

**The effect of different bagging treatments in the
characteristics of seedless and seeded fruit of date palm
Phoenix dactylifera L. cv. Hillawi**

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Abstract:

The study was conducted during the growing season 2009 in one of an orchard in Abu-Al-Khaseeb region–Basrah, to study the effect of bunches bagging with different bags (brown paper , white polyethylene , black polyethylene , brown paper covered with black polyethylene and brown paper covered with white polyethylene) in the characteristics of seedless fruits compared with seeded fruits of date palm Hillawi cultivar, results showed that the fruit seeded superior seedless fruits significantly in weight and size fruit also seeded fruits superior seedless fruit significantly in percentage of total soluble solids, total sugars, sucrose and reducing sugars and dry matter , while seedless fruits superior seeded fruit significantly in percentage of water content, the treatment of brown paper covered with black polyethylene increased significantly the water content of fruits so treatment of brown paper covered with white polyethylene increased significantly dry matter of fruits compared with other treatments while the treatment of brown paper bags increased total sugars , reduced sugars and percentage of ripening of seeded fruits significantly compared with other treatments and the results showed significant differences between the treatment of brown paper bags and control treatment of seedless fruits in increased percentage of fruit ripening.

Introduction:

The date palm *Phoenix dactylifera* L. cv. Hillawi is the second most widely grown cultivar of soft dates in Basrah, The fruits of this cultivar ripe early in the season with good flavour and high economic return (Attaha and Abbas ,2002), Spaths Covering This is done, to protect the fruits from unsuitable environmental conditions, facilitate harvest, or protection from insects or bird damage The different materials used for each purpose (EL-Hammady ,2004).

Ibrahim and Khalif (2003) found that bagging of bunches used for the purpose of increasing the quality of fruits in the tropics and dry zone to reduce the percentage of drop fruits, especially in the Rutab stage, EL-Hammady (2004) clear that in hot and dry weather fruit can be packaged spaths of polyethylene bags are open from the bottom for ventilation and thus helps to create a climate featuring the high levels of humidity reduce the effect of the temperature of the external environment to prevent dry fruits, Shereef (2008) found that the effect of bunches bagging by brown paper bags on early ripening of fruits that treatments of bunches bagging to Hillawi and Sayer cultivars to a period of 50 days after pollination led to increased percentage of fruits ripening. seedless fruit growing from unpollinated flowers the fruit set is without pollination and fertilization, where the fruit set is known Parthenocarpy and usually all the three carpels of the unpollinated flowers will grow slowly producing three Parthenocarpic fruits, such Parthenocarpic fruits are usually of small size and will never reach to the final stage of ripening (Rutab) (Mattar, 1991).

The studies pointed out to changes in some physiological characteristics during the evolution of the seedless fruits of date palm Hillawi cultivar that seedless fruits walk in the fruit growth curve of exponential growth similar to the singular and the growth pattern of fruit with seed for the same product, but the seedless fruits not reach to the final stages of ripening (Rutab) and override ripening (Tammam) has been attributed to the absence of seed, which is the main source of plant growth hormones (Abbas,1997; Ati, 2009).

The process of obtaining the fruits without seed is one of the most important economic processes desired by the consumer and the product through the use of these dates in the consumption or the food industry, therefore this study aimed to achieve the following:

- 1 - Ripening of seedless fruits.
- 2 - improve the quality of seedless fruits.
- 3 - compared the characteristics of seedless fruits with seeded fruit qualities under the effect of different bags.

Materials and methods :

The study was conducted during the growing season 2009 in one of an orchard in Abu-Al-Khaseeb region-Basrah, eight palms of Hillawi cultivar homogeneous as possible in height and age and service operations are, Bunches under the treatments were pollinated with the same male tree (Ghannami Akder) cultivar in 15th April 2009 the number of bunches was adjusted to six bunches per tree Treatments were arranged in completely randomized block design with each treatment replicated four times for each treatment, a single bunch per tree (replicate) was used bagging immediately after pollination by small dimensions bags (30 x 40) cm for two weeks and then removed to bagging by large dimensions bags (50 x 70) cm all bags were perforated (24 perforations with diameter 0.5 cm) to improve aeration, except for the brown paper bags and all types of bags stay to the beginning stage of (Rutab), did not use the process of pollination of palms selected for seedless fruits.

