



Formation and speciation of Sullage Water Natural Conduct analysis of Fuzzy logic Application by Solar Distillation

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Abstract

The recital analysis of thermal techniques for sullage water treatment and fuzzy logic techniques are used to harvest clean water, drinkable water (H₂O), fertilizer, ash impurity adding with cement from sullage water by using the energy of the sun. The experimental analysis of sullage water process is implemented of strong luminous that diurnal with weather condition in Vel Tech Multi Tech Dr. Rangarajan Dr Sakunthala Engineering College. It is an innovation to reduce the fluid waste and called water quality conversion. The suspended fluid waste changes the excellence of pure water and ash by thermal and fuzzy logic techniques. In this work is to analyze and compare between pure water and sullage water. It is analyzed of one of the days in the system have been given the 24 hr cycle, the total drip production of the proposed system is found to be 7.324 kg/m²day and without drip 4.952 kg/m²day and Overall efficiency is 36%.

Keyword: Solar still, Nanoparticles, Solar Thermal internal heat Transfer model, fuzzy logic,

1. Introduction

Focal goalmouth is purifying water without any chemical for a desalination process. Nowadays, very dementing of water is ended of global waterways to the sentimental wrapping of sea heights. We are all downstream. In our country (India) has the highest number of people without access to drinking safe water. Overall 76 million people are reported by water aid, a water and sanitation non-profit. In our country, the lot of peoples is buying water by spending a lot of money. Water is essential and without water, we can't live even single day. In this techniques are used to bridge the access non-safe water, it is recycled to get adding impurity with cement and fertilized to agriculture and medical field. All problem resolution by the overcome to solar still using in sullage water is converting to clean drinking water by way of environment process. Solar desalination process can be easily done of water quality and is a conversation of squat budget resources. Hence, many investigates are inspired by discovery supernumerary bases of energy and non -conventional solar still is used in condensing glass cover elevates with temperature, thereby reduce rate which that to be distillate & efficiency. Prakash and Kavatherkar [1] have shown the performance of the regenerative still and its daily yield is about 7.5 l/m² compared to conventional solar stills. Dhiman and Tiwari [2] have planned of multi-wick type solar still. It is expected found that the output of 10% higher due to the water flow over the glass cover to a thin layer form, as it is increased the transformation amid in water and glass cover temperatures. Singh and Tiwari [3] have carried out a passive regenerative solar still and is a good agreement of simulation results. An analytical expression for an active regenerative solar still is observed by

Singh and Tiwari [4]. It found that heat transfer unit and the collector for overall thermal efficiency 50%. Regenerative solar still is higher than passive/active to overall efficiency increases to water overflow rate of glass cover have been proposed by Sanjay Kumar and Sinha [5]. Prasad *et.al.* [6] was reported that the regenerative active solar still produces the thermal performance increased. Sangeeta and Tiwari [7] have proposed that water flow rate of the glass cover and evaporative heat transfer coefficients are increasing from a water depth of the basin area.

The Challenges:

Each year approximately 7, 60,000 children are under the age of five and a disease important source of which is hazardous drinking water. Government & donors commonly fund the construction of the new plant or enhanced water sources waste contamination of the water with the faecal-oral pathogens that Cause diarrhoea. However, recontamination water is transported or stored, remains a problem even if the source of water is pollution control.

2. Materials and Methodology

2.1 Investigational study of a solar still

The performance of a new single slope single basin type solar still is sectional vision accessible in Fig 1. The new design is completed of outward and internal enclosure consists of plywood by measurement of 1.3 x 1.3 m and 1.25 x 1.25m. The gap midst the attachments are engaged with glass wool having the thermal conductivity of 0.0038 W/mK. The stature of the hind wall is 0.03m and the front wall of 0.10m. The glass covers of fatness

4mm are used as the condensing superficial and the slope of the glass cover are fixed at 11° which is equivalent to the latitude of the location (Chennai).



Fig. 1: illustration the Experimental analysis of solar distillation.

