

Role of Fish Hepatic Aldehyde Oxidase in Oxidative In Vitro Metabolism of Phenanthridine Heterocyclic Aromatic Compound

Authors : Khaled S. Al Salhen

Abstract : Aldehyde oxidase is molybdo-flavoenzyme involved in the oxidation of hundreds of endogenous and exogenous and N-heterocyclic compounds and environmental pollutants. Uncharged N-heterocyclic aromatic compounds such phenanthridine are commonly distributed pollutants in soil, air, sediments, surface water and groundwater, and in animal and plant tissues. Phenanthridine as uncharged N-heterocyclic aromatic compound was incubated with partially purified aldehyde oxidase from rainbow trout fish liver. Reversed-phase HPLC method was used to separate the oxidation products from phenanthridine and the metabolite was identified. The 6(5H)-phenanthridinone was identified the major metabolite by partially purified aldehyde oxidase from fish liver. Kinetic constant for the oxidation reactions were determined spectrophotometrically and showed that this substrate has a good affinity ($K_m = 78 \pm 7.6 \mu\text{M}$) for hepatic aldehyde oxidase, coupled with a relatively high oxidation rate ($0.77 \pm 0.03 \text{ nmol/min/mg protein}$). In addition, the kinetic parameters of hepatic fish aldehyde oxidase towards the phenanthridine substrate indicate that in vitro biotransformation by hepatic fish aldehyde oxidase will be a significant pathway. This study confirms that partially purified aldehyde oxidase from fish liver is indeed the enzyme responsible for the in vitro production 6(5H)-phenanthridinone metabolite as it is a major metabolite by mammalian aldehyde oxidase.

Keywords : aldehyde oxidase, fish, phenanthridine, specificity

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020