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4th Cycle
Assessment & Accreditation by NAAC

CRITERIA- III- Research, Innovation & Extension

Metric No. : 3.3.2.1 QnM- Number of books and chapters in edited volumes/books published and papers published in national/ international conference proceedings per teacher during last five years

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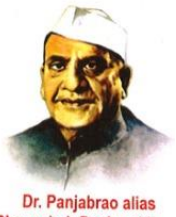

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Sr. No.	Name of Author	Title of the Book/Chapter/Proceeding Paper	Page No.
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Adsorption based recovery of cobalt using chemically modified activated carbon

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ABSTRACT

In present investigation 3-Aminophenol and 2-hydroxy-5-methoxy benzoic acid were used for surface modification of adsorbent such as Filtrasorb 300 (F-300). It was achieved by stirring organic ligand with fixed quantity of granular activated carbon (GAC) at a temperature 25 ± 1 °C at 500 rpm. A chemically modified GAC was used to examine its uptake capacity in removal of cobalt by batch technique from the aqueous media. The experimental data were fitted well to the Langmuir adsorption isotherm model indicating monolayer phenomenon. The GAC F-300 modified with 2-hydroxy-5-methoxy benzoic acid showed a high efficiency for the removal of Co^{2+} ions from aqueous solution.

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Currently different treatment techniques such as are precipitation, adsorption, ion exchange, electrochemical treatment, membrane separation technique, coagulation, reverse osmosis, flocculation, electro dialysis are in use for the removal of heavy metals ions like cobalt from aqueous waste. Among these few methods are elaborated below.

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In chemical precipitation, precipitant is added to change the physical state of suspended and dissolved solids and facilitate their separation by sedimentation process. This method is not used for large solution volumes containing very low concentrations of metal ions. In this method a large quantity of chemical reagents are required to reduce metals to an acceptable level for discharge which produced excessive sludge.

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Studies on adsorption characteristics of manganese onto coal based chemically modified activated carbon

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ABSTRACT

The present study was undertaken to evaluate the adsorption capacity of activated carbon modified by organic ligand for the removal of Manganese ions in aqueous solution. In present work, adsorption of Manganese ions from aqueous medium using coal based granular activated carbon filtrasorb-300 and filtrasorb-820 modified by 1,2-Benzenediamine was used for a surface modification of the selected adsorbent. All adsorption isotherms of metal ion on modified GAC have been determined at p^H 5 and temperature 25 ± 1 °C. The adsorption parameters were determined using Langmuir, Freundlich, and Temkin isotherm models. The experimental data were analyzed by pseudo first order and pseudo second order kinetic models. Results were found to follow Langmuir adsorption isotherm and pseudo second order equation well.

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While at least 20 metals are classified as hazardous and half of these are discharged into the water bodies in huge quantities that lead to adversely affect human health [4–8]. The inorganic pollutants are highly toxic and non-biodegradable. The ground water contain an appreciable quantity of Fe^{2+} and Mn^{2+} or both and has always having very low less percentage of dissolved O_2 and optimum CO_2 content. The chronic manganese poisoning has been reported which damaged the central nervous system, lungs and liver. According to World Health Organization, the maximum tolerable limit of Mn^{2+} in drinking water is about 0.5 mg/l. [9–13]. It, therefore, becomes necessary to remove toxic metals from wastewaters by an appropriate treatment before releasing them into the environment. Among the different treatment technologies, adsorption is widely accepted for scavenging the toxic metals because of its cost-effectiveness and high affinity towards the metal ions. The capacity and rate of adsorption differ significantly for different potentially hazardous metal and different commercial carbon. The technique of complex formation between the metal ions and ligand was used in this study to enhance the adsorption of Mn^{2+} metal ion on the surface of adsorbent. Various researchers have used a multitude for the removal of toxic metals from aqueous solution [14–27]. Therefore, the aim of the present experiment is to carry out adsorption of Mn^{2+} from aqueous solution by using modified granular activated carbon by 1,2-Benzenediamine. In the present study, a chain of batch mode experiments were carried out in order to examine the practicability of granular activated carbon for the removal of Manganese from aqueous medium.