The still is completed vapour tight with the sustenance of metal putty. The j-shaped drainage channel is immovable near the front wall to gather the distillate yield and the output trickled down to the measuring jar. The basin of the still is made of Galvanized iron sheet and a thin copper sheet is involved in the basin and coated black engross more solar radiation. A changed preparation has been concluded to pour sullage water drop by drop in the basin to endure least water depth. The research is ended by heat transfer pipes with drip button immovable at even intervals of 0.10m horizontally in the basin. The saline water cistern is distributed with a gate valve and is committed to the inlet of the drip association. The basin temperature, saline water temperature and condensing cover temperature have been exalted by fixing copper-constantan thermocouples which have been standardized initially. Solar radiation intensity and ambient temperature have been restrained with solar radiation monitor and digital thermometer. The solar radiations falling on the glass cover, after transmission through the basin liner and absorb to the water masses. A part of the energy is utilized to heat the basin water by convection and the test is the loss to the ambient through the insulation and by evaporation, convection and radiation. The trial has been approved out from 6 am to 6 am of the 24h period in the system during May 2017 at Research Center of Physics, Vel Tech Multitech Engineering College at Chennai – 600 062 [latitude 13° N, long 80° 54' E], Tamilnadu, India.

The previous norms have been finished in the script the energy balances of the mechanisms in a solar still.

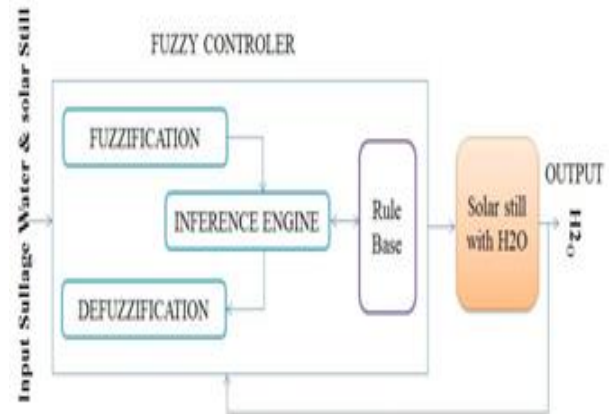
1. The glass cover, the engrossing material, the condensing covers and the padding are trifling.
2. The proclivity of the glass cover is actual minor.
3. The solar distiller unit is suspension Escape resistant.
4. Nearby is no vapour seepage in the still, hence the water haze is shortened into the water.
5. The water superficial and the glass cover are equivalent.

2.2 Fuzzy Controller

Fuzzification

Solar still internal heat transfer temperature have been used the rule for Fuzzification couriers the effort variables in the usage of fuzzy membership ethics founded on numerous association functions. Governing rules in the verbal procedure are expressed founded on comments. The allocated fuzzy rules sordid consist of

if-then switch rules with two inputs and output shadow the illustration.



The rubrics charity is

- The condition is Low and is Low now Productivity is Middle
- The condition is Low and is Middle now Productivity is Low Middle
- The condition is Low and is high now Productivity is Low
- The condition is Middle and is Low now Productivity is Middle High
- The condition is Middle and is Middle now Productivity is Middle
- The condition is Middle and is high now Productivity is Low Middle
- The condition is high and is Low now Productivity is high
- The condition is high and is Middle now Productivity is Middle High
- The condition is high and is high now Productivity is Middle.

Defuzzification:

The outcome got from fuzzy implication method is then treated to harvest a computable effect i.e. the thermal analysis of entire period the situation receipts to working taken period. Defuzzification procedure is recycled to interpret the membership grades of the fuzzy circles in the certain exact actual worth of thermal image network form of fig. 2.

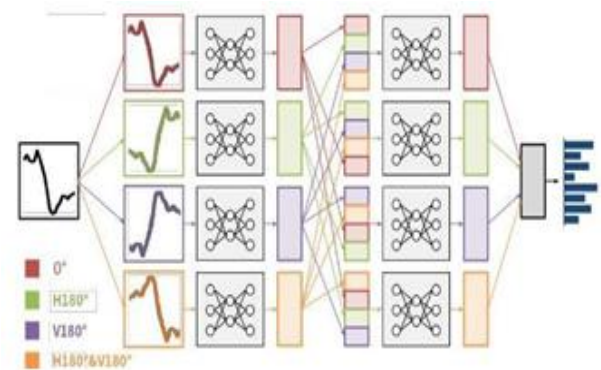
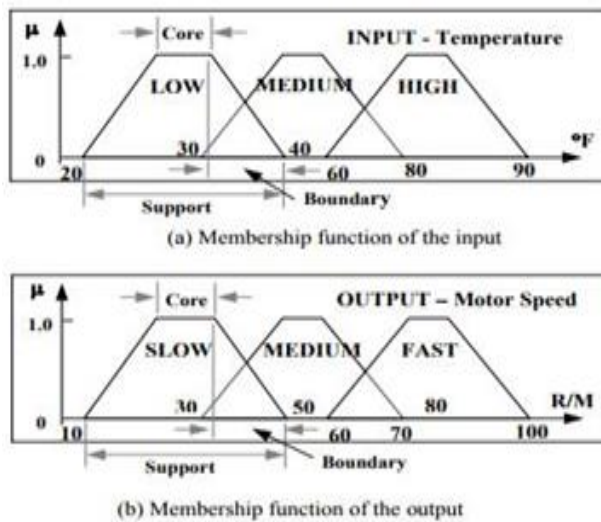


