تحسين تقطير المياه باستخدام سخان ماء شمسي منزلي

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الخلاصة :

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m² 0.4   2005

m² 4

– 13.5   % 40 – 30   ,   % 5 – 3.5

.   % 15

Abstract :

This article conclude study the effect of preheating inlet water supplied to a single effect solar water still on its production and its performance and also the effect of glass cover cooling by air and water flow on its production and performance. the experimental results done for the period Feb. to Jun. 2005 at Baghdad –Iraq on a solar water still of 0.4 m² which was combined with a solar water heater of 4 m² show 3.5 - 5 % enhancement in its production and of 30 – 40% and 13.5 – 15 % production enhancement for glass cover cooling by air and water flow rates respectively.

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1872

[1] M.A.S.Malik

4700 ²   ² / 4.255 .

[2] 1972 .Soliman S.H   ,

.Howe E.D   [3] 1973 H.P.Hanson

[5] 1976 Gary [4] 1974   ,

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[10] 1982

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2]] 1973   .

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:   Satcunanathan   .

-1   1972 [6]

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-3   H.P. Hanson   .

:   [3] 1973

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[11] 1960 G.O.G.Lof
[12] 1973 P.I.Cooper   7] 1978 G. Kamaraj   .
: [13] 1974 A.A.M.Sayigh   [

$$Q_r = \varepsilon_w \cdot \sigma (T_w^4 - T_s^4) \qquad W / m^2$$

% 60– 50
25
$$Q_c = 0.884[(T_w - T_g) +$$

،   % 30 –

$$\frac{(P_w - P_g) \cdot T_w}{268 \times 10^3 - P_w}]^{\frac{1}{3}} (T_w - T_g)$$] Bastors 1979   .

$$W / m^2$$ [8

،

$$Q_e = 4.52 \times 10^{-3} \left[Q_c \frac{P_w - P_g}{T_w - T_g} \right]$$.

      [9] Bornemenn
$$W / m^2$$ 2003

:   4

.

P_w :

N/m^2 .

P_g :

N/m^2 .

T_w - : k .

T_g : k .

σ :

5.67×10^{-8} W/m^2k^4 .

ε_w : 0.9

.

$$Q_{ca} = h_{ca}(T_g - T_a) + \varepsilon_g \cdot \sigma (T_g^4 - T_a^4)$$

T_a : k .

ε_g : 0.88

$$h_{ca} = 5.7 + 3.8V \qquad W/m^2k$$

h_{ca} :

V

m/s .

:

$$\eta_h = \frac{P \times h_{fg}}{I \times A}$$

:

A : m^2

I : W/m^2hr

P : $liter/m^2$

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h_{fg} :

kJ/kg .

:

$$\eta_d = \frac{\sum P \cdot h_{fg}}{A \cdot \sum I}$$

$\sum I$

$W/m^2 day$.

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(1)

1

100   2

11   40

5

36

30

50

10   150

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100   .

1

10

(1)

0.4

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110   2

50

² 2   5

² 4

'   .   '

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² 4

:   '   ² 2

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2005

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(

'   30

² 2   '

² 4

.   45

10   12.5

Ts 4 ^{2}

(3)

بشكل واضح تقديم فترة بدء التقطير من
الساعة 10 إلى الساعة 8.5 صباحا في حالة
زيادة مساحة المجمع الشمسي مع زيادة كبيرة في
الإنتاج المسائي واليومي يصل إلى ما بين
0.25−0.35 % حسب الظروف الجوية .

خزان ماء معزول

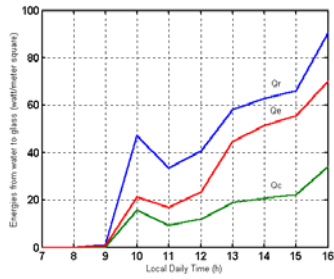- أ -

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T_b 2 ^{2} ,
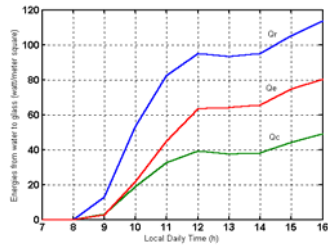
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2 4

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2

(4)

(5)

4

2

4

12.5

8   9.5

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Q_r Q_r (5)