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All the chemicals used in the experiment were of analytical reagent grade. In the adsorption study the stock solution of Mn^{2+} ion was prepared by dissolving requisite $MnSO_4$ (E-Merck) in freshly prepared distilled water. Granular activated carbon was first subjected to size fractionation by sieving them using a sieve

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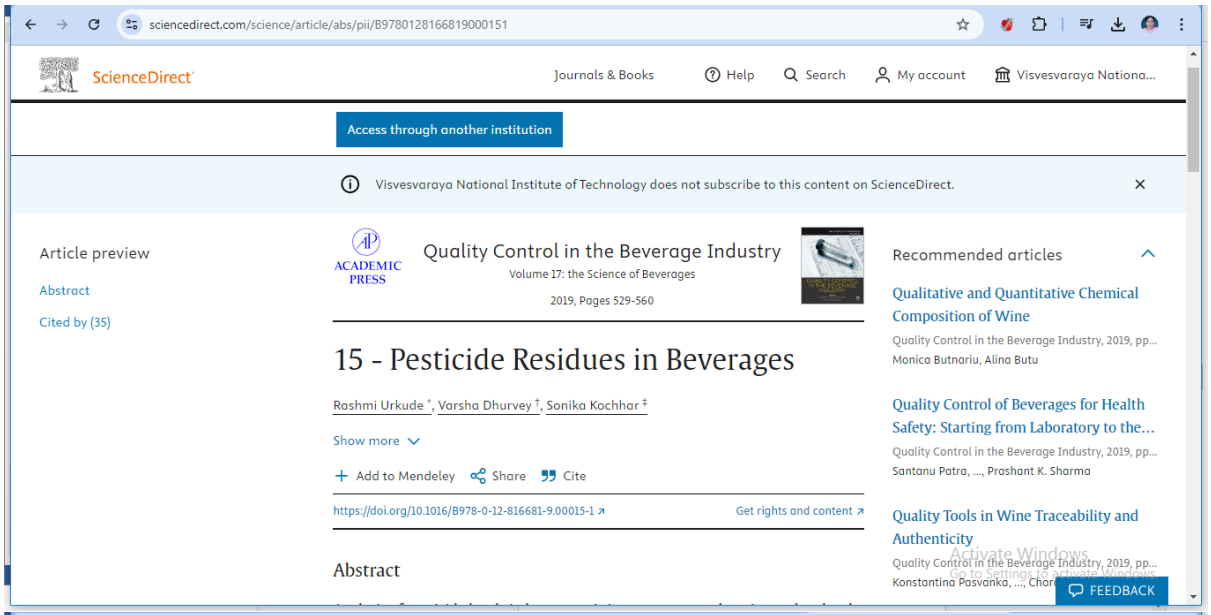

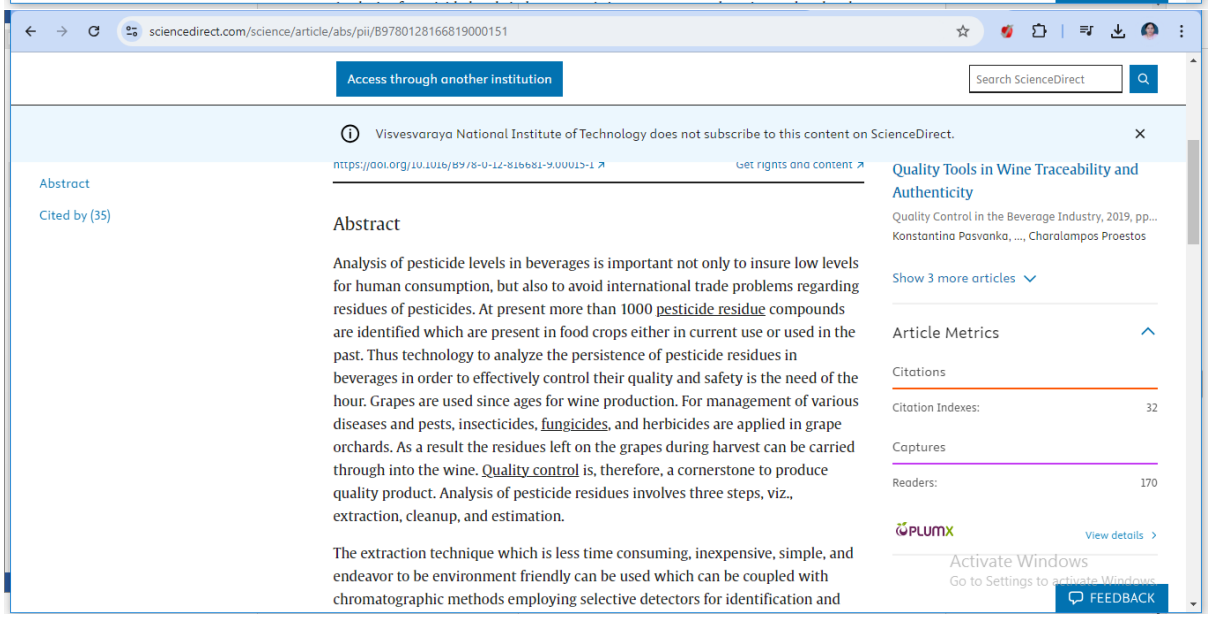

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