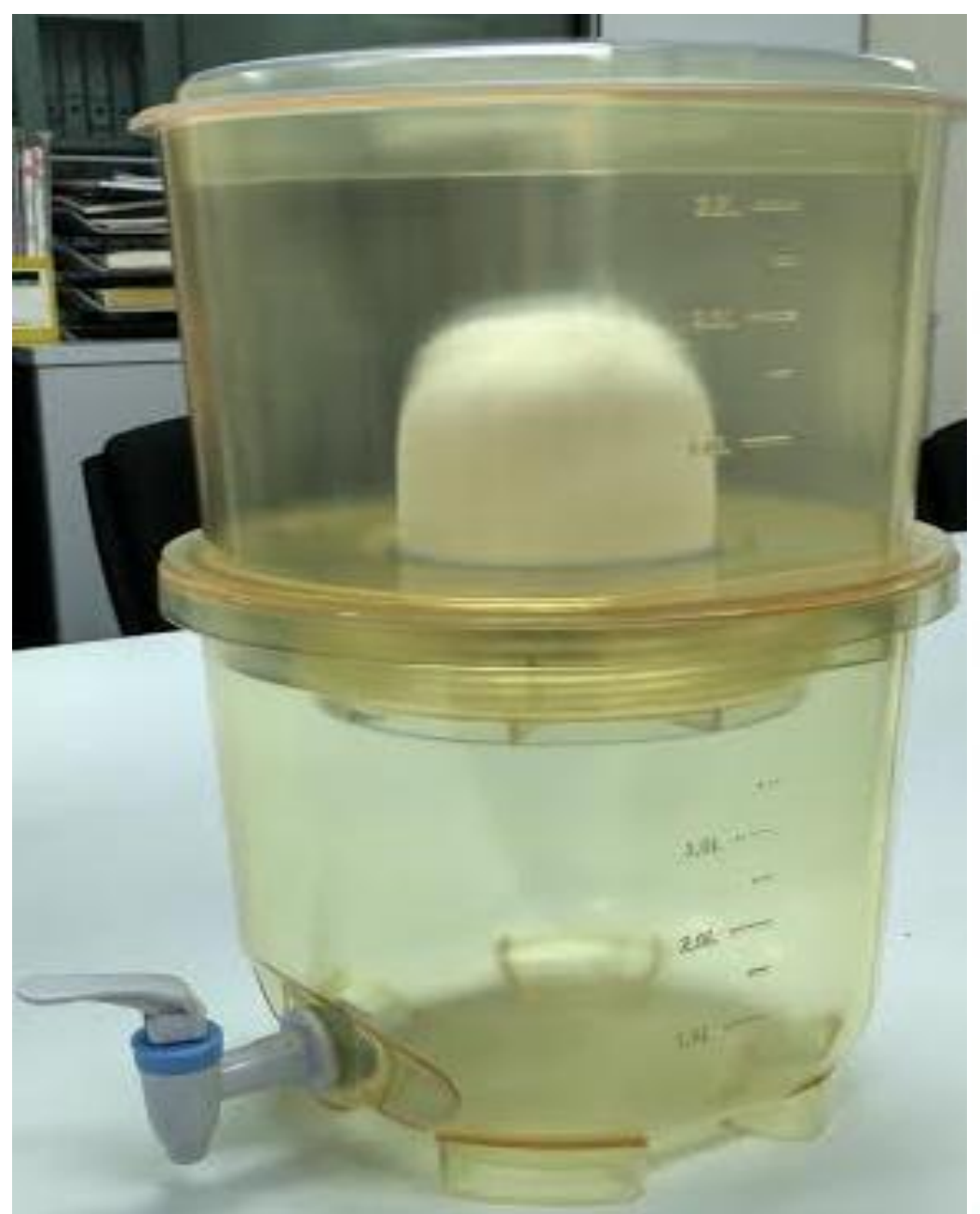




EMERGENCY NANO WATER FILTRATION UNIT

Patent No. PI2015704571 & Industrial Design No. 16-00682-0101

FILTRATION UNIT
Industrial Design
(Commercial Prototype)
16-00682-0101



- Dimension: W24 x H36 cm
- Material: PVC
- Finishing: Clear Coated
- Dry Weight : <2 kg
- Weight with water : 5.5 kg

SILVER NANOPARTICLE COATED ON CELLULOSE PAPER
Patent
Filter Paper: PI2015704571



- **Chemical reduction method** using sodium borohydride
- Can be prepared by **2 hours**
- Particle size distribution of silver nanoparticles was between **5 and 31 nm**.

TABLE 1: PERFORMANCE OF EMERG NANO FILTER FOR SMALL SCALE USING FIELD SAMPLES

		pH	Temp (° C)	Turbidity (NTU)	E. Coli (cfu/100 mL)	Heavy metal (mg/L)	Human Health Risk
Low turbid	Tap water	6.4	24.3	4.4	NIL	All the heavy metals were in µg/L	Low
	Rainwater	6.3	24.0	5.2	NIL	All the heavy metals were in µg/L	Low
High turbid	River water	6.6	24.5	8.3	Present	All the heavy metals were In mg/L	High
	Malaysia Drinking Water Quality Standard	6.5 - 9.0	-	5	0	mg/L	--
	WHO Drinking Water Quality Standard	6.5 - 9.5	-	5	0	mg/L	-

