

## Waste glass as a substrate for arsenic removal from drinking waters in Bangladesh: a laboratory and field-based study

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A number of low-cost natural and synthetic filtration media have been proposed for the removal of arsenic (As) from drinking water in areas such as Bangladesh, where exposure to environmental As is a major human health issue. This PhD research project examines the application of recycled glass and waste stainless steel fragments as a practical medium for As removal at a household scale. To assess the performance of recycled glass media as a practical filter bed, glass granules were differentiated by color, size and mode of preparation (imploded and ground) and used as media for batch adsorption and column filtration experiments using a prepared As (III) test solution.

Field experiments were also performed in Bangladesh using larger column filters (750ml volume) and local As-contaminated groundwater. Filter media made from recycled glass and waste stainless steel fragments were characterized via SEM, XRD, PXRF, and sequential extraction experiments were performed on used filtration media to assess arsenic removal and adsorption processes.

Results indicate that glass granules can remove ar-

senic from drinking water at an efficiency suitable for household application. Arsenic removal efficiency depends on the presence of other ions such as Fe, Mn, P etc. in the treated water and the presence of stainless steel fragments with glass (introduced during the recycling and preparation process). The presence of stainless steel fragments in the filtration medium significantly improved adsorption capacity. The glass particle size and mode of size reduction was also found to influence the removal of Arsenic: smaller ground glass was better than imploded glass of the same size. The results, coupled with the low cost of waste glass, indicate that the glass should be investigated further for use in domestic water filtration for arsenic.

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