



## Low cost fluoride removal filters

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THE SOCIAL AND PSYCHOLOGICAL impact on children with unsightly discoloration due to mottling of teeth secondary to high fluoride levels in their drinking water is well documented. Most of these effected individuals try hard not to expose their front teeth while smiling. This problem now has risen to endemic levels in Sri Lanka specially in the North Central Province and some other dry zone areas in Sri Lanka. This is not confined to Sri Lanka only but reported else where in India, Japan and South Africa. The fluorosis in teeth of the humans takes place where the fluoride level in drinking water exceeds 1.0 mg/l.

The newly designed filter for defluoridation is a domestic model with an upward flow. The versatility of the new filter is that it can be locally produced at a cost of US\$ 20. This is 75cm in height, 20cm in diameter and has a capacity of 16 litres of water. One of the advantages is that the water could be withdrawn in batches. The filter media is low temperature burnt clay which is locally available.

The top of the filter media is covered with 5 cm thick layer of coconut shell charcoal.

A reasonably good removal of fluoride can be obtained in 4 - 5 hours time retention in the filter. This time suits our cultural pattern in the rural society where they could use this water for cooking activities. The best results could be obtained if water is fed and withdrawn in 24 hour intervals.

During this 60 days period of operation about 640 litres of high fluoride water was fed and withdrawn. The fluoride level of defluoridated water at end of 60 days was 2.0 mg/l. The chemistry of burnt clay is in the form of Silicates Aluminates and Hematite. When this is soaked in water for several hours it could turn to oxyhydroxides of iron, aluminium and silica. At this stage hydroxyl ions exchanges with the fluoride ions in water. This filter provides a very appropriate cost effective medium to remove fluoride from groundwater thus achieving VLOM status.

Figure 1. Lost cost fluoride removal filter

Figure 2. Defluoridation Vs time for low temperature burnt clay - retention time 8 hrs