Fig. 2: Thermal heat produce of internal heat transfer to solar still

Fuzzy Logic use cooking inference:

The future Fuzzy Logic Organizer for thermal involves of three Verbal Contributions i.e. methods-of-range of temperature 1. Method-of-low of temperature 2. Middle temperature 3. High-temperature working period the future Fuzzy Logic Organizer inference machine is intended by 9 rubrics for working period. The rubrics shaped in this investigation are imitative afterwards the common intelligence and virtuously founded on involvement after a characteristic family usage. Each Verbal efforts and productions have a usual for association purposes. The X-axis of all the MF charts signifies the LI morals which are got from the devices and it varieties after 0 to 1 up to chief while the Y-axis of all MF graph signifies the grade of membership purpose.



3. Consequences and Deliberations

Tryouts have been approved obtainable through solar (thermal technique) distillation & fuzzy logic technique for the number of days during June 2017 to March 2018. Observation for unique of the six characteristic aeroplanes month of October & might have been secondhand to envisage the presentation of this techniques. Hence, during of difference in solar radiation and ambient temperature with new got sullage water from diverges six aeroplanes. Then, it is perceived that the hourly disparity of ambient temperature the identical inclination. Purification processes by solar distillation with use in solar intensity and ambient temperature are found that to be highest at midday and formerly reductions slowly cashbox 5 pm. Sullage Waste Water Treatment of full Solar Energy Process High way Service of H₂O in Solar Still has been developed in high-efficiency products in Vel Tech Multitech Engineering College, Research Centre of Physics, with a Solar Energy LAB, discussion for input and output in the system at Chennai, Tamilnadu, India one of the day on 29.06.2017. The solar radiation is high energy save to 1120°C and ambient Temperature is 40 °C in a system absorb by the system. The variation the same trend for all the days and solar radiation intensity seems to be maximum between 12 pm to 2 pm following the Fig.1.

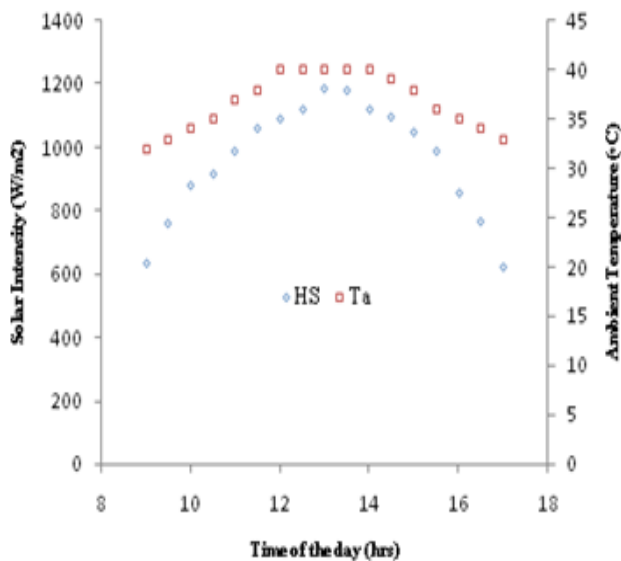


Fig. 1: Display in the hourly difference of solar radiation and ambient temperature.

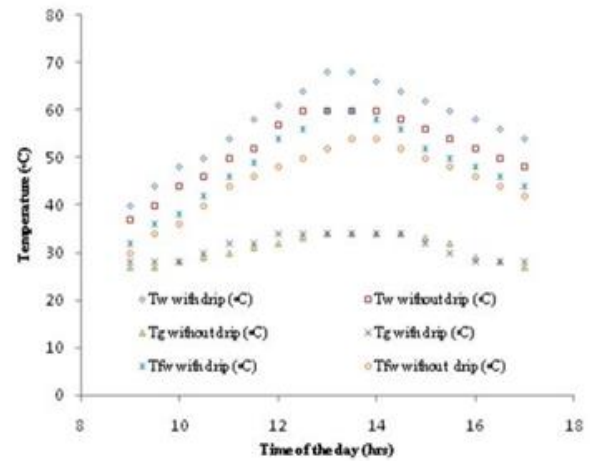


Fig. 2: The disparity of production rate compared with and without dripping solar still.

