

# Water Treatment During Flooding Season (Domestic Use)



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## Abstract

Water safety for domestic use after floods, cyclones and disasters can be associated with health risks, infections and water-borne disease. During the flooding season, **raw water was polluted** with organic substances and decomposition of animal corpses which contains a lot of harmful microorganisms. A study was conducted to investigate three sources of water, river A, river B and river C to be used as **safe domestic water** by villagers. The raw water was first treated with **alum** to coagulate some of the heavy particle. The raw water was then filtered using our own developed filter column to produce clean domestic water. The raw water before and after was tested for qualitative analysis using **microscale chemistry** apparatus. **pH test** using natural indicator, **electrolysis** test and **cation test** was also conducted. It was found that river A of Beta filtration is the murkiest among three of the water after going through electrolysis process. Also, after being added to the potassium iodide, it shows that none of the water contains lead. River C of Beta filtration does not form white precipitate after being added to sodium hydroxide. It also shows that all the water is acidic because of the alum presence in water. To **reduce the acidity** of the water, **slaked lime** should be **added together** with the **alum**. As a conclusion, along the flash floods that are occurring, this test can be carried out to help people especially those in an area that usually will be polluted **after the flash floods** to use the **clean and safe water** in their **daily life**.

## Literature Review

**SEDIMENTATION** : The mechanism of sedimentation is due to force of gravity and the associate settling velocity of the particle, which causes it to cross the streamlines and reach the collector.

**INTERCEPTION** : Interception of particles is common for large particles. If a large enough particle follows the streamline, that lies very close to the media surface it will hit the media grain and be captured.

**BROWNIAN DIFFUSION** : Diffusion towards media granules occurs for very small particles, such as viruses. Particles move randomly about within the fluid, due to thermal gradients. This mechanism is only important for particles with diameters < 1 micron.

**INERTIA** : Attachment by inertia occurs when larger particles move fast enough to travel off their streamlines and bump into media grains.

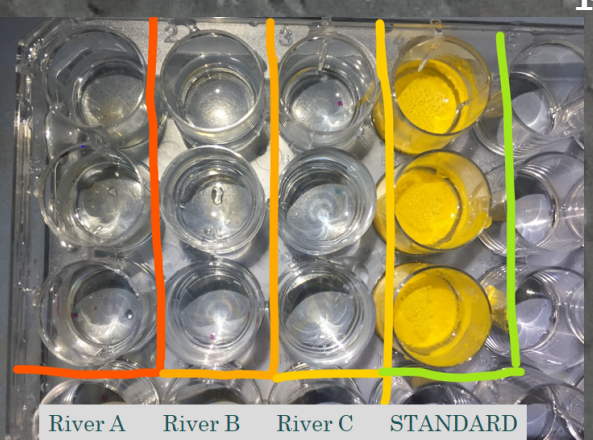
## METHOD :



