# EVALUATION OF TREATED VOLUME OF ACETAMINOPHEN AQUEOUS SOLUTIONS IN A FIXED BED COLUMN PACKED WITH MALT BAGASSE CHARCOAL

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## INTRODUCTION

Despite the benefits induced by pharmaceuticals, their indiscriminate use increases the environmental contamination. Paracetamol is among the most commonly used drugs and is one of the most copiously found medicines in water resources (Boix et al. 2016, J Hazard Mater). Studies carried out by Naldony (2018) in a batch trial showed the great adsorptive capacity of paracetamol by malt bagasse carbon, and also, indicates the need of further studies of a continuous process aiming a larger volume treatment. Hence, this work evaluates the breakthrough curves observing the volume of treated aqueous acetaminophen solutions in a fixed bed column packed with malt bagasse activated charcoal.

## MATERIAL AND METHODS

The charcoal was macerated and the granulometric analysis was conducted with a series of TYLER sieves with pore opening diameters of 115, 150, 170, 200 and 250 mesh, which allowed to sort the adsorbent distribution in the bands between 0.125 mm and 0.063 mm and less than 0.063 mm. The adsorption occurred in a continuous process (25 °C) in a polypropylene column of 0.74 cm of internal diameter and 3.20 cm of height, until the saturation of column of the initial concentration (100 mg $L^{-1}$). The feed flow rates were analyzed at 2.5 and 5 mL $min^{-1}$ with a charcoal mass of 0.38 and 0.75 g. The samples were analyzed by UV-VIS

## RESULTS

spectrophotometry at a wave-length of 243 nm.

The largest retention range of the charcoal (39.33%) is in the 115 mesh sieve inferring on particles with a diameter greater than 0.125 mm. The lowest yield (0.99%) is found for particles with a diameter of less than 0.063 mm. About 59.68% of the particles have a diameter smaller than 0.125 mm and greater than 0.063 mm. The breakthrough curves were analyzed in relation to the volume treated, where for 0.38 g of charcoal the saturation was obtained at about 200 mL of treated paracetamol solution and for 0.75 g the saturation occurred at 350 mL.

## CONCLUSIONS

In the best operating condition (2.5 mL $min^{-1}$ and 0.75 g of adsorbent), the treated volume acetaminophen aqueous solutions was 350 mL, showing the potential in a continuous system.

## ACKNOWLEGMENTS