Experimental observations of with and without drip system in the basin, water and glass cover temperature of the planned solar still is well decided in figure 2. The alteration of manufacture rate of water and glass cover temperature through basin by drenched saline water through drenched preparation to preserve smallest water penetration has been associated to the same basin type solar still without dripping. Experiment without dripping has been accepted obtainable through 1.5cm of sullage water sideways through a basin solar still. Water temperature is growth with drip button average reach in a system 68°C and glass cover is reach to 30°C. The maximum energy absorbs to solar still more fast evaporation of the still. Figure 3 expressions the difference between manufacture rate of water, glass cover temperature, with and without dripping of sullage water of the basin. The temperature alteration amongst water and glass cover temperature is without dripping minor owing to large thermal capacity and degree of evaporation is reasonable. Extreme drenched distillation harvest of the system is 0.390 kg/m²30minutes during 1.00 pm to 2 pm and without drip 0.250 kg/m²30minutes. The total drip distillate yield during 9 am to 5 pm is found to 7.624 kg/m²day without dripping 5.234 kg/m²day Over 24 hr cycle, the total drip production of the proposed system is found to be 7.978 kg/m²day and without the drip. Moreover, the theoretical results validated with the experimental observations are quite good as there is no deviation in the trend. Figure 4, it is clear that at any instant, the instantaneous energy efficiency with and without drip varies The situation has obviously reproduced to the prompt distillation harvest through dripping effect of the solar still is 45% and higher than is without dripping solar still compare to Shanmugan *et al.*, [8 & 9].

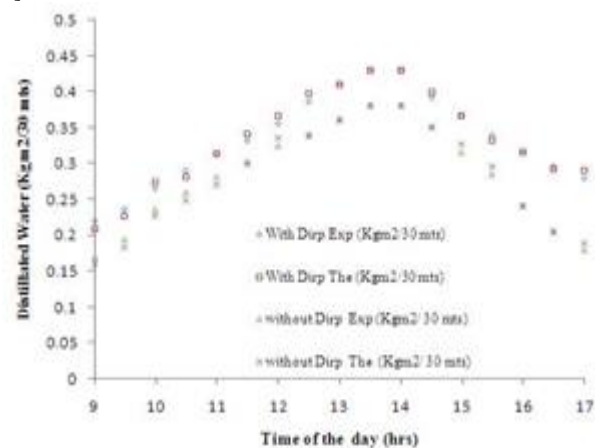


Fig. 3: Variation of distillate production rate with and without the dripping system.

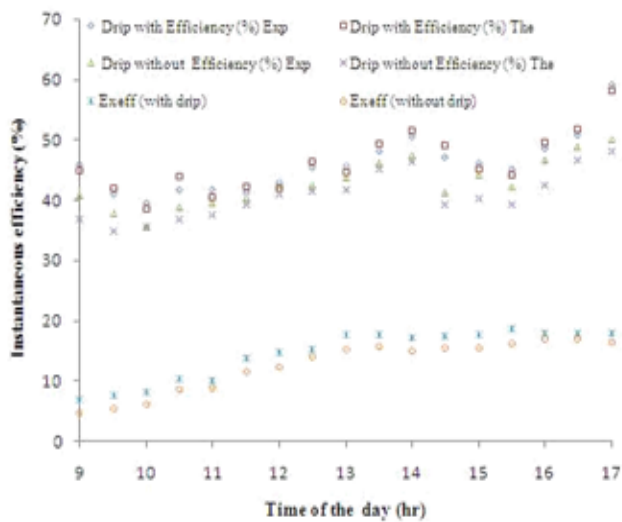


Fig. 4: Influence of hourly variations of prompt energy efficiency with and without a drip of the solar still.

4. Conclusion

The warm air technical classical are industrialized in new observational and perfect working of the system is appropriate to optimization. Average efficiency of a system from this technique is 7.624 kg/m²/day and without drip 5.254 kg/m²/day and Overall efficiency is 45%. The approach of the method can be shaped to pretend the suggested arrangement of any climatic circumstances for big scale industries, domestic purpose and agriculture.

Smart way

This is a way of smart to termination to the water calamity. Masses of persons everywhere the world is could be getting entrée to safe water in their households through the benefit.

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