

A contemporary review on plant-based coagulants for applications in water treatment

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Abstract:

Conventional coagulants, like aluminium sulphate and ferric chloride, are used in potable water treatment and involve non-sustainable mining and transformation of raw materials for their production with costly sludge disposal. Natural coagulants are mostly obtained from bacteria, fungi, animals and plants and are classified as polysaccharide, amino-polysaccharide, poly-phenols and proteins-based substances. Plant-based coagulants extracted from *Moringa oleifera*, *Strychnos potatorum* Linn, *Plantago ovate*, *Trigonella foenum graecum* and *Opuntia ficus indica* are potential substitutes to chemicals mostly based on bench-scale testing. These are organic polymers and polyelectrolytes that are classified as cationic, anionic and non-ionic coagulants. This paper provides a historical and contemporary review of plant-based coagulants, their notable milestones achieved, chemistry involved, as well as bench, pilot and full scale trials, highlighting the effects of plant-based coagulants on physico-bio-chemical properties of raw water. Commercialisation constrains are also included and discussed.