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Ameliorative effects of dietary inclusion of selenium biofortified african eggplant (*Solanum macrocarpon* L.) leaves against impaired brain and kidney redox status in rats fed selenium-restricted diets

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Abstract

Selenium (Se) deficiency is associated with neurological disorders due to its antioxidant properties. This study investigated the neuroprotective effects of African eggplant (*Solanum macrocarpon* L.) on rats fed Se-restricted diets. African eggplant was cultivated on soil containing 8.36 ± 2.02 mg/100g Se. Thereafter, the AE leaves were harvested, dried and pulverised for subsequent analyses. The Se content in the pulverised leaves were subsequently determined. For the feeding experiment, adult Albino rats were divided into four groups (n=6) consisting of Se control (rats fed basal diet with Se), Se restricted control (rats fed basal diet without Se), 4 % AE (rats fed Se-restricted diet plus 4 % AE leaf) and 8 % (rats fed Se-restricted diet plus 8 % AE leaf). The feeding experiment lasted for fourteen (14) days after which the rats were euthanized. Brain and kidney tissue were rapidly isolated and homogenized. This was followed by assaying the tissue homogenates for neural antioxidant and redox markers. These showed that the AE leaves bioaccumulated Se to the level of 5.91 ± 0.02 mg/100g. Rats fed Se-restricted diet elicited significantly reduced ($p < 0.05$) levels of neural and renal total thiol and non-protein thiol, as well as significantly ($p < 0.05$) elevated level of lipid peroxidation, when compared to the control rats fed basal diet containing Se. In addition, activities of GPx, GST and catalase were significantly reduced ($p < 0.05$) in rats fed Se-restricted diet. However, the impaired redox/antioxidant indices were significantly ameliorated ($p < 0.05$) in rats fed Se-restricted diet plus AE (4 % and 8 %). This study therefore revealed that AE leaves significantly bioaccumulated Se from the soil and was able to ameliorate impairments to neural and renal antioxidant markers observed in rats fed Se-restricted diets.

Keywords: Brain, functional food, nutritional disorder, selenium, *Solanum*