Impact of Activated Carbon and Magnetic Field in Slow Sand Filter on Water Purification for Rural Dwellers

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Abstract : Most farmers that produce food crops in Nigeria live in rural areas where potable water is not available. The farmers in some areas have problem of water borne diseases which could affect their health and could lead to death. This study was conducted to determine the impact of incorporating Granular Activated Carbon(GAC) and Magnetic Field(MF) in Slow Sand Filter(SSF) on the purification of water for rural dwellers. The SSF was developed using PVC pipe with diameter 152.4 mm and 1100 mm long, with layers of fine sand with size 0.25 mm and 350 mm depth, followed by GAC 10 mm size and 100 mm depth, fine sand 0.25mm with 500 mm depth and gravel grain size 10-14 mm and 100 mm depth. The SSF was kept moist for 21 days for biofilm layer (schmutzdecke) to fully develop, which is essential for trapping bacteria. Two SSFs fabricated consist of SSF+GAC as Filter 1, SSF+GAC+MF as Filter 2 and Control (Raw water without passing through filter. Water samples were collected from the filter and analyzed. The flow rate of Filter was 25 litres/h Total bacteria counts(TBC) for Filter 1 and Filter 2 and control were 2.4, 4.6 and 8.1 cfu/mg, respectively. Total coliform count for Filter 1 and Filter 2 and control were 1.7, 3.0 and 6.4 cfu/100mL, respectively. The filters reduced water hardness, turbidity, lead, copper, electrical conductivity and TBC by 53.13-73.44% but increased pH from 5.8 to 7.1-7.3. SSF is recommended for water purification in the rural areas.

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Keywords : magnetised water, sow sand filter, portable water, activated carbon

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