

**KINETIC CHARACTERIZATION OF ATPase OF *PLASMODIUM FALCIPARUM* (PfATP4)
& ITS INHIBITION BY *DUTTAPHRYNUS MELANOSTICTUS* (SCHNEIDER) SKIN
EXTRACT: AN *IN VITRO* STUDY**

Akshay D. Bagwe¹, Roshan C. D'Souza¹ & B. B. Sharma²

¹Department of Zoology, Sophia College (Autonomous), Mumbai, India.

²Department of Zoology, KET's V. G. Vaze College of Arts, Science & Commerce
(Autonomous), Mumbai, India.

Abstract:

Bufadienolides, which are naturally present in the toxic skin secretions of toads, have recently been discovered to have a variety of antiparasitic effects. These substances are known to inhibit the activity of ATPase enzyme, thereby preventing the ATP usage in the parasites leading to their rapid death. In present study, the crude hydroalcoholic skin extract of Common Asian Toad, *Duttaphrynus melanostictus* containing bufadienolides was evaluated for its ability to inhibit the ATPase of *Plasmodium falciparum* (PfATP4). PfATP4 was isolated from the trophozoites of *Plasmodium falciparum* 3D7 cells and its kinetic characterization was performed at varying concentrations of ATP, sodium, potassium, hydrogen, and calcium. The results obtained confirmed that PfATP4 followed Michaelis-Menten kinetics when treated with ATP, sodium, and hydrogen while no significant change in the activity was observed after the treatment with potassium and calcium. The inhibition constant of the extract was determined *in vitro* which was found to be 0.06 µg/ml. The Michaelis-Menten, Lineweaver-Burk and Eisenthal-Cornish-Bowden plots showed that the Km value of the enzyme significantly increased while the Vmax remained unaffected after extract treatment. Therefore, from this preliminary study, it could be concluded that the bufadienolides present in the skin extract possess a potential of being a strong competitive inhibitor of ATPase in *Plasmodium falciparum* and hence could be further explored as a novel antimalarial drug.

Keywords: Bufadienolides, Malaria, ATPase, *Plasmodium falciparum*, Common Asian Toad.