

## Green Filters: A Low Cost an Effective Way to Treating Waste Water

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**Abstract:** Today, discharge of toxic materials through Industries, e-waste, sewage, dyes, heavy metals, chemicals compounds and pesticides are found in water bodies like lakes, rivers and ground water takes developed a major difficult, which increases their contaminations levels significantly. These contaminants and toxic compounds are challenging to remove by outdated water treatment processes. A new technique had developed by non-toxic method using green filters to remove water contaminants. These techniques are cost effective and easily available or doesn't harm in our environment. This paper provides an in-depth review for green filters synthesized using Nanotechnology and their efficiency to remove contaminated for waste water.

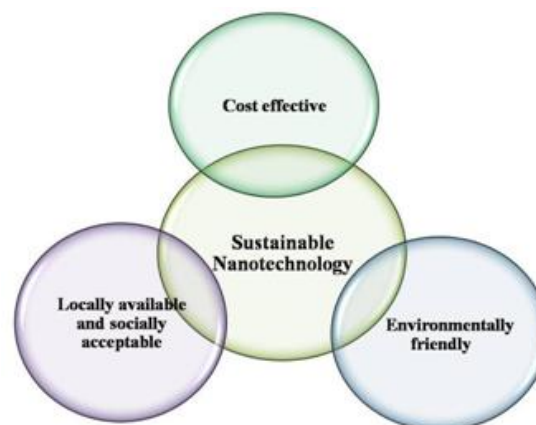
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### 1. INTRODUCTION

Green filter are used for sustainable water remediation and treatment is a good analysis of recognized procedures for removing metals from polluted water [1]. Recent advances in the field of nanotechnology and larger applications of nanoparticles have led to learn about the unexploited resources that already exist in nature for development of new methods in synthesis of nanoparticles. Commonly, nanoparticles can be readily formed using physical and chemical methods [2]. Nanoparticles (NPs) are defined as materials with a size between 1 and 100 nm. Their Nano size provides them more surface areas than the corresponding bulk forms, advanced reactivity and a tunable nature of several properties. These special properties have encouraged the development of nanoscience and the application of NPs in wide range of fields like biomedicine, cosmetics, electronic, food, environmental examination and remediation or paints [3].

Several of the nanomaterial synthesis or making techniques of nanomaterials include the usage of dangerous elements, low material changes and high energy requirements. So, an increasing

need to develop an environmentally friendly procedure for nanomaterials synthesis without using dangerous chemicals is gaining importance. Green filters techniques using also microorganisms or leaf extracts have developed as a simple and possible another to plant synthetic processes and physical procedures [4].



**Figure1.** Sustainable Green Filter Nanotechnology [5]

### 2. REMOVAL METHOD FOR IRON NANOPARTICLES IN WASTE WATER

Due to a number of restrictions of conventional procedures, review application has newly

moved towards the improvement of clean and eco-friendly creation procedures. Nanomaterials can also be green filter, based on the use of leaf extracts which are responsible for the decrease of metallic complexes to appropriate nanomaterials. Green filter is not only ecologically friendly, but also low-cost. Because there is no requirement to use high temperatures, pressure, or supplementary energy contributions, it is easy to implement on a huge scales [5, 6]. Green filter to products Nano zero valent iron (nZVI) was first useful by *Veru TEK* and USEPA. This technique involved the preparation of a polyphenolic solution by warming leaf extracts (coffee, green tea, black tea, lemon, balm, sorghum, bran, grape etc.) in water to a temperature nearby to the boiling point. Extract ready in that technique is divided from the leaf filtrate and then mixed with a solution of Fe<sup>2+</sup>. The iron ions in the occurrence of polyphenols remained reduced to nZVI [7]. This green filters procedure for producing iron nanomaterials is considered as the most ecofriendly method and is still now commonly used.

