

SYSTEMATIC REVIEW OF PROCESSES FOR ADVANCED TREATMENT OF  
BREWERY WASTEWATER FOR WATER REUSE PURPOSES

Iwalda Bezuidenhout

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## **ABSTRACT**

Water scarcity becomes more apparent every day. As such, the consideration of making use of available advanced treatment technology for the reuse of wastewater must be encouraged. In 1982 it was reported that it was time for South Africa to develop a guide for the planning, design and operation of water reclamation schemes as conventional water sources were predicted to soon be insufficient to meet water needs. The malt brewing industry is one of the largest industrial water users in South Africa. All plants of Anheuser-Busch InBev (AB InBev) in South Africa (previously known as South African Breweries (SAB) and Sedibeng Breweries), which represent 99% of the market share, have some form of wastewater treatment works at their breweries. This study systematically reviews available literature on advanced wastewater treatment technologies with the aim of identifying additional process(es) to existing wastewater treatment works to treat effluent to potable standards for internal reuse.

The review's design parameters include capital and operational cost of technology, operational skills level required and final effluent quality achieved. Following the rigorous systematic review as defined by the 2009 Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA), 863 pieces of literature were initially identified, 152 of which were analysed. A number of relevant technologies were identified as processes to add onto existing wastewater treatment works including: stand-alone Ultra-Filtration (UF) or Nano-Filtration (NF) membranes; UF Membrane Bio Reactor (MBR); expanded granular sludge bed; Anaerobic MBR (AnMBR); Reverse Osmosis (RO) Electro Coagulation (EC); Microbial Fuel Cells (MFC); advanced flocculation using Magnesium (Mg)-sericite or Carbon Nano Tubes (CNTs) as flocculants; and fortified clay filtration. Further investigation and / or pilot studies are required to narrow down the best technology for the relevant effluent.