

Bedside screening test to determine methaemoglobin semiquantitatively in patients with propanil self-poisoning

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Propanil (3, 4-dichloropropioanilide) is a selective contact anilide herbicide used in rice, wheat and potato cultivation to control broad-leaves and grass weeds. Propanil-induced methaemoglobinemia is mediated by enzymatic hydrolysis of propanil to 3, 4-dichloroaniline which is able to directly oxidize haemoglobin (Hb) to methaemoglobin (metHb) making the haem moiety incapable of carrying oxygen. Treatment of propanil-induced methaemoglobinemia in Sri Lanka is complicated by the lack of laboratory facilities. **Objective:** To discover a bedside screening test for detection of the amount of metHb in-patient with propanil self poisoning at peripheral hospitals where laboratory facilities are not available. **Method:** 10% to 100% metHb blood samples were prepared and the amount of metHb in the blood sample was measured using the method described by Evelyn and Malloy. Red-brown coloured blood was observed from 10% to 100% metHb blood samples. The prepared methaemoglobin samples were subsequently used to develop a bedside test, which could measure the level of methaemoglobin in the blood. A series of metHb samples were prepared and one to two drops were placed on a piece of absorbent and scanned. The colour grade from red to brown was measured using an image program; ImageJ 1.37v (e.g. an area was selected and the median RGB (red, blue, green) values were calculated after processing with median filter with 25 pixels in three times). According to the change in RGB value, a colour code was prepared. **Results:** The absorbance at 630 nm correlates linearly with metHb levels (Figure 1). There is an inverse relationship between colour grade and metHb content with the correlation coefficient of 0.9938 (Figure 2). Variability in Hb levels was not associated with significant variation in the colour grade (Figure 3) and would not significantly effect the metHb colour grade for various patients. **Conclusion:** The result shows the possibility of developing a colour code for detection of the amount of methemoglobin for as a bedside test to guide treatment. **References:** Sir. Johny, Dacie and S.M.Lewis, *Practical haematology*, 6th edition, Churchill Livingstone, Edinburgh London Melbourne and New York 1984 (148-149), Eddleston M; Rajapakshe M; Roberts D; Reginald K; Rezvi Sheriff MH; Dissanayake W; Buckley N. Severe propanil [N-(3, 4- dichlorophenyl) propanamide] pesticide self-poisoning. *J Toxicol Clin Toxicol*; 40(7):847-54, 2002, E.M. Garrido, J.L.F.C. Lima, C. Delerue-Matos, F. Borges, A.M.S. Silva, A.M. Oliveira Brett Electrochemical oxidation of propanil and related *N*-substituted amides, *Analytica Chimica Acta* 434 (2001) 35–41.

Fig 1

Fig 2

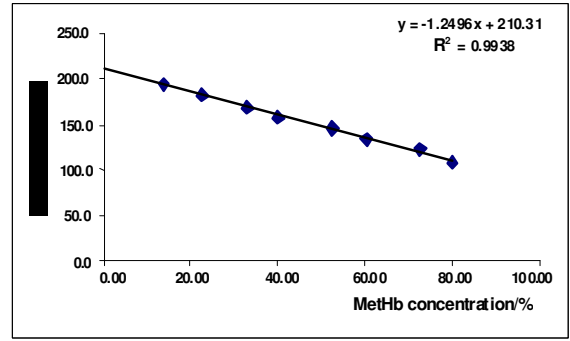
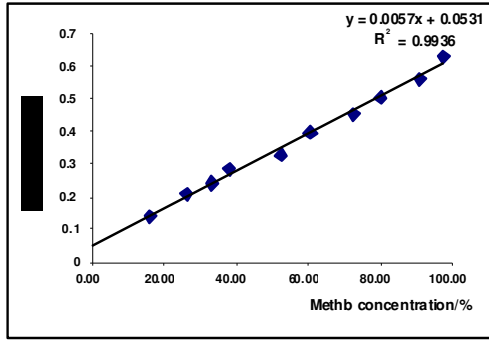


Fig 3

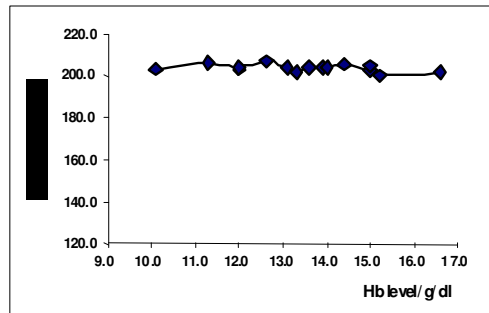


Figure 1 Change in absorbance with the amount of metHb

Figure 2 The variation of colour grade with the amount of metHb in Image J program

Figure 3 The variation of colour grade of normal blood with haemoglobin levels in Image J program