Another different procedures e.g. hydro thermal production with leaf extracts, production with plant or leaf biodegradables -assisted production are further common in the production of iron oxide nanoparticles [8]. The main disadvantages of using leaf extract for nanomaterials mixture is the devastation of leaf and plant amounts [9]. Extracts from several remains (skin, albedo, flesh) of such fruits as lemons, mandarins, limes, oranges or vine pomace [6, 10]. Herb extracts decrease the metallic ions in a smaller period as associated to micro organisms. Contingent upon leaf category and application of phytochemicals reactions, nanomaterial remain complete within a limited time, although microorganism-based methods require a longer time. The main disadvantage of microorganism nanomaterial production is the required limitation of sterilized situations, which needs qualified supervisor, and increases the scaling-up charge [8]. Green filter ZVI has been positively used as a Fenton catalyst for oxidizing monochlorobenzene [11]. The reducing agent are used dye such as malachite green [12] or bromothymol blue [7]. Former research's show the report of green nZVI it can be used to damage medicines (e.g. ibuprofen) in soils [10], Cr (VI) ions [13, 14], nitrate [15]. Treatment of sewage waste water [20]. In spite of the various benefits of using this technique, green filter is still not generally

believed. These consequences after lacking information of the reactivity, physicochemical belongings, and accumulation of the nanomaterials formed [10]. The data presented in the writings shows that dependent of the kind of leaf isolation used for the manufacture of nZVI, we found nano particles with several dimensions and standards of particular surface area. Green filters can also be restricted by the lacking decrease of iron to nZVI by plant extracts [13], subsequent in of the construction of additional procedures of iron, e.g. iron oxides of hydroxides, in the progress of the development [12].

### 3. REMOVAL METHOD FOR SILVER NANOPARTICLES IN WASTE WATER

The newly collected leaf of cocaine (12 g) remained carefully washed with fresh tap water follow the procedure ultra-pure deionized water to remove the filth. The cleaned leaf sample was occupied in a 250mL Erlenmeyer flask; 100mL of miliQ was added and boiled at 80 °C for 5min. The leaf extract was filtered through Watman's No.1 filter paper and the obtained filtrate was stored at 4 °C for further use for the green synthesis of AgNPs. In this study, the leaves extract acts as a reducing and protecting agent for the green synthesis of AgNPs. In a typical synthesis of AgNPs, 0.5mL of *I. coccinea* leaves extract was added to 10mL of 1mM AgNO<sub>3</sub> aqueous solution and kept in a dark place at room temperature. After few minutes, the colorless reaction mixture changed to dark brown color which indicates the formation of AgNPs. The bio-reduced AgNPs were monitored by using a UV-vis spectrophotometer. The UV-vis spectra was recorded on a UV-vis spectrophotometer and the sample was measured in the wave-length region 200–800nm. The morphological studies of the synthesized AgNPs were viewed instrument. The green synthesized AgNPs were centrifuged at 10,000rpm for 15min to obtain the residue. The residual part of AgNPs was washed with deionized water and dried in a hot air oven at 60 °C for 24h. The crushed AgNPs were studied by a Bruker model D8 progressive concentrate X-ray diffractometer. The intensity data for the lyophilized nano silver powder were collected in the 2θ range 20–80° and the scanning speed at 0.02 min per degree. The green filter of AgNPs was documented by JASCO FTIR spectrophotometer using KBr pellet in the range of 400 – 4000cm<sup>-1</sup> with the spectra resolution of 4cm<sup>-1</sup> [17].