Q_e Q_e **Q_c** Q_c
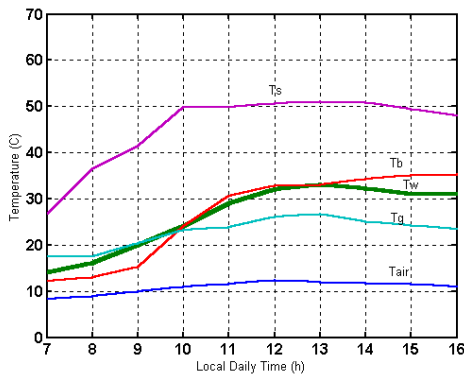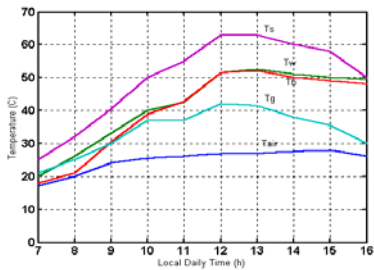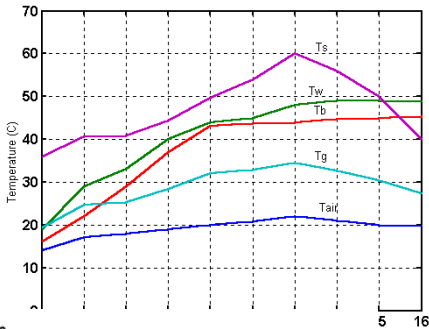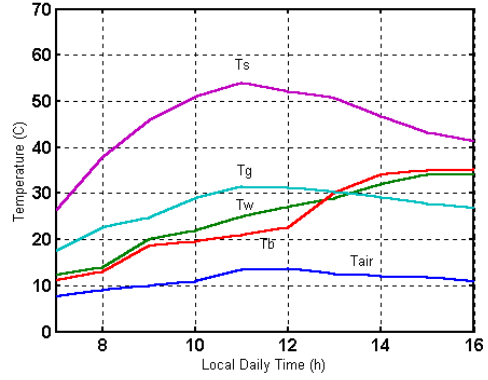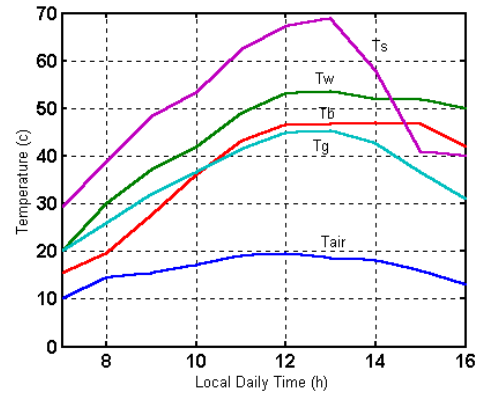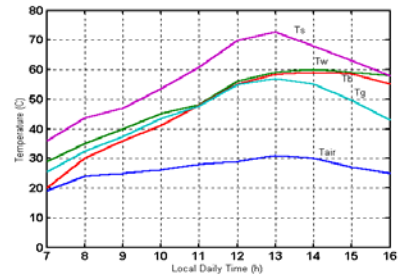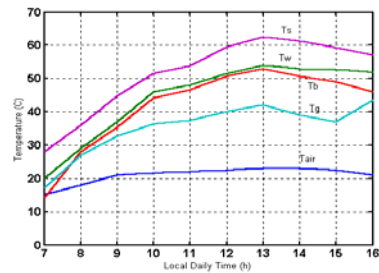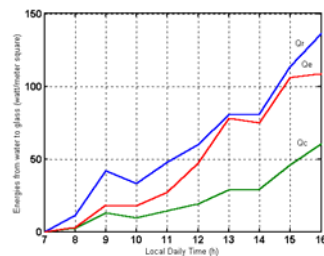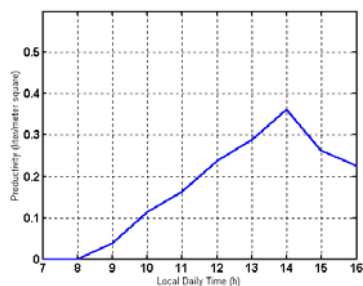
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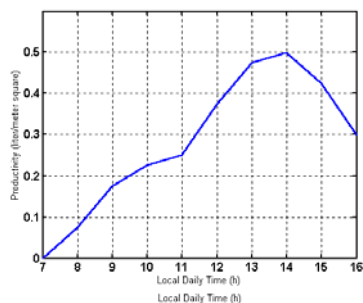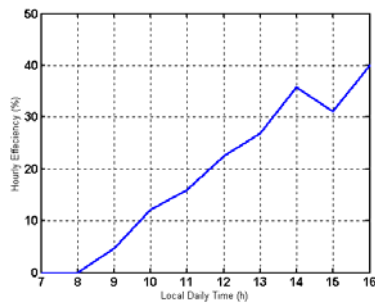
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شكل (7) إنتاجية المقطر في الحالات الثلاثة

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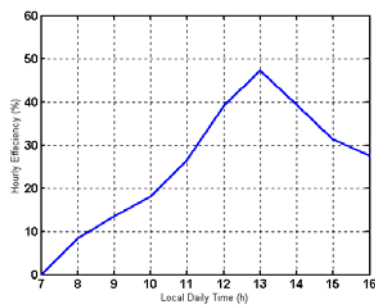
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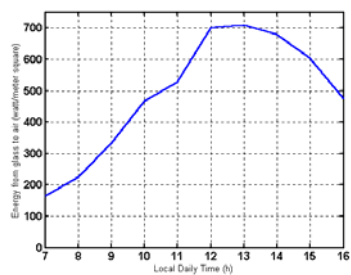
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شكل (8) الطاقات المنتقلة من الغطاء الزجاجي
إلى الجو

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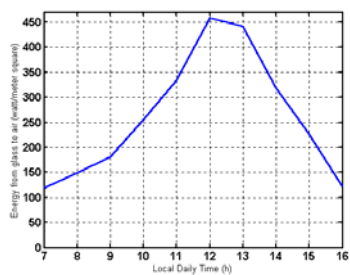:   .
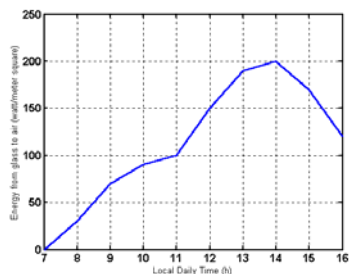
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1-

3.5 –5 % ,

0.25 %

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2-

30 – 40 % ,

0.35 % .

13 – 15

% ,

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2-

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3-

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