

Exercises for Mid-term exam preparation: organic micropollutant treatment

Applied wastewater engineering/Michael Mattle

Exercise 1: Activated carbon treatment at wastewater treatment plant Bachwis

Solve the following exercise based on the data given in the course on the WWTP Bachwis in Herisau (AI). There are two PAC contactors, two sedimentation tanks and eight sand filters installed.

- a) What volume has each PAC contactor?
- b) Compute the total surface area and the depth of the PAC clarifiers.
- c) What is the surface area of each sand filter?
- d) How much PAC (10 mg/L), FeClSO_4 (2 mg/L) and flocculent (0.3 mg/L) is consumed per year (in t/year)?

Exercise 2: 12 substances to monitor the 80 % elimination of oMP

1. Why does the list not contain any pesticides?
2. Why are paracetamol and ibuprofen not in the list?

Exercise 3: Direct dosage of powdered activated carbon into biological tank

- a) A municipality implements the direct dosage of powdered activated carbon into the biological tanks. They decide to measure the following six substances: carbamazepine, clarithromycin, diclofenac, hydrochlorothiazide, irbesartan and mecoprop. Based on the trials conducted at the wastewater treatment plant Schönau, what dosage of PAC do you suggest (suppose they will use the same type of activated carbon and that their COD concentration in the wastewater is very similar to one of WWTP Schönau)?

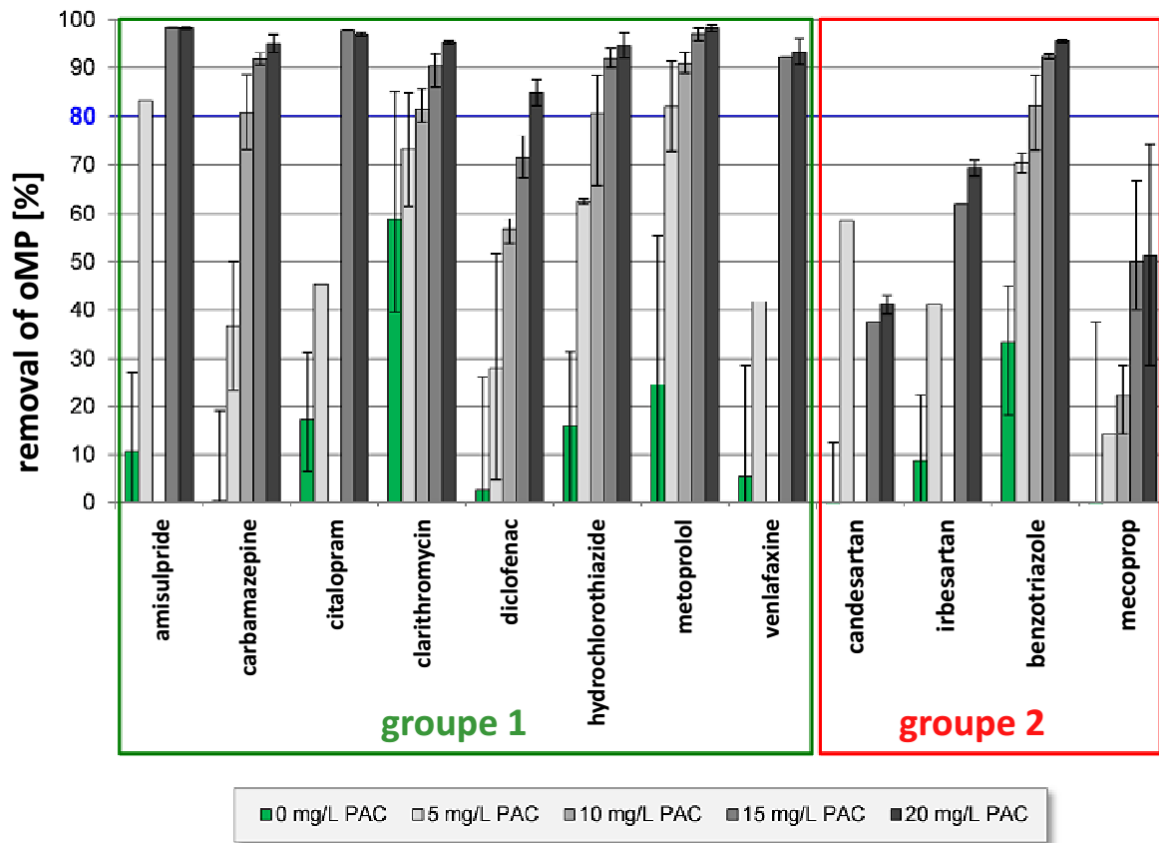


Figure 1: Trials conducted at the wastewater treatment Schönau in Cham (PAK im Belebtschlammbecken, Frank, K. et al. HSR and UMTEC 2015).

- b) With which six compounds do you achieve the best removal yield with the lowest possible dosage of PAC respecting the rules of the legislation (do not suggest candesartan as the results of the trials are confusing)?