## ABSTRACT

Chromium is a type of heavy metal often found in industrial waste. Its presence in the environment can cause pollution and contamination. Chromium exists in several forms, including the hexavalent form, or Chromium (VI), which is more toxic and carcinogenic than trivalent chromium. One way to reduce Chromium (VI) levels is through adsorption methods utilizing natural materials such as zeolite, which has good adsorption capacity due to its pores. This material can be combined with polyaniline, which has good conductivity and thermal stability. Therefore, this project seeks to develop a composite material that combines natural zeolite with polyaniline. Its objective is to analyse how changes in the composite's composition impact its capacity to absorb the heavy metal Chromium (VI).

Before use, natural zeolite needs to be activated using HCl to clean the pores of impurities. Furthermore, polyaniline needs to be synthesized from aniline monomers through an oxidative polymerization method. Composite synthesis was carried out by mixing activated zeolite with polyaniline in the form of Emeraldine Salt through the physical mixing method with variations in the composition of natural Zeolite/Polyaniline (2:1), (1:1) and (1:2). The composite is an adsorbent that may be utilised for Chromium (VI) adsorption at concentrations ranging from 5 mg/L to 50 mg/L. The concentrations of Chromium (VI) can be varied from 20 mg/L to 30 mg/L to 40 mg/L. The final concentration of Chromium (VI) was determined using UV-Vis after forming a complex with 1,5 Diphenylcarbazide. The composite's character was examined using FTIR, GSA, and SEM EDX, which evaluated the surface area, morphological structure, and presence of functional groups, respectively.

The dark green powder served as the end product of the natural zeolite/polyaniline composite. The FTIR analysis revealed the presence of C-H, C-C, C=C, and C-N functional groups typical of polyaniline and Si-O-Si and Si-O/Al-O functional groups typical of natural zeolites. In addition, based on the GSA and SEM-EDX tests, changes in surface area and surface morphology were identified in the composite when compared to natural zeolite. In addition, from the adsorption test that has been carried out, the best adsorption results were obtained which were shown by the composite at a variation (1:1) of the initial concentration of Chromium (VI) 50 ppm with an adsorbed concentration of 24.286 mg/g, this indicates that the natural zeolite/polyaniline composite is effective in adsorbing Chromium (VI).