The treatments were as follows : (see fig 1)

- 1- Treatment of control unbagging bunches .
- 2 - Treatment of bunches bagging with brown paper .
- 3 - Treatment of bunches bagging with black polyethylene .
- 4 - Treatment of bunches bagging with white polyethylene .
- 5 - Treatment of bunches bagging with brown paper bag covered with polyethylene.
- 6 - Treatment of bunches bagging with brown paper bag covered with polyethylene.

Repeated the same Treatments on seedless and seeded fruits.

Samples have been taken at the stage of Tammar for the purpose of the study.

fifty fruits were picked at random from the bunch of each replicate to the estimation of physical and chemical fruit characteristics, fruit weigh and size were recorded , fruit water content and dry matter (%) were determined after drying pulps of fifteen fruit in an oven at 70 ° C for 48 hours . total soluble solids T.S.S.(%) of fruit pulps were measured using Hand Refractometer . Sugars test of fruit as total , reducing and non-reducing sugars (%) were determined according to method of Lane and Eynon outlined in (Abbas and Abbas , 1990) samples of six strands were chosen randomly from each replicate to determined fruit ripening percentage using the following formula:

percentage of fruit ripening = (number of ripe fruits per bunch / total number of fruits per bunch) * 100

The results were statistically analyzed as a randomized complete block design with each treatment replicated four times as Factorial experiments (type of fruit and different treatments of bags) so used the angular transformation the differences between treatment means were test by R.L.S.D. test at level 0.05 as pointed out (Al- Rawi and Khalaf- Allah, 1980).

Result and Discussion:

Table 1: The effect of different types of bags in the weight of seeded and seedless fruits of Hillawi cultivar at the stage of Tammar , fruit seeded superior seedless fruits significantly in fruit weight, the fruits seeded gave the highest weight of fruits (5.51 g) while seedless fruits gave the lowest weight (1.71 g) and wasn't significant difference between the treatments of bagging to influence weight of the fruits at the stage of Tammar .

Table 2: The effect of different types of bags in the Size of seeded and seedless fruits of Hillawi cultivar at the stage of Tammar , fruit seeded superior seedless fruits significantly in fruits size , the fruits seeded gave the highest Size of fruits (5.58 cm³) while seedless fruits gave the lowest Size (1.57 cm³), but wasn't significant difference between the treatments of different bagging to influence Size of the fruits at the stage of Tammar .

Table 3: The effect of different types of bags in T.S.S. of seeded and seedless fruits of Hillawi cultivar at the stage of Tammar , fruit seeded superior seedless fruits significantly in percentage of T.S.S. of fruits and fruits seeded gave the highest percentage of T.S.S. (69.45 %) while seedless fruits gave the lowest percentage of T.S.S. (15.50 %), Treatment of brown paper bag increased T.S.S. significantly compared with the treatment control, and gave the highest percentage of T.S.S. (46.07%) while the treatment of control gave the lowest percentage of T.S.S. (40.89%), the interaction wasn't differences significant between bagging treatments to influence the percentage of T.S.S. at the stage of Tammar .

Table 4: The effect of different types of bags in water content percentage of seeded and seedless fruits of Hillawi cultivar at the stage of Tammar , seedless fruits superior seeded fruits significantly in percentage of water content and it gave the highest percentage of water content (72.33 %) while seeded fruits gave the lowest percentage

of water content (13.34 %) , Treatment of brown paper bag covered with black polyethylene bag increased water content significantly compared with the treatment control, and it gave the highest percentage of water content (45.32%) while the treatment of control gave the lowest percentage of water content (40.36 %) and the interaction wasn't differences significant between bagging treatments to influence the percentage of water content at the stage of Tammar.

Table 5: The effect of different types of bags in dry matter percentage of seeded and seedless fruits of Hillawi cultivar at the stage of Tammar , fruit seeded superior seedless fruits significantly in percentage of dry matter of fruits and fruits seeded gave the highest percentage of dry matter (86.65%) while seedless fruits gave the lowest percentage of dry matter (27.66 %) , Treatment of brown paper bag covered with white polyethylene bag increased dry matter significantly compared with other treatments , and it gave the highest percentage of dry matter (59.63 %) while the treatment of brown paper bag covered with black polyethylene bag gave the lowest percentage of dry matter (54.68 %), and about the interaction wasn't differences significant between bagging treatments to influence the percentage of dry matter at the stage of Tammar.