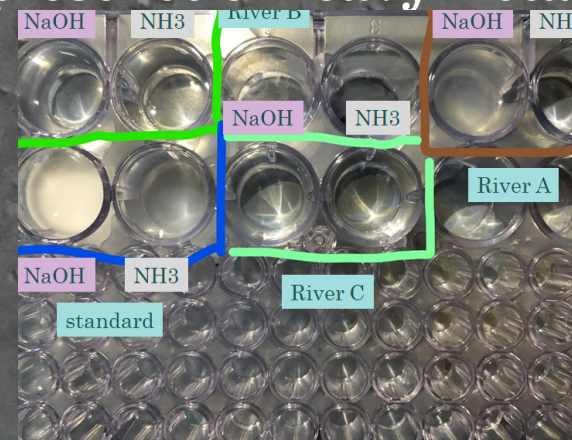
Filtration Process



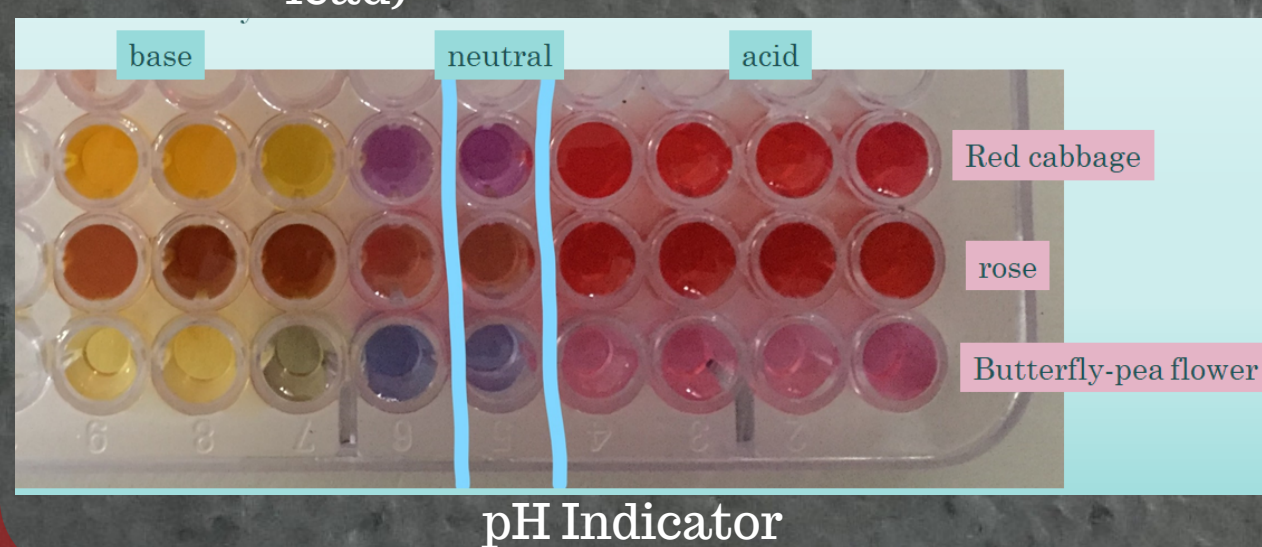
Electrolysis (to detect the presence of heavy metal)



Potassium iodide (to detect the presence of lead)



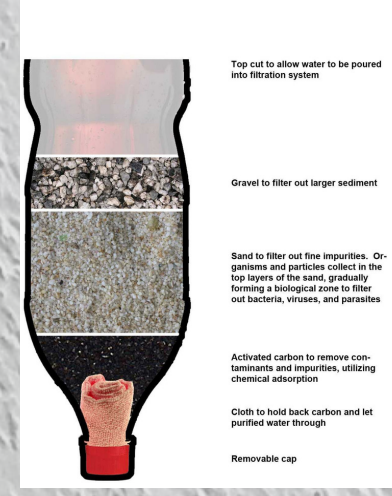
Sodium Hydroxide and Ammonia (to detect the presence of calcium)



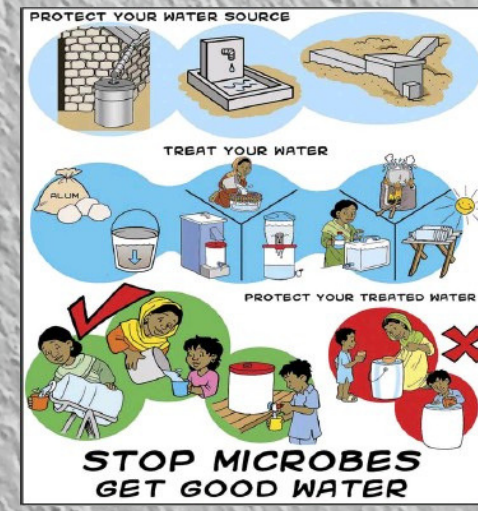
pH Indicator



Clean water for sanitation



Natural resources as water filtration



Prevent water-borne disease



conserve preserve natural resources for sustainable environment

## Objective

## PROBLEM STATEMENT

During the flooding season, raw water was polluted with organic substances and decomposition of animal corpses which contains a lot of harmful microorganisms. While waiting for clean water to be transferred to the evacuation centre, a filtration method can be done using natural resources. The tests had been conducted to prove that natural resources is safe to use in the filtration method the flood victims can use the water for domestic used safely (excl. drinking water). Beta filtration had been developed. Is the filtration method is safe to be used ?

