A-20 Development of a field assay method for estimation of cholinesterase activity

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In Sri Lanka 79% of the pesticide poisoning fatalities are due to organophosphate poisoning. The highest number of organophosphate poisoning cases admitted to hospitals are from the rural areas of Anuradhapura, Kurunegala, Matale and Vavuniya districts. The methods available for estimation of cholinesterase activity, which can detect organophosphate poisoning at early stages are not suitable for field studies in the rural areas.

In this study cholinesterase activity of blood was determined using Lovibond comparator with bromothymol blue as the indicator. The phosphate buffer (pH 7.6) used and the substrate, acetyl choline chloride was shown to be stable up to 48 h at room temperature. The temperature correction for cholinesterase activity from 15 to 30°C is 0.0012-pH/min per increase in °C. Cholinesterase activity was assayed using the Lovibond comparator in 161 school children of age 15 - 16 years, from Kurunegala and Kegalle districts under field conditions. The mean value obtained for enzyme activity was 0.030-pH/min with standard deviation of ± 0.0043. Cholinesterase activity varied from 0.026-pH/min to 0.04-pH/min. No statistically significant difference in enzyme activity was observed due to variations of height, weight, midarm circumference or sex.

The results indicate that cholinesterase activity can be measured under field conditions using Lovibond comparator and thus detect organophosphate poisoning at early stages.