The Adsorption of Safranin O and Crystal Violet Dyes onto Pyracantha coccinea Biosorbent

Buyukgolcigezli, Idil (School: Bilkent Erzurum Laboratory School)

This project aims to develop a new, applicable, eco-friendly and efficient method to remove hazardous dye substances that are released into peripheral water bodies from textile factories as it has been proven that these dyes upset the ecological balance and threaten the health of living organisms, particularly those that are a part of the marine eco-system. The binding between the surface of a biological substance and non-biodegradable contaminant surfaces -such as heavy metals or pollutant dyes- in a suitable aquatic environment is scientifically known as biosorption. In this project, Crystal Violet and Safranin O biosorption studies have been conducted using Pyracantha coccinea. The biosorption yield has been calculated using the initial absorption peak intensity and the one after 45 minutes of contact between the contaminant molecules and the biosorbent surface. The initial dye concentration, pH, biosorbent mass, temperature and agitation speed in the adsorption process have been studied. Judging from experimental data, it is possible to conclude that either most or some of the dye has been adsorbed onto the Pyracantha coccinea surface and that the findings further suggest that Pyracantha coccinea can be used as a suitable biosorbent for mass biosorption of Crystal Violet dye with a yield of 87.67 %. Later, the isotherm and kinetic data regarding cationic dye biosorption by Pyracantha coccinea have been obtained in order to specify the type and details of the biosorption performed. Further research planned in the scope of this project includes the trial of experimental colon studies with industrial wastewater instead of model solutions and the testing of Pyracantha coccinea behavior on several other azo-dyes and heavy metal pollutants.

Awards Won: