

# TREATMENT OF AN EMERGING CONTAMINANT PERCHLORATE FROM WATER USING MODIFIED NEEM AND TEA LEAVES

Ann M George\*  
Research Fellow  
Chemical Engineering,  
University of Kerala

Dr K B Radhakrishnan  
Professor and Head,  
Department of Chemical Engineering,  
TKM Engineering College

Dr A Jayakumaran Nair  
Professor and Head,  
Department of, Biotechnology  
Kariavattom

## Abstract

*Ammonium perchlorate is commonly used as an energy booster in rocket fuels. Perchlorate salts are highly soluble in water. The soluble and non-complexing nature makes perchlorate highly mobile in aqueous environment. It attains public attention because of its presence found in drinking water and well water of many areas. The consumption of such contaminated water can lead to improper functioning of the thyroid gland which may lead to goitre and other developmental defects in fetuses. In this study the removal of perchlorate is done using green adsorbents like neem leaves powder (NL) and spent tea leaves (STL). Cationic surfactant modified NL and STL for the removal of perchlorate was evaluated in terms of adsorption kinetics and adsorption isotherms. The work involves batch experiments to investigate the effect of pH, adsorbent dose, adsorbate concentration, temperature and contact time on the extent of adsorption. In this study the maximum adsorption was found at pH 4-5, adsorbent dose 1g, adsorbate concentration 10mg/L, temperature 40°C, and contact time 1hr for tea leaves and pH 4, adsorbent dose 3g, adsorbate concentration 20mg/L, temperature 50°C and contact time 60 minutes for neem leaves were obtained. It was observed that under optimum conditions the percentage efficiency of removal of perchlorate was up to 97.5 for STL and 97.8 for neem leaves. Adsorption studies were carried out using Langmuir, Freundlich and Temkin adsorption isotherms. The results obtained were favourable in all the cases.*