The Technology Of Sterilizing Brackish Water Become Drinking Water In The Society

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Abstract. Banyu Urip Village, Hamlet III, Tanjung Lago Sub-district, Banyuasin Regency, South Sumatra. The distance from the Palembang city is ± 40 km. Lack of awareness of the importance of maintaining the personal and environmental health is also seen from the absence of a place for taking clean water. People still take water which is red, smelly, sticky and salty from the river in the dry and rainy season. The results obtained from the technology of sterilizing brackish water into drinking water for the society have succeeded well. The final results of measuring treated water are Ph 7.7 and TDS / TS 794 mg / liter. 1.36 scale turbidity of NTU. TSS 0.2 mg / liter. Specific gravity of 0.1 mg, very clear and odorless. It is expected that the Science and Technology for society that has been implemented can be a role model for people in other villages, and can form cooperation villager’s community through partners that have been formed.

Keywords: Technology, Sterilization, Brackish Water, Society.

1. Situation Analysis
Banyu Urip Village, Hamlet III, Tanjung Lago Sub-district, Banyuasin Regency, South Sumatra is located between 1,30° - 4,0° South Latitude (LS). The average rainfall is 1700 m per year, the topography is flat and bumpy, the average temperature ranges from 24°C-29°C with the type of Clay Humus soil. In tidal and swamp areas, people have difficulties to obtain clean water for household needs, especially drinking water. This is caused by the peat water in that area is brown and acidic, and the results; 4.66 soil pH measurement is smelly and sticky. The acidic nature of peat water is caused by the presence of clay containing sulfide, which is oxidized to sulfuric acid.

2. Partners Problems
Based on the situation analysis, can be identified several problems that faced by the partners, namely:
- Water condition in Banyu Urip Village is not good for their daily activities because the water’s quality is not qualifying. The well water in this area is red, smelly and salty while the water from the river in this area is clear but sticky and salty.
- Lack of awareness of the villagers about the importance of maintaining the personal and environmental health.
- The low level of formal education is possessed by villagers.
- Mastery of technology, especially water treatment (taking bath, washing, drinking) is still very low.
The role of the Regional Government, especially Banyuasin Regency is still very limited.

Example of river water  Counseling on water purification methods

Figure 1. Example and Counseling

3. Solution
- The results of the meeting of related elements, the problem that is faced by the society today is the needs of clean water (for taking bath and washing) and drinking water for daily activity needs. Built clean water installations that are suitable for health (drinking water, taking bath, and washing).
- Banyu Urip villagers are aware of their personal and environmental health.
- Helping the government of Banyuasin Regency build clean water installations with technology that has been applied to the Banyu Urip village to other nearby villages.

4. The Implementation Method
- In the implementation of IbM activities involved 2 partners, namely the Pokja Group 1 and Pokja Group 2. The implementation methods included:
  - The first stage is to provide information on PKM activities that will be carried out on referring to the Regulation of the Minister of Health of the Republic of Indonesia Number 492/MENKES/PER/IV/2010, which is meant by drinking water through processing that is qualifying of healt requirements and can be drunk directly.
  - The second step is to build clean water sterilization technology and prepare the necessary materials, such as Poly Aluminum Chloride (PAC), which is $\text{Al}_m(\text{OH})_n\text{Cl}_{(3m-n)}$. as a coagulant or flocululant to decompose cloudy solutions and agglomerate particles, it is possible to separate from the solution medium\(^{(1)}\)
  - The implementation of assisted society groups that carry out the provision of drinking water by providing training through assisted groups about clean water supply systems and processing water for drinking.
5. Results And Discussion

1) Intake tub, the coagulant used in processing river water through pump 1 is PAC as a coagulant or flocculant to decompose turbid solutions and agglomerate particles, making it possible to separate
from the medium solution for 4 hours. The deposited clots will be visible, then flow through the drain faucet.

2) Pre-sedimentation tub accommodates water through a pipe faucet from the processing tub. Remaining particles that clot will precipitate to the bottom to be released through the mixing faucet. Water in a reservoir that has been clear, not too clear, still contains: Fe CO₃ (Ferro Carbonate); Mn CO₂ (Manganese Carbonate); Zn CO₃ (Zinc Carbonate)

3) Processed water from the settling basin is transferred to the reservoir tank via pump 2. Water from the tedmon can be directly flowed or pumped into the manganese zeolite filter.

4) Filter manganese zeolite to filter or remove substances that are still attached to the water and remove suspended solids: Mn CO₃ (Manganese Carbonate), and Zn CO₃ (Zinc Carbonate).

5) Activated carbon filters to remove organic matter, odors, flavors and other micro pollutants.

6) Then the water is flowed into the cartridge filter as a filter filter which can remove dissolved solids.
7) Water that has passed through the filter cartridge is very clear and categorized as clean water is collected in the reservoir. The water can already be used for bathing and washing washing for various household needs.

8) Ultra violet sterilizer, its function is to kill pathogenic microorganisms in water. This process without requiring large energy because it works with a gravity system and only requires 30 Watts of electrical energy.

### Final Results of Processed Water Inspections

| No | Examination | Content Allowed | Results examination | Unit |
|----|-------------|-----------------|---------------------|------|
| 1  | TDS/TS      | 1000            | 794                 | mg/l |
| 2  | Turbidity   | 25              | 1,30                | Scale mtu |
| 3  | TSS         | 0,20            |                     | Mg/l |
| 4  | Density     |                 | 0,10                | Mg   |
| 5  | pH          | 6,5 – 8,8       | 7,7                 | -    |

From the final results of examination of processed water in Brackish Water Sterilization Technology to drinking water for the Banyu Urip Village Village 3, Tanjung Lago Sub-district, Banyuasin Regency, South Sumatra has succeeded well, where:

1) TDS / TS (Total Dissolve Solid) or often said the amount of dissolved solids is 794 mg / liter.
2) Turbidity is a measure that uses light effects as a basis for measuring the state of raw water with the NTU scale (Nephelo metrix turbidity unit). Turbidity caused by the presence of mixed objects or colloidal objects in the 1.30 scale water.
3) TSS (Total Suspended Solid) is the residue and total solids held by a filter with a particle size of 0.20 mg / l.
4) Weight The type of solution is the measurement of mass per unit volume of objects with a measuring instrument picnometer 0.10 mg.
5) Ph water measurement results 7.7 are alkaline, odorless and tasteless, meaning processed water is safe for consumption.

### Conclusion

The results obtained from the technology of brackish water sterilization into drinking water for the people of Banyu Urip Village, Hamlet 3, Tanjung Lago Sub-district, Banyuasin Regency, South Sumatra have succeeded well. The final result of measurement of TDS / TS processed water is 794 mg / liter. 1.36 scale turbidity of NTU. TSS 0.2 mg / liter. Specific gravity of 0.1 mg. The value of Ph 7.7 and very clear does not smell. Technology transfer, was given a demonstration of how to purify water into clean water and how it was subsequently processed until the water could be drunk and the sustainability of the program, carried out monitoring and evaluation programs.

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