Table 6 : The effect of different types of bags in total sugars percentage of seeded and seedless fruits of Hillawi cultivar at the stage of Tammar , fruit seeded superior seedless fruits in percentage of total sugars significantly , fruits seeded gave the highest percentage of total sugars (54.17 %) while seedless fruits gave the lowest percentage of total sugars (12.09 %) , Treatment of brown paper bag increased total sugars significantly compared with control treatment, and it gave the highest percentage of total sugars (35.94 %) while the treatment of control gave the lowest percentage of total sugars (31.90 %), and the interaction wasn't differences significant between bagging treatments to influence the percentage of total sugars at the stage of Tammar .

Table 7 : The effect of different types of bags in reducing sugars percentage of seeded and seedless fruits of Hillawi cultivar at the stage of Tammar , seeded fruits superior seedless fruits in percentage of reducing sugars significantly , fruits seeded gave the highest percentage of reducing sugars (52.42 %) while seedless fruits gave the lowest percentage of reducing sugars (10.39 %) , Treatment of brown paper bag increased percentage of reducing sugars significantly compared with control treatment, and it gave the highest percentage of reducing sugars (35.94 %) while the treatment of control gave the lowest percentage of reducing sugars (28.62 %), However, the results of interaction showed that treatment of brown paper bag to seeded fruits increased percentage of reducing sugars significantly compared with other treatments.

Table 8 : The effect of different types of bags in sucrose percentage of seeded and seedless fruits of Hillawi cultivar at the stage of Tammar , seeded fruits superior seedless fruits in percentage of sucrose significantly and fruits seeded gave the highest percentage of sucrose (5.10 %) while seedless fruits gave the lowest percentage of sucrose (1.69 %) , Treatment of control increased sucrose significantly compared with other treatments and it gave the highest percentage of sucrose (4.61 %), while the treatment of brown paper bag gave the lowest percentage of sucrose (2.37 %), However, the results of interaction showed that treatment of control to seeded fruits increased sucrose significantly compared with other treatments .

Table 9 : The effect of different types of bags in percentage of ripening of seeded and seedless fruits of Hillawi cultivar at the stage of Tammar , seeded fruits superior seedless fruits in percentage of ripening fruits significantly and fruits seeded gave the highest percentage of ripening fruits (90.77 %) ,while seedless fruits gave the lowest percentage of ripening fruits (2.68 %) , Treatment of brown paper bag increased percentage of ripening fruits significantly compared with control treatment, and gave the highest percentage of ripening fruits (51.03 %), while the treatment of control gave

the lowest percentage of ripening fruits (40.41 %), However, the results of interaction showed that treatment of brown paper bag to seeded fruits increased percentage of ripening fruits significantly compared with other treatments .

The increase in percentage of T.S.S. in bagging fruits may be due to the high percentage of sugars in fruits bagging (Al-Jabri, 2002) or the reason may be due to the high content of fruits bagging endogenous hormones (Auxin and Gabbrellin) due to decrease of photo-oxidation process of endogenous hormones, Muhammad and Al-Rais (1990) said that natural light destroys growth regulators by the process of photo-oxidation, it is thereby increasing the soluble solids within the cells consequently, a higher water content in fruits.

The differences between the contents of seedless and seeded fruits because seedless fruits still at the stage of Khalal while the seeded fruit in the stage of Tammar .

The reason for decreased in dry matter under treatments of bagging to the high percentage of fruit set because decreased the nutrients reaching to fruits under bags or to the high percentage of water content of fruits (Shareef, 2008) and that causes of decreased in acidity is the consumption of a section of the organic acids in the process of breathing and convert some of its to sugars (Burton, 1982), the reason of high reducing sugar is bagging bunches this process led to increase the effectiveness of invertase enzyme in fruits, which is invert sugars to reducing sugars (Al-Jabri, 2002). the reason for the high percentage of ripening seeded fruits to decrease of photo-oxidation process which a higher level of endogenous growth regulators in fruits under bags consequently led to changes at maturity after the remove of bags and increased the effectiveness of the enzymes responsible for ripening (Invertase and Celulase) (Shareef, 2008).

