

Summary of the MSc thesis No ..., The Faculty of Veterinary Medicine of Urmia University.

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Title of thesis: Evaluation of Serum KIM-1, NGAL, IL-18 as an Early Prediction Indicators of Nephropathy in Mice With Chronic Exposure to Isopropylidene Diphenol and The Role of Nephroprotective Efficacy of the Zinc Oxide Nanoparticles.

## Summary

**Introduction:** Isopropylidene diphenol is an organic polymer compound with high molecular weight, which is widely found in synthetic industries such as plastics almost all over the world. In this study, due to the harmful effects of this substance on the kidney, early diagnosis of kidney damage using new evaluation indicators; 18-IL, KIM-1 and NGAL were examined. Also, the protective effects of administering zinc oxide nanoparticles against kidney damage caused by bisphenol A were studied.

**Materials and methods:** In this study, 100 mice were purchased and randomly divided into two main control and treatment groups (isopropylidene diphenol poisoning). Each of these groups were divided into two subgroups receiving zinc nanooxide supplement and without zinc nanooxide supplement. The groups receiving zinc nanooxide supplement received this substance intraperitoneally at a dose of 3 mg per kilogram of body weight for 5 days. The control group had full access to the normal food ration with drinking water, and the second group received drinking water containing isopropylidene diphenol (final concentration 0.1 mg/liter) through drinking water in addition to the food ration. Mice were sacrificed on days 0, 7, 14, 28 and 56 to evaluate biochemical parameters and blood samples were collected directly from the heart.

**Results:** The obtained results showed that the induction of chronic poisoning by using isopropylidene diphenol during the study period led to the induction of kidney damage in such a way that the values of KIM-1, NGAL and IL-18 along with the

values of urea and serum Creatinine increased significantly. In the groups receiving zinc oxide nanoparticles supplementation, this increase was very slow and significantly lower than the groups without zinc oxide nanoparticles supplementation.

**Discussion and conclusion:** Examining the results of this study showed that isopropylidene diphenol can act as a nephrotoxic compound and induce kidney damage. Also, zinc oxide nanoparticles with their antioxidant properties can protect the kidney structure against damage caused by oxidative stress and free radicals. In the meantime, considering the rapid changes of KIM-1 & IL-18 in comparison with other studied markers, it seems that this biomarker can be used as a quick and sensitive diagnostic test for the early diagnosis of kidney damage.

**Keywords:** KIM-1, NGAL, IL-18, nephropathy, isopropylidene diphenol, zinc oxide nanoparticles, mice