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Antioxidant Enzymes and Crude Mitochondria ATPases in the Radicle of Germinating Bean (Vigna unguiculata) Exposed to Different Concentrations of Crude Oil

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Abstract : The study examined the effect of Bonny Light whole crude oil (WC) and its water soluble fraction (WSF) on the activities of antioxidant enzymes (catalase (CAT) and superoxide dismutase (SOD)) and crude mitochondria ATPases in the radicle of germinating bean (Vigna unguiculata). The percentage germination, level of lipid peroxidation, antioxidant enzyme, and mitochondria Ca2+ and Mg2+ ATPase activities were measured in the radicle of bean after 7, 14, and 21 days post germination. Viable bean seeds were planted in soils contaminated with 10ml, 25ml, and 50ml of whole crude oil (WC) and its water soluble fraction (WSF) to obtain 2, 5, and 10% v/w crude oil contamination. There was dose dependent reduction of the number of bean seeds that germinated in the contaminated soils compared with control ($p<0.001$). The activities of the antioxidant enzymes, as well as, adenosine triphosphatase enzymes, were also significantly ($p<0.001$) altered in the radicle of the plants grown in contaminated soil compared with the control. Generally, the level of lipid peroxidation was highest after 21 days post germination when compared with control. Stress to germinating bean caused by Bonny Light crude oil or its water soluble fraction resulted in adaptive changes in crude mitochondria ATPases in the radicle.

Keywords : antioxidant enzymes, bonny light crude oil, radicle, mitochondria ATPases
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