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# Degradation of ciprofloxacin by manganese(III) intermediate: Insight into the potential application of permanganate/bisulfite process

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**ABSTRACT:** Permanganate could be activated by bisulfite to generate soluble Mn(III) which can oxidize organic contaminants rapidly. However, a lot of concerns need to be addressed for the application of permanganate/bisulfite (PM/BS) process. Taking ciprofloxacin as a target contaminant, the influence of pH, temperature and co-existing solutes on the degradation of organic contaminant in PM/BS process was systematically investigated. The PM/BS process oxidized ciprofloxacin with  $k_{obs}$  2.18-6.27 orders of magnitude larger than other oxidation processes under various reaction conditions and thus stood out. Ciprofloxacin present in real waters can be degraded effectively in the PM/BS process and the co-existing solutes have less inhibiting effect at lower pH and lower ciprofloxacin concentration. Bromate less than 5  $\mu\text{g/L}$  was generated in PM/BS process even in the presence of 1000  $\mu\text{g/L}$  bromide and thus bromate generation in PM/BS process was not a concern. The residual manganese

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