



# COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH

## WATER RESEARCH INSTITUTE

Our Ref:.....

04<sup>th</sup> October, 2005  
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### BACTERIOLOGICAL ANALYSES ON THE EFFICIENCY OF NIADE WATER PURIFICATION UNIT IN REMOVING PATHOGENIC BACTERIA FROM SURFACE WATER.

ANALYSES DATE: 30<sup>th</sup> September – 02<sup>nd</sup> October, 2005

#### 1.0 PREAMBLE:

- 1.1 NIADE Water Purification, a simple, stand-alone unit that is to filter and disinfect by UV, was brought by Melpool Technology Enterprise, Tema to be analyzed for its efficiency in removal of pathogenic bacteria from Ghanaian waters.
- 1.2 The NIADE unit was able to destroy considerable number of pathogenic bacteria. The unit's efficacy was assessed using surface water that contained the following pathogens; total and faecal coliform bacteria, *Salmonella* and *Shigella* spp., *Aeromonas* and *Vibrio* spp., *Enterococcus* spp. and total heterotrophic bacteria.
- 1.3 The NIADE Purification unit was able to remove the following pathogens from surface water; total and faecal coliform bacteria, *Salmonella* and *Shigella* spp., *Aeromonas* and *Vibrio* spp., *Enterococcus* spp. and total heterotrophic bacteria.
- 1.4 The NIADE Purification unit may be useful in disinfection of surface water for communities that lack treated water.



Setting up the NIAIDE Purification unit

## 2 METHOD:

Water from a drain that is heavily polluted from non-point sources as well as from a hospitality industry was diluted to 100 parts and passed through the NIAIDE Water Purification unit as recommended by the manufacturer. The treated water was collected aseptically into sterilized beaker and the sample analyzed for the presence of total and faecal coliform bacteria, *Salmonella* and *Shigella*, *Aeromonas*, and *Vibrio cholerae* using the Membrane Filtration Method.

The media used for the various analyses included m-Endo Agar LES (Total coliform), FC (Faecal coliform), SS agar (*Salmonella* and *Shigella* spp.), M-Enterococcus agar (*Enterococcus* spp.), and hiosulphate Citrate Bile Salt agar (*Aeromonas* and *Vibrio* spp.)

For each determination, 100ml of the treated water was passed through 0.45 $\mu$ m pore size membrane filter (Millipore) and incubated on appropriate media for specified duration.

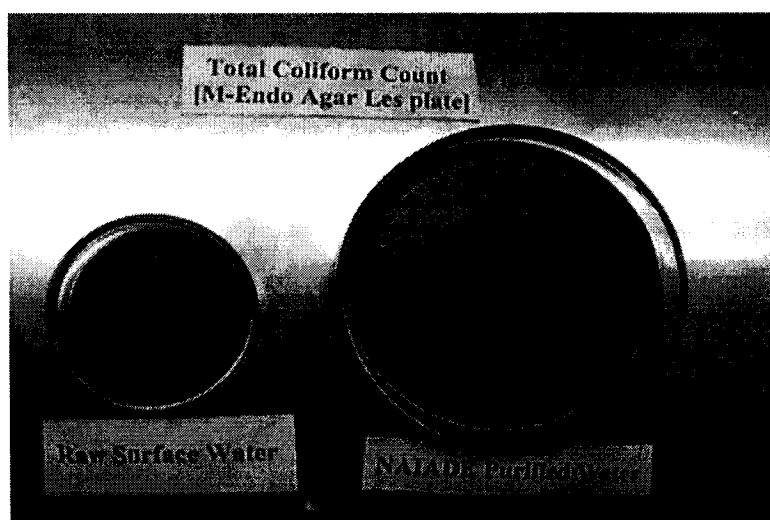
Total Heterotrophic Bacteria count presence in the filtered water sample was determined using Yeast Extract Agar (Oxoid).

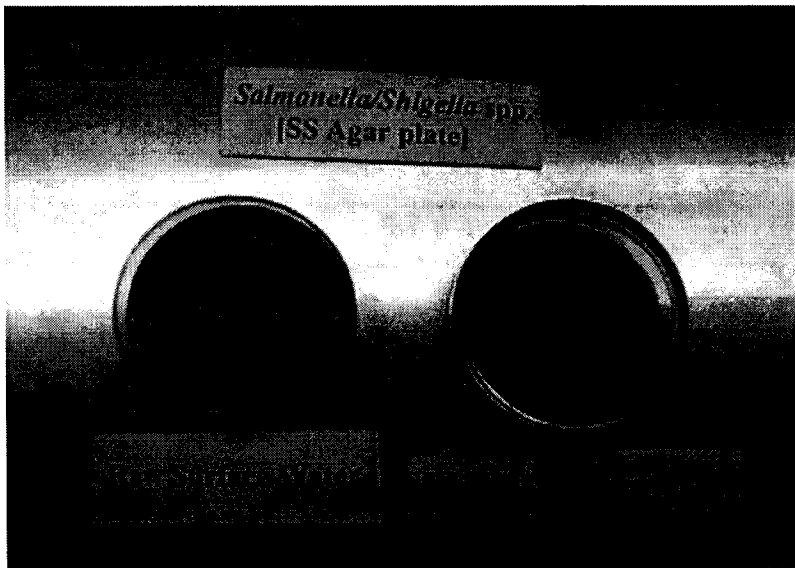
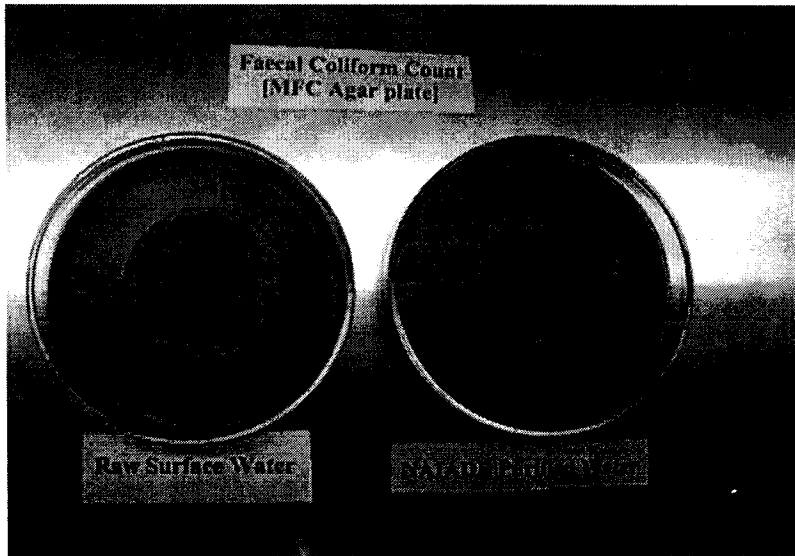
As control, the untreated water was analyzed alongside the disinfected water.

