



3rd World Congress on Biotechnology

September 13-15, 2012 Hyderabad International Convention Centre, Hyderabad, India

Serum glucose and serum protein levels in *Plasmodium falciparum* infected experimental C57BL/6J mice

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Background: Malaria remains the most important parasitic disease afflicting about 2.2 billion people globally. Most malaria deaths are due to *Plasmodium falciparum* infection. *P. f* is an intra erythrocytic protozoan parasite. It exports antigens and imports extra cellular nutrients to survive. Serum albumin and its associated fatty acids are essential for intra erythrocytic development and cell cycle progression of the *P. falciparum*. A change in serum glucose level & protein level is a characteristic feature of much parasitic infection.

Materials and Methods: 12 week old C57BL/6J mice were divided into 6 batches each with 6 mice. These experimental groups were Control (Batch-1), Infected (Batch-2), Infected+Arteether treated (Batch-3), Infected+Artesunate treated (Batch-4), Arteether Prophylactic (Batch-5) and Artesunate Prophylactic mice (Batch-6). Serum Glucose levels were determined by Orthotolidine method (Mono-step). Serum proteins levels were determined by Biuret and BCG (Bromo Cresol Green) Dye Binding method. Statistical analysis such as Mean, Standard Deviation (SD), Standard Error of Mean (SEM) and Paired T-Test were performed with 'MINITAB 11. 1232 Bit'. For between group comparisons 'Two Sample T-Test' was performed. Differences were considered statistically significant at $p<0.05$ and $p<0.001$.

Results and Discussion: In the present investigation glucose levels were significantly decreased ($p<0.001$) causing hypoglycemia at high rate of parasitemia in *P. f* infected mice. At high rate of parasitaemia malaria parasite utilizes glucose for their own energy requirement. And malaria fever and infections increase the metabolic demand of the body hence more glucose is utilized. When these infected mice treated with Arteether/Artesunate the glucose levels were increased significantly ($p<0.001$) to normal level. In mice treated with Arteether/ Artesunate prophylaxis the blood glucose levels were significantly high ($P<0.001$) when compared with infected mice, but these levels were in normal as in control group. And also low serum total protein concentration was observed in this study may be due to reduced concentration of albumin i.e., hypoalbuminea. Hence the serum proteins, serum albumin levels were found to be significantly lower ($p<0.05$) compared to control group. Total globulins have increased significantly ($p<0.05$) due to *P. f* infection. When the *P. f* infected mice treated with Arteether/ Artesunate and during prophylactic treatment; total serum proteins, total albumin and total globulin levels restored to normal values. Also the finding suggested that the level of total globulins is influenced by the degree of parasitemia. It is said that the high levels of globulins are due to acute or chronic infection of *P. falciparum*.

Conclusion: By evaluating the above parameters in treated mice; Artesunate and Arteether have proven as still efficient drugs to human malaria, *Plasmodium falciparum* when compared with other existing drugs in spite of increasing drug resistance.

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Enzymatic properties of biotechnologically important industrial enzymes: Phytases

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Present study involves enzymatic characterization of industrial enzymes i.e., phytases. Groundnut field rhizospheric soil sample was aseptically collected and subjected to serial dilution by pour plate method. Screening of phytase activity was evaluated on the basis of zone of clearing. Potential and selected fungal isolate was identified and characterized as *Aspergillus foetidus* MTCC 10367. Phytase production was investigated both qualitatively and quantitatively by using five different natural substrates i.e., wheat bran, soybean meal, corn powder, sesame seed powder and oats keeping calcium phytate as standard synthetic substrate. Among five different substrates, wheat bran and corn powder (1% w/v) provide a maximal yield of production of phytase i.e., 5.7 and 6.3 U/ml respectively when Submerged fermentation was carried out by using media inoculated with 2% inoculum with 2×10^7 spores/ml of 7 days old, incubated at 30°C for 72 h at 120 rpm. The extracellular phytase was studied for the optimum pH and temperature and was found to be active at pH 7 and 50°C.

Keywords: Phytase, *Aspergillus foetidus* MTCC 10367, wheat bran, Calcium phytate.

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