NOVEL METHODS TO REDUCE AND RECYCLE SOLID WASTE FOR INDUSTRAIL APPLLICATION

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EFFECTS OF HEAVY METAL IONS

1. Heavy metals are toxic and detrimental water pollutant

2. Their presence not only affects humans beings but also animals and vegetation because of their mobility in aqueous affects ecosystem, toxicity and non-bio degradability.

3. Different metals have different toxicity or toxic profiles depending upon their chemical form.

4. Source of heavy metal includes natural source, mining, smelting, agrochemicals, and sewage sludge application.

5. The heavy metals present in water doesn't possess a property to degrade naturally and are toxic to aquatic life even at low concentration.

Some metal ions are

1. Copper
2. Zinc
3. Nickel
4. Lead
5. Cadmium

PROJECT SCOPE

1. The scope of the project is to produce economical, low maintenance, energy efficient heavy metal ions adsorbents from industrial, agricultural, and domestic waste and also to prepare HAP bone material from domestic waste for orthopedic application

2. Different method such as ion exchange, perception, evaporation membrane filtration and adsorption are used for heavy metal, adsorption process has attracted of many researchers because of low cost, based on the performance of various absorbents such as natural material, industrial by products

OBJECTIVE

1. To remove heavy metals from industrial wastes during adsorbents from industrial, agricultural, domestic wastes.

2. To synthesis hydroxyapatite (HAP) from domestic waste for orthopaedic application.

MATERIALS AND METHODS

MATERIALS REQUIRED

Rice husk, Nitric acid, Egg shell, Phosphoric acid.

EXPERIMENT 1: Production of HAP from egg shell

1. Egg shell obtained from domestic waste was sintered to 900c.
2. An appropriate amount of sintered egg shell was taken in a round bottom flask and dispersed in 500ml distilled water.
3. 500ml of phosphoric acid of 0.6M strength was added to the egg shell drop wise with stirring
4. The precipitate obtained is filtered, dried and sintered to 1000c
5. The resultant HAP is characterized by FTIR and XRD studies.

EXPERIMENT 2: Removal of heavy metal ions [Cu^{2+}, Zn^{2+}] using domestic, agricultural and industrial waste.

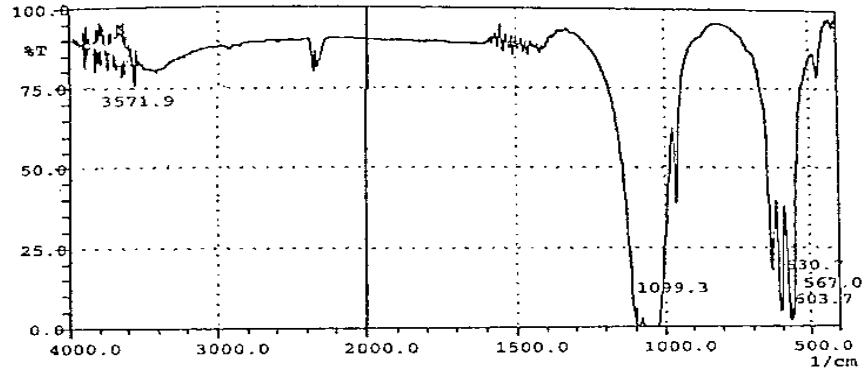
2A: COPPER

1. Rice husk was treated with nitric acid for one hour.
2. Filtered, dried in air oven at 100c.
3. The treated rice husk was sintered at 600c.
4. The treated and sintered husk(1g) was added to 100ppm Cu2+ solutions, stirred and filtered.
5. The filtrate was estimated for copper by volumetric analysis using EDTA [indicator: FSBF ; buffer: ammonia hydroxide]

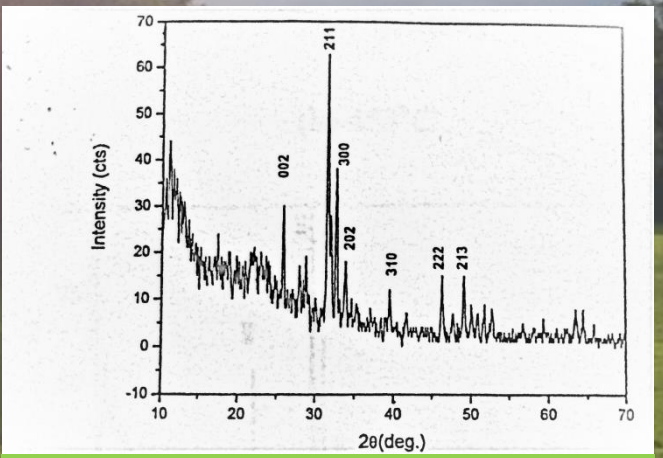
2B:ZINC

1. The same procedure was adopted to zinc. {indicator: EBT ; buffer: 10ml of ammonium chloride and ammonium hydroxide]

RESULT AND DISCUSSION



Picture 1
Shows the FTIR spectrum of HAP produced from egg shell



Picture 2
Shows the XRD spectrum of HAP produced from egg shell

The FTIR and XRD spectrum of the synthesized and sintered HAP at 900c showed peaks characterized of HAP

This tabular column shows the amount of copper and zinc adsorbed by HNO_3 treated and sintered rice husk, sintered rice husk

S.NO	METAL IONS	SINTERED RICE HUSK	NITRIC ACID TREATED AND SINTERED RICE HUSK
1.	Zn2+	8.4ppm	18.3ppm
2.	Cu2+	20ppm	31.75ppm

Ph = 7 approx.
Quantity of rice husk = 1g/l

BENEFITS OF THE ENIVIRONMENT

1. The toxic carcinogenic metals like Zn^{2+} ,Cd^{2+} ,Pb^{2+} and Ni^{2+} can be removed from the environment.
2. Reduction and reuse of the agricultural, domestic and industrial wastes that pollutes the environment.
3. Production of HAP from domestic waste like egg shell for orthopaedic application.
4. Renewable resources has been used to produce HAP and also to reduce metal ions in industrial effluents.

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THANK YOU