# "Pesticides Induced Changes In Circulating Thyroid Hormones In The Freshwater Catfish Clarias Batrachus" By Sinha Et. Al., Demonstrates The Importance Of Environmental Awareness In Endocrinology

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**Citation**

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**Abstract**

Throughout this investigation the effects of three commonly used agricultural pesticides, endosulfan (an organochlorine), malathion (an organophosphorous) and carbaryl (a carbamate) were studied on circulating levels of T4, T3, and the T3/T4 ratio of the fresh water catfish Clarias batrachus during the vitellogenic ( formation of the yolk of an egg) and post-vitellogenic phases of their annual reproductive cycle. Female C. batrachus were collected from a local pond in the suburb of Varanasi India and acclimated to laboratory conditions for fourteen days prior to the experiment (laboratory conditions were not stated in this paper, but I assume when transplanting fish to a new environment one has to regulate proper mineral balance, temperature, light exposure and nutrient level prior to achieving fully accurate outcomes). Analytical-grade chemicals were purchased, including 125I-labelled thyroid hormones, commercial grade malathion, endosulfan and carbaryl. Three levels of toxicity were established in response to endosulfan, malathion, and carbaryl by static bioassay method. They included LC(I)50 which is the initial median lethal concentration in which 50% of fish exposed were killed 96 hours after exposure, sub lethal concentrations (SL) in which apparent stress was observed, (paper did not give specific indications of stress)with no mortality seen, and finally, safe concentrations (SC) which is indicated as the maximum concentration of pesticide in which fish exhibited no stress. C. batrachus were exposed to different concentrations of each pesticide to explore approximate concentrations of LC(I)50, SL, and SC. Numerous trials were carried. Finally five glass aquaria each containing thirty fish were exposed to 96 hour LC(I)50, SL, and SC concentrations of each pesticide and mortality levels were recorded.

Female Clarias batrachus were placed into four groups. Groups 1-3 were exposed to sub lethal (SL) concentrations of pesticides (0.008 mg/l of endosulfan, 0.007 ml/l of malathion, and 12 mg/l of carbaryl) during vitellogenic (June 2 $^{nd}$ week, 13.5 L: 10.5 D; 40+ 2 C; GSI= 8.3 + 0.03) (Sinha et al 1990) and post vitellogenic ( July 3 $^{rd}$ week, 13 L : 11D; 29 + 1 C; GSI= 11.1 + 0.3) (Sinha et al 1990) phases of their annual reproductive cycle. The forth group was the control group and contained no pesticides. After 96 hours of exposure to each pesticide the experiment was terminated on day 4 of each phase. Blood samples were collected from fish in each group by caudal incision, (exact amount of blood, and where it was obtained from was not stated by the author) centrifuged, and assayed for T4 and T3 concentrations using radioimmunoassay.

Results obtained showed that after 96 hours of exposure to endosulfan there was a significant increase in T4 in both vitellogenic and post-vitellogenic phases, when compared to the control, where as carbaryl significantly decreased T4 levels (Fig. 1). Malathion showed no difference in T4 levels in both phases when compared to the control (Fig. 1). Upon investigating levels of T3 in both vitellogenic, and post vitellogenic phases, results showed that both endosulfan and malathion decreased levels of T3 as well as T3/T4 ratio also (Fig. 1 and 2). Carbaryl showed an increase in both T3 and T3/T4 ratio in both vitellogenic and post-vitellogenic phases when compared to the control group (Fig. 1 and 2).

## References

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## Author Information

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