NEED



Drinking water contamination during emergency situation



Require electricity & pumps



Electricity shortages

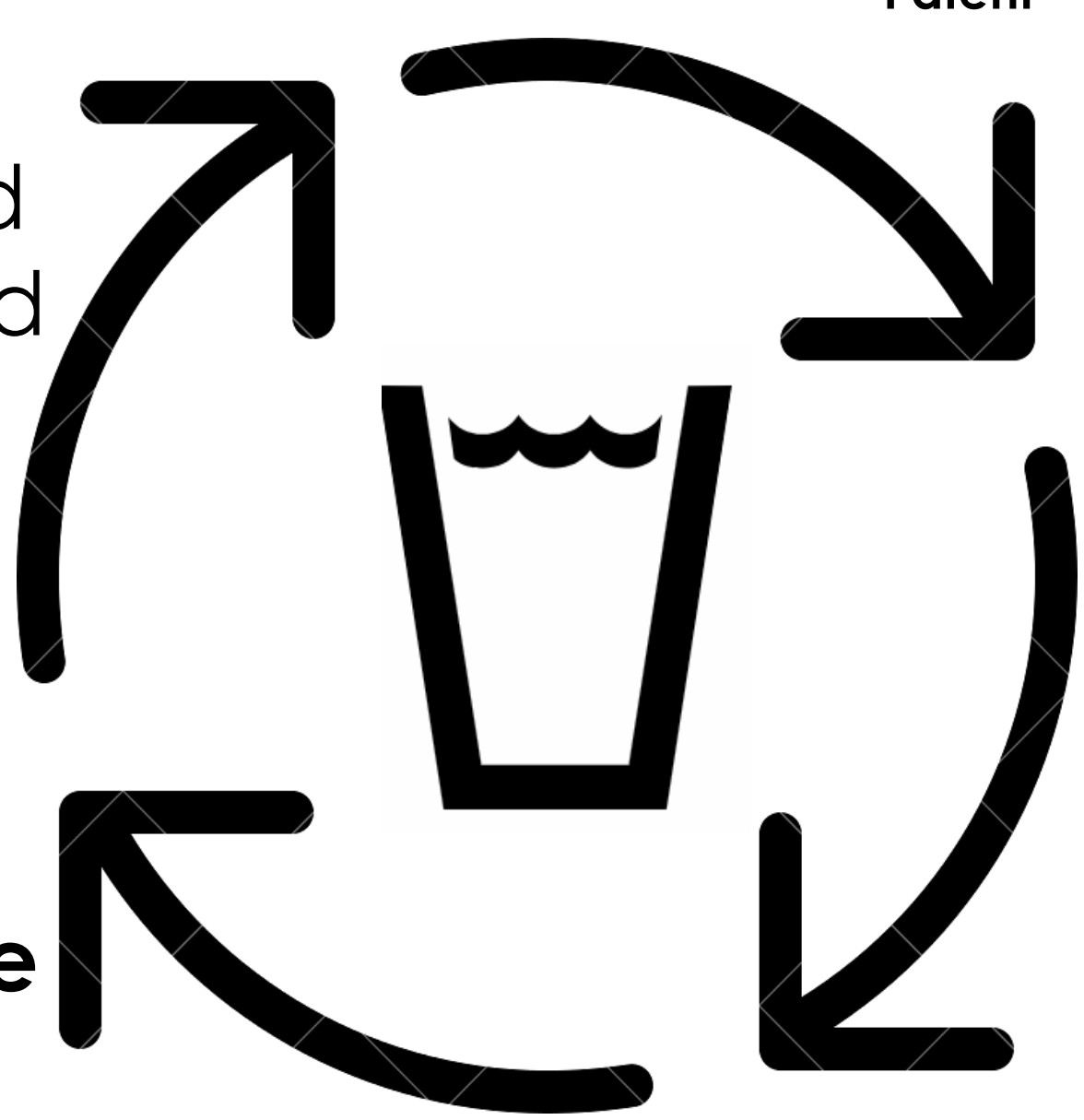


Point-of-use water purification

APPROACH

1. Input
- Low turbid
- High turbid

4. Selection of suitable water type



2. INNOVATION – Process
Industrial Design - Commercial Prototype
Patent - Filter Paper

- Quick preparation (2 hours)
- Inexpensive and easy-to-use emergency antibacterial water filter
- Filtration by flow of gravity
- No additional energy input (electricity/pressure)

3. Data Analysis

- Drinking Water Quality
- Human Health Risk

BENEFIT/ ADVANTANGE

- Suitable for any emergency use
- Low cost material
- Minimizes electricity usage
- Low energy input (no pump required)
- Non-toxic and easy to distribute
- Sustainable point-of-use water treatment

COMPETITORS

- Local made
- Cheaper
- Can be used in any situation
- No any cleaning required
- No chemical additions
- No additional energy required



PUBLICATION

• **Praveena, S. M.**, Han, L. S., Than, L. T. L. & Aris, A. Z. (2016). Preparation and characterization of silver nanoparticle coated on cellulose paper : evaluation of their potential as antibacterial water filter. *Experimental Nanoscience*, doi:10.1080/17458080.2016.1209790 IF: 0.832 (Q3)

• **Sarva Mangala Praveena**, Karmegam Karupiah, Ho Yu Bin, Leslie Than Thian Lung, Emilia Zainal Abidin, Sharifah Norkhadajah Syed Ismail, Irmiza Rasdi, Vivien How, Ahmad Zaharin Aris & Zailina Hashim. (2017). Evaluation of Emergency Drinking Water Treatment At Point of Use: A Case Study From Kelantan (Malaysia). *International Journal of Disaster Risk Reduction* (Under Review) (Q2)



Project Leader : Dr. Sarva Mangala Praveena
Co-Researcher's : Karmegam Karupiah, Leslie Than Thian Lung, Ho Yu Bin, Emilia Zainal Abidin, Sharifah Norkhadajah Syed Ismail, Irmiza Rasdi, Ahmad Zaharin Aris, Zailina Hashim
Faculty : Medicine and Health Sciences
Email : smpraveena@upm.edu.my
Tel : +603-89472692
Expertise : Geochemistry and Health