Coagulation with polymers for nanofiltration pre-treatment of highly concentrated dyes: a review

Abstract

Water scarcity and strict legislation make water reuse in dye related industries like textile and leather become more important. Among the different types of dyes, soluble dyes are the most problematic. Nanofiltration was vital for the treatment of dye wastewater but the major limitation is fouling. Coagulation/flocculation can be effective to enhance nanofiltration performance towards water reuse and minimisation of fouling. The selection of the coagulant type (metal or polymer) and dosages are very critical in this technique. Factors that improved the coagulation were studied in detail and suitable metal coagulants were presented. Cationic, anionic and natural polymers as flocculant aids were also reported for successfully enhancing dye removal. Adding a suitable type of metal coagulant-polymer at an optimum dosage and mixing conditions increases the dye removal at a wider range of operating pH and reduces the production of sludge. In-depth studies on the effect of metal coagulant-polymer on membrane fouling are still lacking and visualisation techniques might be helpful in this regard.