



## Novel method for the removal of organic halogens from process wastewaters enabling water reuse

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### ABSTRACT

The industrial production unavoidably generates waste in many cases but that should be recycled and reused following the principle of circular economy. New waste treatment methods or green technologies with zero waste should be developed in order to solve this problem. Since zero emission technology is a difficult task, it is rather typical that waste treatment process is developed. A typical example can be found in pharmaceutical industries because these plants generate wastewaters with high organic content, so-called process wastewaters (PWWs). These waters should be definitely treated before discharging, their organic content must be removed and then the PWW may be usually allowed into the sewer. Nowadays, the physicochemical methods are increasingly used since they have a smaller footprint compared with that of the biological treatments. On the other hand, the polluting organic substances can be recovered and recycled or reused. In our novel method, distillation is applied that is based on relative volatility differences of the individual components. The more volatile organic pollutants of the treated PWWs are obtained as the top product of the distillation, preferably in reusable form. The bottom product of distillation, namely the PWW should satisfy the discharge limits. Our novel innovative method is developed to remove and reuse the organically bound halogens and to reduce the chemical oxygen demand below the emission limit of PWWs. Our method is implemented and this well-planned industrial apparatus meets the requirement of the Sustainable Water Solutions and Circular Economy, and moreover the payback time of the investment is less than 2 years.

*Keywords:* Process wastewater; AOX removal; Dichloromethane; Distillation; Industrial column; Circular economy

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