EFFICACY OF IVERMECTIN TO CONTROL *LEISHMANIA MAJOR* IN SAND FLY VECTOR *PHLEBOTOMUS PAPATASI* AND THE MAMMALIAN HOST

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ABSTRACT

EFFICACY OF IVERMECTIN TO CONTROL *LEISHMANIA MAJOR IN* SAND FLY VECTOR *PHLEBOTOMUS PAPATASI* AND THE MAMMALIAN HOST.

BY : JANETTE MOUSSA KAMEL GEORGY

The present study investigated the effect of two avermectins (ivermectin and abamectin) as environmentally safe biocides agents to control ***Leishmania*** parasites and ***P. papatasi*** sand flies. Treatment of ***P. papatasi*** adults with abamectin showed that abamectin has a high efficacy against sand flies at very low concentrations. The calculated $LC_{30,}$ LC_{50} and LC_{90} values 48h post-treatment were 2.75ng, 4.35 ng and 13.28 ng respectively. Abamectin showed no effect on the mortality percentages of ***L. major*** parasites neither in culture nor in sand flies. Ivermectin revealed a great systemic activity on sandfly at extremely low dosage. . The values of LD_{30}, LD_{50} and LD_{90} values 48h post-treatment were 2.62 µl, 3.65 µl and 8.22 µl respectively. The highest mortality was achieved at 24 h of the treatment. No fly mortality was observed after 72 h till the 9^{th} day post injection at all doses. Survival of ***P. papatasi*** females that tolerated 2.6 µl, 3 µl and 7 µl of ivermectin was 11, 6, 12 days versus 15 days for the control. Flies fed on 2.6 µl and 7µl lived significantly shorter than those did in control group. Sublethal dose (LD_{30}) of Ivermectin also produced significant reduction in the fecundity but lower effect on fertility. Ivermectin significantly reduced the longevity of treated females and decreased the number of emerging flies. Sex ratio distortion (male biased) was observed. Ivermectin showed high activity against ***Leishmania*** parasites in culture. The corresponding LC_{30}, LC_{50} and LC_{90} values were 0.25 µg, 1.45 µg and 107.1 µg. Histopathological studies revealed that abamectin displayed a great efficacy on the gut of sandfly ***P. papatasi*** when treated with LC_{30}. This efficacy appeared from the third day post feeding. No apparent histological changes in the treated gut with LD_{30} of ivermectin was observed. Histopathologic effect on the ovaries on the sixth and seventh

days post-feeding was noticed. The oocytes were few in numbers and the nuclei of nurse cells were extremely distorted and showed pycnosis. The effect of ivermectin on the liver of treated hamster with 2.6 µl displayed pathologic alteration in the hepatocytes enlargement and disarrangement of hepatic sinusoids were also observed. The liver tissues with the lethal dose (16 µl) of ivermectin showed that the hepatic tissue has completely lost their characteristic features. The treated splenic tissue with sublethal dose of ivermectin suffered minimal dose dependent pathological alterations. With the lethal (16 µl) dose applied to hamster, spleen tissue showed progressive ulceration.

Key words: Ivermectin – Abamectin – *Leishmania major* – *Phlebotomus papatasi* - Hamster.

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