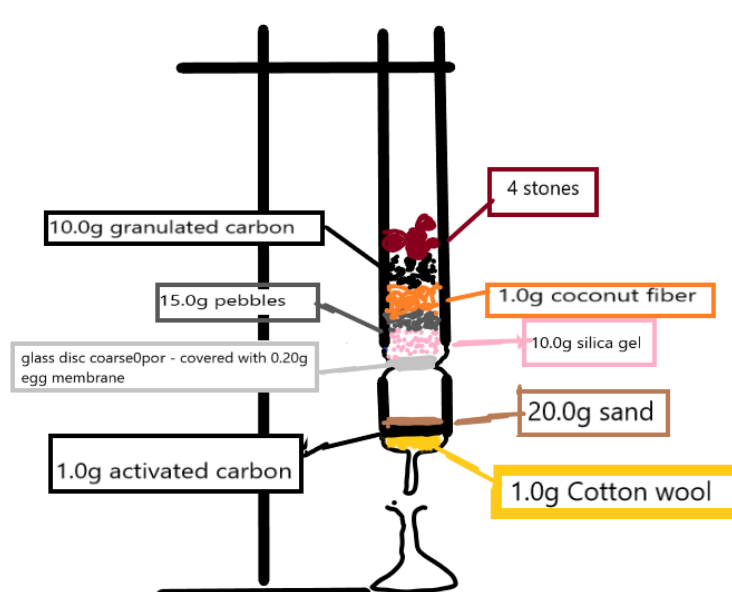
## DATA :

Prototype	Type Of River	Experiment 1 (Average time taken for filtration)	Experiment 2 (Electrolysis)	Experiment 3 (Cation test - Lead presence)	Experiment 4 (Cation test - Calcium Presence)	Experiment 5 (pH indicator)
Raw Water	A		More murky	No Change	White precipitate is formed	acidic
	B		murky		No change	
	C		Less murky		No change	
Beta	A1	14	More Murky	No Change	Only a little white precipitate is formed	alkaline
	A2					
	A3					
	B1	15	Less Murky			
	B2					
	B3					
	C1	15	Less Murky			
	C2					
	C3					

## NEXT PLAN :

1. Ozonization (iron react with ozone)
2. Chlorination (kill bacteria)
3. Airation (oxidize)

## NEXT PLAN (MODEL) :



## MATERIALS AND APPARATUS

Glass-filter column, glass disc coarsepor, egg membrane 0.2g , cotton wool 1.0g, activated carbon 1.0g, sand 20.0g , silica gel 10.0g , pebbles 15.0g, coconut fibre 1.0g, alum 10.0g, granulated carbon 10.0g, conical flask 100ml, beaker 100ml, retort stand, sample water (River A, River B, River C), 500ml volumetric flask, 4 stones, stopwatch, distilled water, electrolysis kit, battery 9V, connecting wire, 50ml beaker , combo plate, dropper, potassium iodide 2.0mol, ammonia 2.0mol, sodium hydroxide 2.0mol, red cabbage, hibiscus, butterfly-pea, boiling water, knife.

## DISCUSSION :

A shorter time is take to flow through the water filter.

The water will turn murky due to the presence of heavy metal in electrolysis process

The water will turn into yellow precipitate if lead is presence in the water.

The water will turn into lime water or white precipitate if calcium is presence.

pH indicator is used determine the alkalinity of water.

## CONCLUSION :

Beta filtration is safe to be used. River C is the safest.

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