



Synthesis of iron doped zeolite nanocomposite: one step treatment of drinking water for biological, inorganic and organic contaminants

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ABSTRACT

Low cost filter, based on iron doped zeolite and pottery clay, was developed for an effective and efficient treatment of the drinking water contaminated with biological, inorganic (both cationic and anionic) and organic contaminants. Iron nanoparticles doped zeolite was characterized using powder XRD, SEM and EDX and shown to have an average particle size of 38.4 nm with spongy appearance. The simulated samples of water self-contaminated with microbes (*S. typhi*, *B. subtilis*, *E. coli*, *S. aureus* and *P. aeruginosa*), organic (cypermethrin, dioctylphthalate and reactive red RB dye) and inorganic pollutants (arsenic, lead, chromium, nitrate, phosphate, fluoride) after treatment with 0.1 g of iron doped zeolite showed effective removal of all the contaminants in less than 30 min. Equally good results were obtained when actual drinking water samples that were totally unfit for human consumption (Colony Forming Unit (CFU) values above the WHO permissible limits) were treated with iron doped zeolite and after treatment these samples have their CFU values lie within 0–9 CFU/mL. The filter was also checked for its adsorption capacity and results showed appreciable decrease in total hardness and conductivity of treated water samples. The present discovery is better, effective and low cost and therefore can easily be applied as filter in water filtration units for provision of safe and health drinking water to public.

Keywords: Biological treatment; Chemical treatment; Drinking water; Iron-doped zeolite; Pollutants removal; Pottery clay

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