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Anti-diabetic potential of whole fruits and extracts of some selected Nigerian *Abelmoscus esculentus* (Okra)

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Background & Objectives: It is a general believe that Okra has anti-diabetic activity but without sound scientific prove. This study investigated the anti-diabetic potential of two varieties (Ila Ede and IlaYaaya) of Nigerian *Abelmoscus esculentus* L. (Okra) with the aim of establishing the mechanism of its anti-diabetic activity if any.

Materials & Methods: The okra samples were extracted with 75% MeOH to give crude extract (CE) which was later partitioned in to hexane, dichloromethane (DCM), ethyl acetate and butanol fractions. The CE and the solvent fractions were used for phytochemical screening, total phenol, total flavonoid, anti-oxidant activity, Carbohydrate degrading enzymes inhibitory potential (α-glucosidase inhibition, α-amylase inhibition) and selenium determinations. Two animal studies were conducted. The first involved six treatment groups: Normal control rats on rice alone; Diabetic control rats on rice alone; Normal rats on rice+2% Okra; Diabetic rats on rice+2% Okra; Diabetic rats on rice+5% Okra and Diabetic rats on rice+10% Okra. The blood sugar the rats were monitored for 3 hrs at 1 hr interval with glucometer. The second study examined the anti-diabetic potential of the solvent fraction with the highest inhibition of carbohydrate degrading enzymes. The study involved five groups: Normal control rats on distilled water; Diabetic control rats on distilled water; Diabetic rats on 150 mg/kg body weight (bwt) extract; Diabetic rats on 300 mg/kg (bwt) extract and Diabetic rats on 2 mg/kg (bwt) glimepiride standard drug. The animals were treated with the extract and drug for 10 days and blood glucose monitored on day 0, 5, 8 and 10 using glucometer.

Results: The phytochemicals were present in the Okra samples which could account for their health benefits. Total phenol varied between 30.20-227.84 mg GAE/g, total flavonoid (21.33-538.76 mg QE/g), α-glucosidase inhibition activity (1386-21408 IC50 µg/mL), α-amylase inhibition activity (545.5-3316.0 IC50 µg/mL) and selenium was between 93.85 and 109.88 18.35 µg/g. The results of the anti-oxidant revealed Ila Ede EtOAc fraction to have the highest activity. The first animal study revealed that the inclusion of 2% Okra into the control animals resulted in 16.3% reduction of blood glucose after 180 min. The incorporation of 2%, 5% and 10% Okra in to diabetic rats resulted in 3.1%; 7.9% and 14.4% reduction in blood sugar after 180 min of feeding compared with 0% Okra diabetic rats. The second animal study also revealed that the administration of EtOAc fraction of Ila Ede resulted in 2%; 0%; 33%; 25% and 31% reductions in blood glucose for normal control rats, diabetic control, 150 mg/kg extract, 300 mg/kg extract and 2.0 mg/kg glimepiride rats, respectively.

Conclusion: The results of chemical composition, anti-oxidant potential, carbohydrate enzymes inhibition, selenium content of Okra and in vivo studies confirmed that Okra could have anti-diabetic potential. Hence the call for the use of Okra in the management of diabetes seems to be justified.

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