THE STUDY ON INTERMITTENT SLOW SAND FILTER IN HOUSEHOLD-SCALE TO INCREASE THE PDAM WATER QUALITY

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ABSTRACT

Water supplied by PDAM (Municipal Waterworks) has a fluctuating quality. The water sometimes doesn’t fulfill the standard quality requirement. Thus, the water must be treated and processed further by consumers in household scale using inexpensive and simple technology. A technology used in the household scale is the slow sand filter, which can be operated in line with the water needs that is of intermittent in nature or the technology is also often called as Intermittent Operational Slow Sand Filter (IOSSF).

This research was conducted with PDAM water at consumer level for parameters of turbidity, organic matters (PV), and E.coli. Variation in the reactor could be done by adjusting filtration rate at 0.3 m/h and 0.6 m/h. Reactor modification was performed using activated carbon and water volume of filtration at 10 liter and 20 liter. Reactor design employed here was the household reactor using a 50-liter bucket, underdrain gravel thickness of 8 cm, coarse sand separation layer of 3 cm, fine sand media of 20 cm and supernatant (water height) of 5 cm. After undergoing ripening period allowed for formation of biofilm for three weeks, the reactor could be operated for two weeks with a resting operational time of 10 hours.

Based on laboratory analysis, a percentage of turbidity removal was 57.35-100%, color removal 46.67-100%, organic matter removal 57.63-100% and E.coli removal 0-100%. The largest removal occurred in the third variation in reactor with filtration rate of 0.3 m/h and water volume of 10 liter. In the reactor with activated carbon modification, the average reduction percentage was 77.94, while without activated carbon the average reduction percentage was 82.11%. Reactor with filtration rate of 0.3m/h had higher average reduction percentage of 88.04 compared with filtration rate of 0.6m/h at 73.26%. Several factors influencing biological processes in the slow sand filter were pH in range of 6.87 – 7.37, temperature 27-29°C and larger biomass in the depth of 0-5 m in the reactor without activated carbon.

Key words: IOSSF, PDAM water, household scale