#### 4. REMOVAL METHOD FOR CADMIUM IN WASTE WATER

The new leaf was Ficus tree (*FicusBenjamina*). This leaf is from the Moraceae family and is one of the maximum rich flowering plant life in Australia and Asia. The leaf can also be create in the Conditions of Florida and Arizona in the United States and in the West Indies. *Ficusbenjaminais* a tree that in usual situations can spread 30m. *FicusBenjamina* was used as a biodegradable of Cd (II). The leaf were clean with tap water, de-ionized water drying in oven at 50 C before cut onto minor particles. To make the extract of *FicusBenjamina* leaf, take 20 g of leaf in Erlenmeyer flask (250 mL) then add 100 mL of sterilized distilled water, boil the previous solution for 5 min (60 C). Later boiling for 5 min the mixture was cleaned and the filtrate will be stored at 4 C until used as a decreasing and preservative resources for the preparation of nanomaterials production procedure. For production Ag<sub>0</sub> nanomaterials procedure, take 2 ml of *FicusBenjamina* leaf extract (FBLE) and add to 25 mL of AgNO<sub>3</sub> (1 Mm). The explanation modifications its pigment to brown. Finally, the solution enthused for 40 min to form the silver nanomaterials. This experimentation was accompanied at room temperature (25 C). The presence of brown color shows the development of Ag nanomaterials. Color modifications to brown within 20 min shows that the AgNPs is made. The categorizations of the made Ag nanomaterials were studied. The illustrations remained occupied at different times and examined by UV- Vis spectrophotometer on UV- Vis measuring lead: Varian ICP – AES. FT-IR studies were completed to notice the development of nanomaterials of Ago. FT-IR ranges have remained taken for dried nanomaterials, done by a Fourier-transform infrared spectrophotometer by crushing the samples dust with potassium bromide for FTIR spectra tests. Scanning electron microscopy (SEM): A tinny picture of nanomaterials was designed on a copper slide protected with carbon, use impairing paper to eliminate the removal resolution and then dry the picture underneath the mercury spotlight for 5 min. Before the picture was located in the container and presented hooked on the microscope [18].

#### 5. REMOVAL METHOD FOR NOVEL NANO-HYDROXYAPATITE IN WASTE WATER

All the compounds used for the tests were analytical markfound from sigma Aldrich.

*Moringaoleiferaleaf* were collected and the leaf were wash away with Milli-Q water then cleaned with acetone to remove the surface impurities. After drying, they remained ground into fine dust by ball crushing and absorbed in 5 ml of conc. HNO<sub>3</sub> and before put into microwave radiation for 2 min at 50W to remove organic compounds. Then, they were broadly wash away with Milli-Q water and dry in vacuum oven for 2 h at 150 °C. 1 g of *Moringaoleiferaleaf* dust was then mixed with 0.1 M of EDTA solution to method Ca–EDTA complex. Then, 0.06 M of (NH<sub>4</sub>)<sub>2</sub>HPO<sub>4</sub> solution was gradually supplementary with gained Ca–EDTA complex and sonicated for 30 min. The pH of the response combination was adjusted to 10 by the adding of NaOH solution. Consequently, the arranged reaction combination was put in a microwave oven (A CEM Discover microwave synthesizer 2455 MHz, 300 W) and irradiated with microwave 100 W for 5 min. The white hurried found was washed and dried out in hot air oven at 150 °C for 3 h. The chemical and phase composition of the nano-HAP was determined by Fourier transform infrared spectroscopy, X-ray beam photo electron spectroscopy and X-ray diffraction analysis. The structural and morphological structures of the as-synthesized nanoparticles were examined with a field production scanning electron microscope and transmission electron microscope [19].

#### 6. DISCUSSION

This Review paper present green filters are used low-cost, safe and easily available for treatment for waste water contamination to purified water. The purpose of waste water treatment to drinking water for anthropological existence and value of human life& aquatic life. The need green filters nanotechnology for maintainable water treatment, as populations continue to develop, and economies develop urban water, decontaminated drinking water through domestic water treatment device. There is a major changes in chemical configurations of herbal or leaf extract of same types when it collected from different parts of world and may lead to dissimilar consequences in different research laboratory. The determination is completed to highlight the several green Filters for the synthesis of nanoparticles such as polymers, amino acids, bacteria, fungi, herbal extracts and toxic compound to remove water and their response ways to approximately range.

## 7. CONCLUSION

Green filter nanoparticles use for remove contamination of drinking water. Green filter nanotechnology developments, as defined in this review paper, deliver a solid basis on behalf of the structure of a change of biodegradables or functionalized nanomaterials that can work as structure blocks in the growth of fresh products that can be related in ecofriendly renewal areas. improving the significant parameters affecting the removal process, analytic concentration, pH, type of disperser solvent, absorption time, ionic strength effect, type of desorption solvent and desorption time examined. The application of green filters nanomaterials in the remediation of the environment not only complete the attention of possible harmful elements, but also complete the charges of huge amount of remediation and the period of the procedure.

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