, group D: Diabetic, treated with standard drug, glibenclamide (0.3mg/kg body weight), group E: Diabetic; no treatment i.e. Positive control and group F: non diabetic, no treatment i.e. Negative control. Blood glucose levels were monitored for 14 days using a glucometer. The levels of the antioxidant enzymes; glutathione peroxidase, catalase and superoxide dismutase were also assayed in serum. The ethanolic extracts of C. longa rhizomes at the dose given (400 mg/kg b. w) significantly reduced the blood glucose levels of the diabetic rats ($p < 0.05$) comparable to the standard drug. Co administration of extract of the peppers did not significantly increase the efficiency of the extract, although C. annum var cameroun showed greater effect, though not significantly. The antioxidant effect of the extract was significant in diabetic rats. The use of piperine-containing peppers enhanced the antioxidant effect. Phytochemical analyses of the ethanolic extract of C. longa showed the presence of alkaloids, flavonoids, steroids, saponins, tannins, glycosides, and terpenoids. These results suggest that the ethanolic extract of C. longa had antidiabetic with antioxidant effects and could thus be of benefit in the treatment and management of diabetes as well as ameliorate pro-oxidant effects that may lead to diabetic complications. However, while the addition of piperine did not affect the antidiabetic effect of C. longa, the antioxidant effect was greatly enhanced.

Keywords : antioxidant, Curcuma longa rhizome, hypoglycaemic, pepper adjuvants, piperine

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