

# Removal of Hydrazine Power Plant Wastewater Using Oxidation Methods

mojtaba niko khesal\*,

**Abstract** Nowadays, environmental protection is one of the most important challenges of the human life. Environmental pollution not only disrupts the human survival, but also causes harm to other organisms. Power plants are one of the greatest sources of environmental pollution. Hydrazine injection is often used in steam power plants to achieve various goals including pH adjustment and corrosion prevention. Due to the toxicity of hydrazine, the remainder must be removed from the power plant's wastewater. In this study, several tests were performed to remove hydrazine. The examined methods include acid-base reaction using HCl and H<sub>2</sub>SO<sub>4</sub>, adsorption using activated carbon and wood ash, and also oxidation experiments. The main approach in this study was the latter experiments that were performed by the sodium hypochlorite and Fenton method. In the Fenton, hydrogen peroxide and iron sulfate were used as oxidizing agent and catalyst metal ion respectively. In the next step, to achieve better results, the catalyst metal ion, ferrous sulfate in Fenton method, was replaced with copper sulfate. According to the suitable results obtained in the presence of copper sulfate, the experiments were repeated using copper chloride and copper oxide. The results showed that oxidation using hydrogen peroxide as the oxidizing agent and copper chloride as the catalyst metal ion leads to better results and the most degradation was obtained. Design Expert software was utilized to design supplementary experiments for optimizing the process, and determining the effects of operating conditions (pH, temperature, stirring speed and time) as well as the effect of the main experimental factors (initial concentration, copper chloride, and hydrogen peroxide). Single-factor studies showed the pH and Hydrogen Peroxide have the most important effects on the process and the effect of both of them are positive. Through evaluation of the interaction between the experimental factors, the largest interaction was observed between pH and hydrogen peroxide. The highest hydrazine removal that was obtained using process optimization was 99.99%. However, it should be noted that economic studies are

---

**needed for employing the achieved results in the full-scale applications. Keywords: Hydrazine, Removal, Oxidation, Wastewater Treatment, Hydrogen peroxide.**

**Keywords : Keywords: Hydrazine, Removal, Oxidation, Wastewater Treatment, Hydrogen peroxide.**

[Islamic Azad University, Rasht Branch - Thesis Database](#)  
[دانشگاه آزاد اسلامی، واحد رشت - سامانه بانک اطلاعات پایان نامه ها](#)