

**CD4 cell activation with the CD8 marker and metallothionein expression in the gills of cadmium-exposed mosquito fish (*Gambusia affinis* Baird and Girard 1853) juveniles**

**ABSTRACT**

This experiment aimed to determine how Cd exposure impacts CD4 cell activation, macrophage cells, pinocytosis activity, metallothionein expression, and Cd levels in juvenile *Gambusia affinis* gills. Four treatment groups were used, with one control and treatments A, B, C, and D at dosages of 0.03 mg/L, 0.023 mg/L, 0.015 mg/L, and 0.008 mg/L, respectively. The results showed that the number of CD4 with CD8 cell markers differed significantly from each treatment compared to the control (0.33%). The value in A, namely 0.54%, was the highest, followed by B, C, and D of 0.46%, 0.44%, and 0.42%, respectively. The number of macrophages increased as the Cd level of the medium increased, as did the activity of pinocytosis. Furthermore, the immunofluorescence test on the gills with the Anti-MT Mouse and goat IgG fluoresce in Rhodamine on the gills showed that luminescence increased with increasing Cd levels in the gills. Similarly, the MT intensity increased at Cd-exposed gills as compared to the control. As the Cd level in the gills increased, the MT levels ascended significantly.