The conclusion that this study a long period of bagging does not led to the early ripening and date palm seedless fruits Hillawi cultivar is not affected by treatments for two reasons: first, the seedless fruits without seed, which is a source of growth regulators, which had stopped at the stage of maturity (Khalal) and not develop to the stage of ripening (Rutab), or after ripening (Tammar), but the high humidity at the beginning of winter led to ripening seedless fruits and this case is consider the fermentation of fruits and not natural ripening , second, the bags used before pollination(seedless fruits result from prevent of pollination) to beginning of the Rutab stage of seeded fruits this is a long period led to save water content of the fruits it is so high to fruits seedless led to ripening late .

We recommend using artificial ripening to seedless fruits and use brown paper bag or brown paper covered with black polyethylene to a period not exceeding two months to improve the quality of fruits and accelerate the ripening. (we noted that use post-harvest materials increased percentage of seedless fruits ripening and reached to Tammar stage after 48 hours of treatment).

Table 1: Effect of different types of bags in weight of seeded and seedless fruits of Hillawi cultivar at the stage of Tammar (g)

Bagging treatments Type Fruits	1	2	3	4	5	6	Average of type fruits
Seeded fruits	5.33	5.79	5.56	5.29	5.52	5.55	5.51 a
seedless fruits	1.65	1.82	1.75	1.66	1.75	1.67	1.71 b
Average of bagging treatments	3.49	3.80	3.66	3.47	3.64	3.61	R.L.S.D . Type *** treatments * ns intraction * ns

* not significant , *** high significant

Table 2: Effect of different types of bags in size of seeded and seedless fruits of Hillawi cultivar at the stage of Tammar (cm³)

Bagging treatments Type Fruits	1	2	3	4	5	6	Average of type fruits
Seeded fruits	5.58	5.68	5.56	5.56	5.73	5.39	5.58 a
seedless fruits	1.57	1.67	1.55	1.49	1.59	1.56	1.57 b
Average of bagging treatments	3.57	3.68	3.66	3.55	3.52	3.43	R.L.S.D . Type *** treatments ns * intraction *ns

* not significant at level 0.05 , *** high significant

Table 3: Effect of different types of bags in T.S.S. percentage of seeded and seedless fruits of Hillawi cultivar at the stage of Tammar (%)

Bagging treatments / Type Fruits	1	2	3	4	5	6	Average of type fruits
Seeded fruits	67.13	73.96	68.37	67.15	71.62	68.49	69.45 a
seedless fruits	14.66	18.19	13.67	15.52	16.71	14.23	15.50 b
Average of bagging treatments	40.89 b	46.07 a	41.02 b	41.34 b	44.16 a	41.36 b	R.L.S.D . Type *** .treatments 2.54 intraction * ns

* not significant at level 0.05, *** high significant

Table 4: Effect of different types of bags in water content percentage of seeded and seedless fruits of Hillawi cultivar at the stage of Tammar (%)

Bagging treatments / Type Fruits	1	2	3	4	5	6	Average of type fruits
Seeded fruits	10.65	15.81	13.11	13.67	16.00	10.79	13.34 b
seedless fruits	71.18	72.59	72.74	72.91	74.63	69.94	72.33 a
Average of bagging treatments	40.91 c	44.20 ab	42.92 abc	43.29 a	45.32 a	40.36 c	R.L.S.D . Type *** .treatments 2.80 intraction * ns

* not significant at level 0.05, *** high significant

Table 5: Effect of different types of bags in dry matter percentage of seeded and seedless fruits of Hillawi cultivar at the stage of Tammar (%)

Bagging treatments / Type Fruits	1	2	3	4	5	6	Average of type fruits
Seeded fruits	89.34	84.18	86.88	86.32	83.99	89.20	86.65 a
seedless fruits	28.82	27.41	27.26	27.09	25.36	30.06	27.66 b
Average of bagging treatments	59.08 ab	55.79 c b	57.07 abc	56.70 b	54.68 c	59.63 a	R.L.S.D . Type *** .treatments 2.80 intraction * ns

* not significant at level 0.05, *** high significant

Table 6: Effect of different types of bags in total sugars percentage of seeded and seedless fruits of Hillawi cultivar at the stage of Tammar (%)

