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### **Effect of imidacloprid insecticide stress on levels of serum thyroid hormones and minerals of fresh water fish *Clarias batrachus* (walking cat fish): Interaction with cortisol**

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Thyroid hormones and cortisol are vital for the regulation of metabolic and hydromineral homeostasis in fish. In the present study, the indices of osmoregulatory activity and the levels of serum Triiodothyronine ( $T_3$ ), Thyroxine ( $T_4$ ), Thyroid stimulating Hormone (TSH) and Cortisol in the fresh water fish *Clarias batrachus* were studied. In addition to this we have also studied the hydromineral regulations of serum Sodium ( $Na^+$ ), Potassium ( $K^+$ ), Chloride ( $Cl^-$ ) and Calcium ( $Ca^{2+}$ ) were quantified after exposing them to Imidacloprid, an insecticide to understand the physiological mechanism of stress and tolerance. After 96 hrs of the exposure period and based on the results obtained, the fish showed the lowering of metabolic rate as indicated by decrease in the thyroid hormone levels  $T_3$ , and TSH. The fish that showed increased metabolic rate indicated the significant increase in serum  $T_4$ . The significant increase of serum cortisol level might have resulted due to the release of cortisol from the interrenal tissue as mechanism of coping up with stress or impaired immune function. Thyroid stimulating hormone (TSH) showed insignificant results in increasing concentration of insecticide due to hypertrophy. The serum ions  $Na^+$ ,  $K^+$  and  $Ca^{2+}$  levels increased significantly and  $Cl^-$  level decreased considerably. Experimental results elucidated that the results induces that Imidacloprid insecticide evokes stress response in test fish, which includes a temporal and inverse interaction between  $T_3$  and cortisol. Thus the study emphasizes the hypothesis of lead role of cortisol in stress response in fresh water fish *Clarias batrachus*.

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