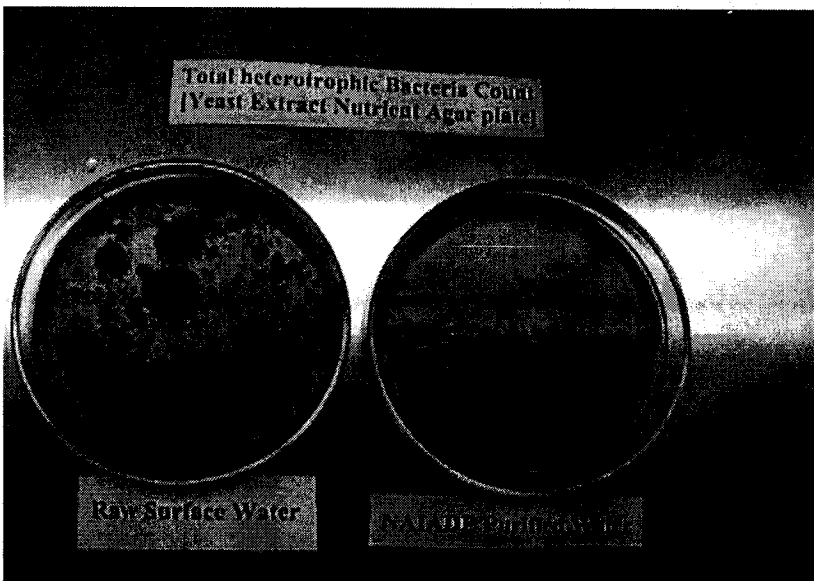
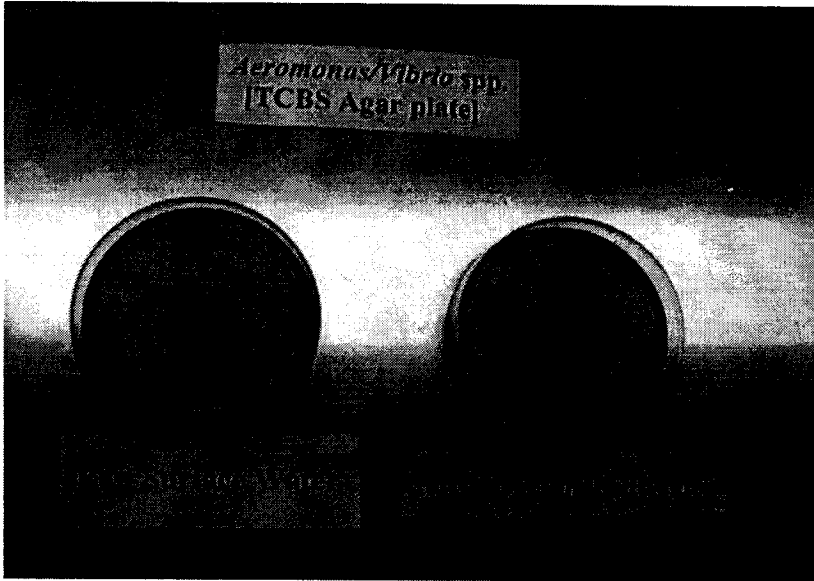
### 3 RESULTS:

Results of the various indicator organisms as determined for the NAIADE treated and the untreated water samples are as follows

| Parameter  | NAIADE Water Purification unit disinfected water sample (cfu) | Untreated water sample (cfu) |
|--|---|------------------------------|
| Total coliform count per 100ml                             | 0   | 1184                         |
| Faecal coliform count per 100ml                            | 0   | 808                          |
| <i>Salmonella</i> and <i>Shigella</i> spp. count per 100ml | 0   | 52                           |
| <i>Aeromonas</i> and <i>Vibrio</i> spp. count per 100ml    | 0   | 52                           |
| Total heterotrophic bacteria count per 1ml                 | 1   | 848                          |







#### 4 DISCUSSION:

Total coliform bacteria, faecal coliform bacteria, *Salmonella* and *Shigella* spp. and *Aeromonas* and *Vibrio* spp were all detected in very high numbers in the untreated water sample. There was also very high count of total heterotrophic count in the untreated water sample.

No indicator pathogenic bacteria were detected in the NAI ADE disinfected water. The total heterotrophic bacteria were considerably reduced with the disinfection.

## **5 RECOMMENDATION:**

The NAI ADE Water Purification unit destroys most pathogenic bacteria in water. The unit will be appropriate for use in communities that are not receiving treated water but still depend on untreated surface waters.

Controlled environments such as school systems, health centers, markets, community centers, etc. will be ideal places to install this unit.



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