Bagging treatments / Type Fruits	1	2	3	4	5	6	Average of type fruits
Seeded fruits	52.36	57.69	53.33	52.38	55.86	53.42	54.17 a
seedless fruits	11.43	14.19	10.66	12.11	13.03	11.10	12.09 b
Average of bagging treatments	31.90 b	35.94 a	31.99 b	32.24 b	34.45 a	32.26 b	R.L.S.D . Type *** .treatments 1.98 intraction * ns

* not significant at level 0.05, *** high significant

Table 7: Effect of different types of bags in reducing sugars percentage of seeded and seedless fruits of Hillawi cultivar at the stage of Tammar (%)

Bagging treatments Type Fruits	1	2	3	4	5	6	Average of type fruits
Seeded fruits	47.63 d	57.30 a	51.73 bc	49.18 cd	55.25 a	53.42 ab	52.42 a
seedless fruits	9.62 e	12.79 e	9.01 e	10.18 e	11.77 e	8.99 e	10.39 b
Average of bagging treatments	28.62 b	35.05 a	30.37 b	29.68 b	33.51 a	31.20 b	R.L.S.D . Type *** .treatments 2.25 intraction 3.18

Table 8: Effect of different types of bags in sucrose percentage of seeded and seedless fruits of Hillawi cultivar at the stage of Tammar (%)

Bagging treatments Type Fruits	1	2	3	4	5	6	Average of type fruits
Seeded fruits	7.41 a	3.34 d	4.33 c	5.88 b	3.47 d	6.15 b	5.10 a
seedless fruits	1.81 e	1.39 e	1.65 e	1.92 e	1.26 e	2.11 e	1.69 b
Average of bagging treatments	4.61 a	2.37 c	2.99 bc	3.90 a	2.37 c	413 ab	R.L.S.D . Type *** .treatments 1.02 intraction 1.44

Table 9: Effect of different types of bags in percentage of ripening of seeded and seedless fruits of Hillawi cultivar at the stage of Tammar (%)

Bagging treatments Type Fruits	1	2	3	4	5	6	Average of type fruits
Seeded fruits	80.82 d	97.10 a	87.16 c	93.57 ab	94.96 ab	91.05 bc	90.77 a
seedless fruits	zero f	4.97 e	1.99 ef	2.80 ef	3.52 ef	2.80 ef	2.68 b
Average of bagging treatments	40.41 d	51.03 a	44.57 c	48.18 ab	49.24 ab	46.93 b	R.L.S.D . Type *** .treatments 3.32 intraction 4.70

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Fig 1 : Treatments of bagging



Khalal stage



Rutab stage

Fig 2 : seedless fruits

تأثير عدة معاملات من التكييس على صفات الثمار البكرية والبذرية لنخيل التمر
Phoenix dactylifera L. صنف الحلاوي

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الخلاصة :

اجريت هذه الدراسة خلال موسم النمو (2009) م في احد بساتين ابي الخصيب في محافظة البصرة بهدف دراسة تأثير التكييس بالورق الاسمر والبولي اثيلين الشفاف والاسود والورق الاسمر المغطى بالبولي اثيلين الشفاف والورق الاسمر المغطى بالبولي اثيلين الاسود على صفات الثمار البكرية ومقارنتها بالثمار البذرية لصنف الحلاوي ، وقد اظهرت النتائج تفوق الثمار البذرية على الثمار البكرية معنوياً في وزن الثمار وحجمها ، كما تفوقت الثمار البذرية معنوياً في كل من نسبة المواد الصلبة الذائبة الكلية والمادة الجافة والسكريات الكلية والمختزلة والسكروز فيما سجلت الثمار البكرية تفوقاً معنوياً في محتواها المائي مقارنة بالثمار البذرية وادى التكييس بالورق الاسمر المغطى بالبولي اثيلين الاسود إلى زيادة معنوية في المحتوى المائي للثمار مقارنة بالمعاملات الاخرى فيما تفوقت معاملة التكييس بالورق الاسمر المغطى بالبولي اثيلين الشفاف معنوياً في المادة الجافة للثمار، بينما تفوقت معاملة التكييس بالورق الاسمر معنوياً في محتوى الثمار من السكريات الكلية والمختزلة والنسبة المئوية للثمار البذرية الناضجة واطهرت النتائج فروق معنوية بين معاملة التكييس بالورق الاسمر ومعاملة المقارنة للثمار البكرية في نسبة النضج .