



Waste Water Treatment - Nano based Approaches

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Editorial

Global water status indicates that 96.54% of water is available in seas and oceans and 3.46% is present as freshwater, out of which about 1% is polluted. So, there is scarcity of fresh water for intended use in industrial, domestic, agricultural and potable [1]. The treatment of waste water is of prime importance to employ the advantage of treatment technology. The present treatment includes preliminary treatment consisting of aeration, neutralisation and chemical treatment comprising ozonation, chlorination followed by primary treatment which includes flocculation, coagulation sedimentation and further treatment involves secondary treatment viz. rapid sand filtration, slow sand filtration, disinfection and other methods and processes [2,3]. The advance treatment comprises aerobic, anaerobic, adsorption, absorption etc. The microbial remediation has made it possible to treat the contaminant to the acceptable level, but the complex waste generated from chemical industry consist of organic and inorganic which are difficult to remove using present treatment technology [4].

The nano based remediation is the leading technology for the remediation of the contaminants. The nano material development: nanoparticles, nano composites, nano bio composites and their use as nano catalyst in the reactor have proved effective and efficient in the removal of organic and inorganic contaminants. The R&D has been developed which comprises the characterization of the contaminant and the remediation based on the identified contaminants. The nano based R&D involves the remediation of contaminants by microbial culture and the assessment of contaminant removal. After that the nano material developed in particular silver adapted in microbial culture and then remediation has been done which further removed contaminants [5-7]. Besides TiO₂ nano particle impregnated with activated charcoal and under the influence of UV radiation has found to remediate organic contaminant. Further the synthesised Iron nano particle as a catalyst were also used, which causes cationic and anionic separation, removed the metallic contaminants. The more complex contaminants are also removed using membrane filtration technology based on nano material synthesised and used as catalyst. The membrane filtration technology involves ultra filtration (0.01 micron), micro filtration (0.1 micron) and nano filtration (0.001 micron) [8]. In the first stage the residual contaminants were passed through membrane filtration viz. ultra filtration, micro filtration and nano filtration [9]. After that nano catalyst was placed at each filter and effectiveness of interaction of nano catalyst along each filter process was assessed. It was found that nano catalyst at each membrane filtration was found remediating the contaminant more effectively and efficiently than the membrane filtration technology alone. The R&D research work carried out has been standardized and established.

The waste water treatment in the first phase by the removal of contaminants by silver nano particles TiO₂/activated charcoal organic remediation and metal removal by iron nano particles [10]. Further any residual if present was also removed by membrane filtration technology using nano catalyst placed at each filtration process which completely remediated the contaminants and proved as a novel treatment method using nano based approaches [11].

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