

The effect of copper on the ultrastructure of *Puntius Javanicus* hepatocyte

ABSTRACT

Histology assessment is necessary to verify the presence of liver toxicity. The present study was carried out to compare ultrastructure alterations affected by copper (Cu) in the liver of *Puntius javanicus* exposed in vivo for 96 hours to sublethal copper sulfate (CuSO₄) concentration of 0.5, 1.0 and 5.0 mg/L. Our results indicated that Cu have significant effects on *Puntius javanicus* hepatocyte ultrastructure. The toxicity of copper was visualized using transmission electron microscope (TEM) where the effected cells show abnormalities of the shape of the nucleus, ripped nuclear membrane, swollen cells and lipid droplet deposition. However, at higher CuSO₄ exposure, other abnormalities were observed which are the development of pyknotic nucleus along with damaged organelles such as mitochondria, Golgi apparatus and endoplasmic reticulum disorientation. Irreversible cell injury was also observed where the hepatic nuclei was undergoing karyorrhexis with the formation of apoptotic body consisted of free scattered damaged organelle. This comparative study provides additional knowledge about the elimination effects of copper for the evaluation of the health status of fish species such as *Puntius javanicus* toward exposure by this contaminant and as an alternative source for biomarker of metal toxicity.