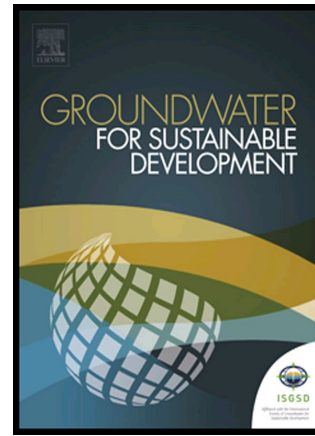


## Author's Accepted Manuscript

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ACCEPTED MANUSCRIPT

# Experimental yield analysis of groundwater solar desalination system using absorbent materials

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## Abstract

Nowadays, feeding population by drinkable water has become an enormous task. The most recent record of potable water shows that more than a billion people throughout the world still lack access getting potable water [1]. In Southern Algeria, the only source of fresh water is the underground water; however, it is of high salinity. Solar desalination is one of the best solutions to supply small communities of arid and semi-arid zones by drinkable water where it is unavailable.

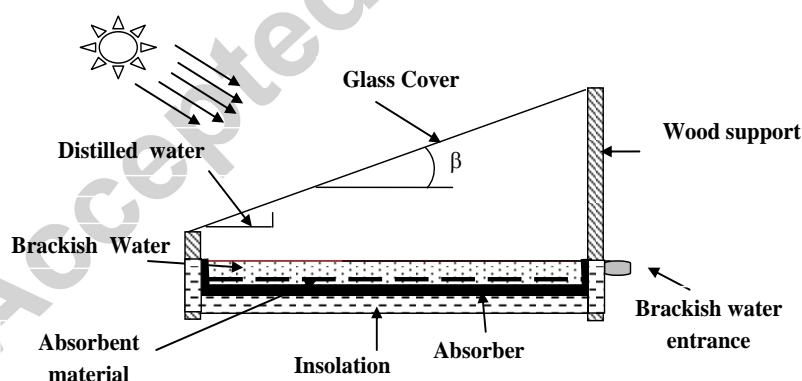
In this paper, attempt has been made to study the effect of the following absorbent on the still productivity under local climatic conditions:

- 0.5 cm thick layer of bitumen.
- 100g of charcoal i.e. (0.6038 kg charcoal/m<sup>2</sup> of absorber area).
- 10 drops of Black Chinese ink /liter of brackish water.

Experiments conducted at Ouargla University show that:

- Absorbent materials increase water absorption to solar irradiance; additionally, they play the role of heat storage medium when they are added within still's absorber.
- Moreover, absorbent materials generally increase the daily yield and leads to nocturnal distillation for a few times.
- Bitumen, Charcoal and black ink improves the output by: 25.35%, 18.42% and 6.87% respectively relative to the baseline case.

## Graphical abstract



Cross-section of test still

## Graphical abstract

Absorbent materials increase the water absorption to solar irradiance and some of them can also play the role of heat storage medium when used within solar still's absorber plate.

In this experiment, absorbent materials used are: Bitumen, Charcoal and Black Chinese ink. The figure (Fig.1) shows cross-section of solar still used in our experimental investigation.

After sunset, those absorbents played slightly the role of heat storage medium especially bitumen and therefore, lead to nocturnal distillation for a few times.

Our results show that the bitumen is better than charcoal and black ink in absorbent and heat storage medium terms.

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