

# ABSTRACT

The present research work was carried out to investigate the chromium toxicity on histology of liver and kidney, haematology and bioaccumulation of chromium in liver and kidney. Moreover effect of mega dose of vitamin-C in alleviating the chromium toxicity was also studied. Fresh water farmed fish *Labeo rohita* was used as experimental animal.

The fish were collected from Department of Fisheries, Manawan Hatchery, Lahore. They were acclimated at  $24 \pm 2^\circ\text{C}$  and  $\text{pH } 7.5 \pm 0.1$  in stock tank for one week prior to experiment. During acclimation, fish were fed with feed containing rice polish, fishmeal, protein and starch.

Tests for determination of LC-50 (48, 96-hr) were performed in a series of experiments. The 96 hours LC-50 of  $\text{K}_2\text{Cr}_2\text{O}_7$  was calculated to be 128 mg/l.

The experimental work was conducted in two phases: Acute and Chronic. In Acute phase, four groups A, B, C and D of 10 fish each were made, and the group A was kept control. The other 3 groups B, C & D were exposed to 3 different concentrations of  $\text{K}_2\text{Cr}_2\text{O}_7$  i.e. 80mg/l, 90mg/l and 100mg/l respectively. For chronic phase, 6 groups E, F, G, H, I & J were made and 20mg/l  $\text{K}_2\text{Cr}_2\text{O}_7$  sub-lethal dose was administered to each group along with six parallel control groups (untreated).

To study the effects of heavy metal on the histology of liver and kidney, the sampling was done after 48 and 96 hours for acute phase and at different days i.e. 1,2,4,8,16 & 32 for chronic phase studies. For this purpose fish were dissected to remove the liver and kidney, which were then processed for histology. Haematological studies were done only for acute phase after 48 and 96 hours.

In the next stage of experiments, 3 groups of fish i.e. K, L and M were exposed to LC-50 (128mg/l) of  $\text{K}_2\text{Cr}_2\text{O}_7$  along with vitamin-C, to investigate the effect of vitamin-C on LC-50. Group K was kept control as it received only  $\text{K}_2\text{Cr}_2\text{O}_7$  solution and no dose of vitamin-C. This experiment was run for 96 hours. Mortality of fish was observed after 24, 48, 72 and 96 hours. At the end of experiment fish were dissected to remove liver and kidney from the three groups and processed for histology. Bioaccumulation of the heavy metal (chromium) was also estimated in the liver and kidney by colorimetric method.

From experiments, it was concluded that  $\text{K}_2\text{Cr}_2\text{O}_7$  had produced highly significant pathological effects. Major histological changes in liver and kidney were the degeneration and deformation of the cells, nuclear pyknosis cellular necrosis and disintegration of the haemopoietic tissue both in acute and chronic phase. The results were enhanced with increasing effects of dose and time. Fish groups treated with mega doses of vitamin-C showed reduced mortality and less severe pathological effects.

The conclusion is that chromium has great detrimental effect on the histology of liver and kidney and haematology of the fish, *Labeo rohita* and that vitamin-C is an effective antidote against chromium toxicity.