

## Effect of wind on performance of double slope solar desalination still for fresh water production.

### Efecto del viento sobre el rendimiento del destilador solar de desalación de doble pendiente para la producción de agua dulce.

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#### ABSTRACT

This study aimed at investigating the effect of wind for double slope solar desalination still. Two double slope solar stills were designed, constructed and experimentally tested their performance depending up on the wind. One experiment carried out with a wind speed of 4m/s and other 3m/s. The results show that the variation in wind affects the fresh water production. Double slope solar desalination still with wind speed 4m/s gives 17.8% higher productivity compare to 3m/s.

Keywords: wind, freshwater production, desalination.

#### RESUMEN

Este estudio tuvo como objetivo investigar el efecto del viento para la desalación solar de doble pendiente. Se diseñaron, construyeron y probaron experimentalmente dos alambiques solares de doble pendiente en función del viento. Un experimento realizado con una velocidad del viento de 4 m / s y otro de 3 m / s. Los resultados muestran que la variación del viento afecta la producción de agua dulce. La desalinización solar de doble pendiente con una velocidad del viento de 4 m / s proporciona un 17,8% más de productividad en comparación con 3 m / s. Palabras clave: viento, producción de agua dulce, desalación.

#### INTRODUCTION

Solar desalination is a process to convert saline water to portable water by using solar energy, to improve the productivity of solar stills are coupled with pre heaters such as solar concentrators and solar flat plate collectors . other parameters are also influenced for fresh water production .The structure of the still and tilt angle of the glass cover is one of the major parameter ,less glass cover thickness gives more output .and the depth of the water inside the still also kept minimum for maximum fresh water

production .the wind also a major part of the solar desalination system.

This study deals with two double slope inward solar desalination still are constructed ,and tested at same date and time one is experiment with a wind speed limit of 3m/s and other is 4m/s and data's are collected and plotted graphs.

#### MATERIALS AND METHODS

Two double slope inward solar stills having base area 1m<sup>2</sup> and two fans are used to wind supply .the inlet of the double slope desalination still connects to saline water tank .the experiment conducted from 8 am to 8pm.4mm glass cover is used and water depth keep 5mm constantly j-type thermocouples are used to measure the temperature at inlet and outlet of the still and wind velocity measure by using anemometer.



Figure 1.Double slope desalination still

Table 1: Features of thermocouple

Sr. No.	Item	Specification
1	Type of thermo-couple	J – Type Iron constantan thermocouple
2	Alloy of positive wire	Iron (100% Fe)
3	Alloy of negative wire	Constantan (55% Cu – 45% Ni)
4	Temperature range	0 – 7500C

Table 2: Features of anemometer

Sl. No.	Item	Specification	Resolution	Accuracy
1	Type of anemometer	Vane type digital anemometer		
2	Operating temperature	0 to 50 <sup>0</sup> C		
3	Operating humidity	Less than 80% RH		
4	Measurement in m/s	Range		
	0.4 – 30 m/s	0.1 m/s	± 2%+0.2m/s	0.4 – 30 m/s

### RESULTS AND DISCUSSION

Figure 1 shows the graph of cumulative fresh water collected with respected to solar radiation ( $w/m^2$ )with respected to time .the readings are taken between morning 8 am to evening 8pm.the cumulative fresh water collected with wind speed of 3m/s was 2045 ml. where series 1 represented solari meter reading and series 2 represented cumulative water collected

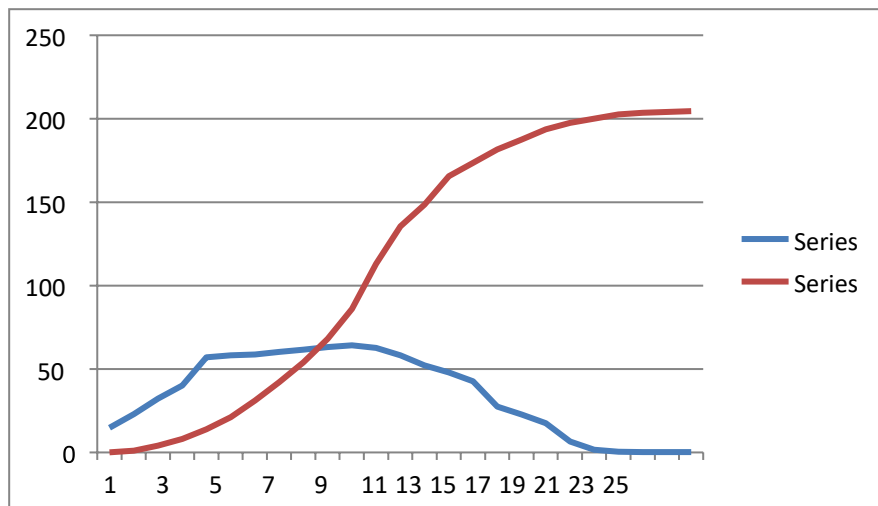


Fig 1: solari meter reading Vs cumulative water collected

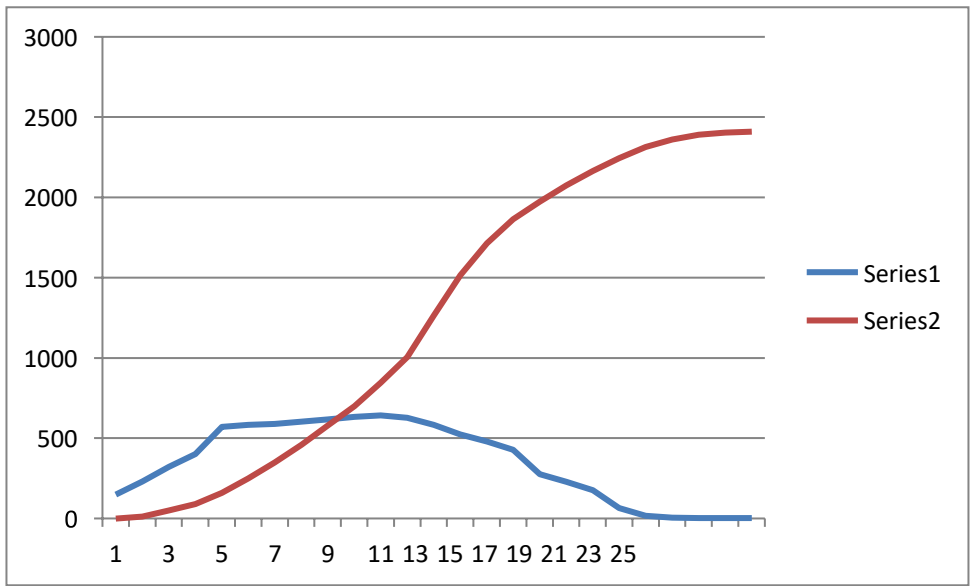


Fig 2: solarimeter reading Vs cumulative water collected

Figure 2 shows the graph of cumulative fresh water collected with respected to solar radiation( $w/m^2$ ) with respected to time. The readings are taken between morning 8 am to evening 8pm. the cumulative fresh water collected with wind speed of 4 m/s was 2410ml, which is 15.1% higher than the water collected with wind speed of 3m/s. where series 1 represented solar meter reading and series 2 represented cumulative water collected

### CONCLUSION

Two double slope desalination stills are made tested with 4m/s and 3 m/s wind velocity. Which means 17.8% increment in 4m/s it can be concluded that higher wind velocity gives more production per unit energy

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