REMOVAL OF CHROMIUM USING VIGNO MUNGO AS A BIOSORBENT IN TANNERY EFFLUENT AT DINDIGUL DISTRICT

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ABSTRACT:

This present study conception is the removal of Heavy Metal of Chromium ions from Tannery effluents using low cost natural absorbent Vigna mungo. The activated carbon prepared from the Vigna mungo (Black gram) husk can be employed as a potentially low cost adsorbent. The activation process was found to increase the high surface area and offering good adsorption capacity. Vigna mungo husk was taken to prepare activated carbon by physical activation (Pyrolysis at 700°C in furnace) and chemical activation (using H_3PO_4). The temperature and dosages are the important factors of finding the metal adsorption capacity of activated carbon. To know the chemical functional groups such as hydroxide group (-OH) and carboxyl group (C=O) are present in the activated carbon can be analysed by FTIR analysis. The pore structure analysis was examined on the basis of SEM analysis. The removal percentage for chromium at 700°C of dosage 0.15 g shows the greater adsorption capacity.

KEYWORD:

Activated carbon, Vigna mungo husk, Adsorption, Tannery effluents, Chromium

INTRODUCTION:

Heavy metals are toxic and detrimental water pollutant. They are toxic and non-biodegradable in nature. They cause so many ill effects in human beings and also animals and vegetation. Most cases in the field of environment studies are the removal study of heavy metal in wastewater. Therefore many researchers attempt a method and technologies for wastewater treatment. Basically some bio-sorption efficient approaches are in the heavy metal removal process. In the tannery industry tanning process started with using the chemical tannin. Mostly chromium (III) sulphate is used as a tanner. The trivalent chromium now commonly used in tanning has a lower toxicity than the hexavalent chromium. Tannery waste water pollution causes a serious health hazards to man and surroundings. During the tanning operation direct contact with chemicals can cause disability, allergy, asthma various skin diseases and permanent illness and even death. Chromium is a controversial on account of the persistent and potentially toxicity of some of its chemical forms.

N.K. Akunwa et al., (2014) describes the standard treatment methods are very precious and demanding to treat waste water from various industrial process. Sometimes wastewater may not treat properly it will cause environmental risks. Saleh and Al-Saadi, (2015); Goscianska et al.,(2016); Shu et al., (2017) discussed about the usage of activation carbon in adsorption studies plays an important role far and wide due to its cost effectiveness. A. Sharma et al., (2019) explains the importance of activation carbon to overcome the accepted methods such as ozonation, sonolysis, membrane filtration, Ion exchange, photochemical oxidation etc., Danish et al., (2013).show as there are two types of activation process takes place in practice namely physical and chemical activation. A. Abdolali et al.,(2014)carried out FTIR studies to explain while using phosphoric acid , activation carbon have an increase of some acidic functional group like C=O and O=H. This present study aims that the preparation of easily available and effective sorbents to be an activated sorption material. A known ecofriendly, cost effective and easily available Vigna mungo (Black gram husk) adsorbent is used to study the adsorption Chromium ions in the tannery effluents.

MATERIALS AND METHODS:

SAMPLE COLLECTION:

Tannery Effluent is collected from Dindigul Tannery Industry. Tannery effluent was taken for the removal study of heavy metals particularly chromium present in it. Physico-chemical characteristic of tannery wastewater was showed that their high organic content leads to environmental pollution. The P^H value of effluent is increased due to chemical process involved in it. The wastewater becomes very basic and affects the soil tendency cause environmental degradation.

ACTIVATED CARBON (AC) PREPARATION:

The material used for the production of activated carbon is Vigna mungo (Black gram) husk. Among the variety of Indian food products Black gram is one of the important pulse. It is popular as "Urad dal". In Black gram dal, the outer skin is peeled off and the husk is the by-product .Black gram