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Abstract

This study evaluated the ability of ethanol extract of *Aframomum angustifolium* seeds to ameliorate the nephrotoxic effect of potassium bromate (KBrO₃) in rats. Biochemical alterations following co-administration of extract with 30 mg/kgbw KBrO₃ were monitored in four animal groups. Biomarkers were monitored using standard spectrophotometric methods. The findings suggest that the extract mitigated bromate-induced kidney lesions in the treated rats.

Aim

To determine the nephro-protective effect of ethanol extract of *Aframomum angustifolium* seeds



(A) Leaf stem
(B) Developing fruits
(C) Seeds

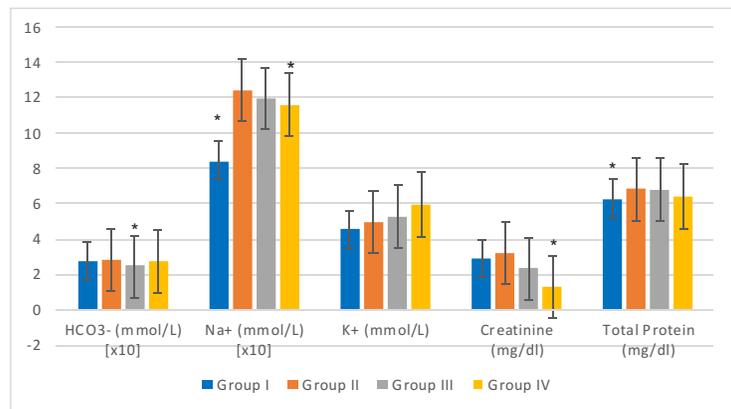
Introduction

The antioxidative property of phytochemicals is well documented (Nimse and Pal, 2015; Ebhohimen et al., 2017^a). This property is to a great extent retained after processing induced modifications (Ebhohimen et al., 2017^b). External supply of phytochemicals support innate systems in the suppression of oxidative stress that may be induced by a number of factors including residual chemical agents used in food processing (JECFA, 1989; Kurokawa et al., 1990; Nimse and Pal, 2015).*

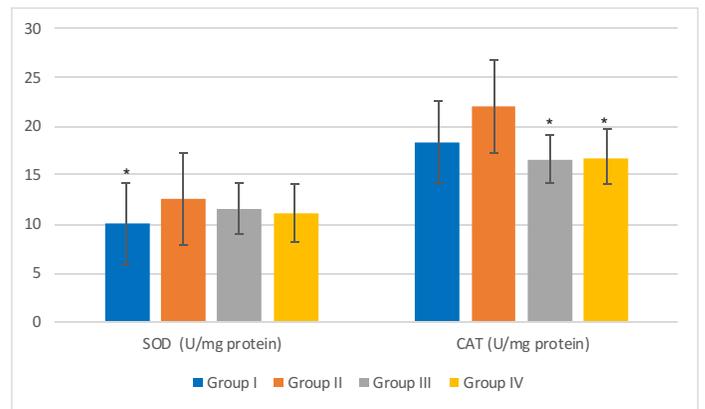
Method

Four animal groups I-IV (3 rats/group); Group I = normal control (distilled water), Group II = positive control (30 mg/kgbw), Group III (30 mg/kgbw KBrO₃ + 350 mg/kgbw extract and Group IV (30 mg/kgbw KBrO₃ + 750 mg/kgbw extract) for 28 days. Blood and tissue samples were collected at the end of the study period. Biochemical analysis were carried out using standard spectrophotometric methods.

Results



*Significantly different from Group II, p<0.05
Fig 1. Bicarbonate, electrolytes, creatinine and total protein concentration



*Significantly different from Group II, p<0.05
Fig 2. Antioxidant enzyme activity in kidney tissue

Histology

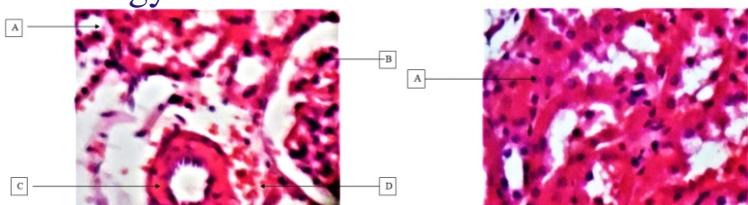


Plate 1: Photomicrograph of kidney section from Group I Showing: tubules(A); glomerulus(B); arcuate artery(C) and interstitial space(D). (H&Ex100)

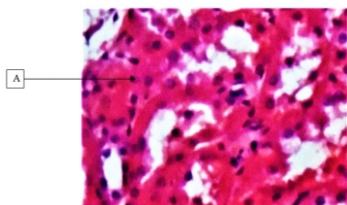


Plate 2: Photomicrograph of kidney section from Group II Showing: patchy tubular necrosis(A) (H&Ex100)

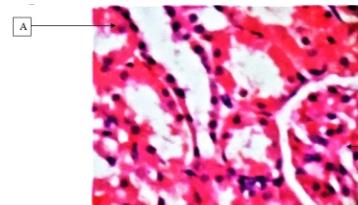


Plate 3: Photomicrograph of kidney section from Group III Showing: normal tubules(A) and glomerulus (H&Ex100)

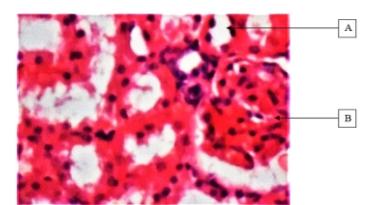


Plate 4: Photomicrograph of kidney section from Group IV Showing: normal tubules(A) and glomerulus (H&Ex100)

Discussion and Conclusion

Nephrotoxicity of bromate is well established, a process mediated by oxidative stress. In this study, serum Na⁺ and creatinine concentration were significantly elevated in group II (Fig 1). The antioxidant enzymes; SOD and CAT activities (Fig. 2) were also elevated in this group. This may be due to bromate induced tubular necrosis. Treated groups were not significantly different from the normal control group. Histological evaluation of kidney tissues revealed patchy tubular necrosis in group II (Plates I-IV). After twenty-eight (28) days, co-administration of KBrO₃ and the extract mitigated its toxic effect. This is important as it suggests a possible mechanism for overcoming the deleterious effect of residual chemicals especially in processed foods.

Selected References

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