



Evaluation the awareness of the benefits and uses of date palm seeds (*Phoenix dactylifera*)

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ABSTRACT:

Date pits, known as seeds, kernels, stones, or pips, are by-products of date processing factories. Despite being considered a major source of waste during harvest and processing, date seed powder is used as a coffee substitute and has beneficial effects for enhancing nutrition. This study aimed to evaluate the awareness of the uses and benefits of date palm seeds among people in Makkah City, Saudi Arabia, to increase awareness of using these seeds and gain from their benefits. Our results indicated a direct correlation between the evaluation of the uses and benefits of date palm seeds and some of the study variables at the significance level of 0.01 and 0.05. This suggests that, with improved education, there will be increased awareness of the evaluation of the uses and benefits of date palm seeds (*Phoenix dactylifera*). The study also found no correlation between gender or marital status and individuals' awareness of the uses and benefits of date palm seeds. However, the results show that education was one of the most influential factors in the awareness of the uses and benefits of date palm seeds (*Phoenix dactylifera*) at 86.1%, followed by employment at 82.4%, followed by gender at 76.5%, and in last rank, age by 71.6%. It is recommended that more studies be conducted about the uses and benefits of date palm seeds for both humans and animals to improve awareness of their uses. This highlights the need for further research to uncover the full potential of date palm seeds.

Keywords: Nutrition, Foods, Date Palm, Seeds, Kernel

INTRODUCTION

The date palm tree (*Phoenix dactylifera* L.) is an important crop in most Middle Eastern countries. Date pits, also known as seeds, kernels, stones, or pips, are by-products of date processing factories. Also, It is considered to be one of the major sources of waste during harvest and processing. Date seed is an inedible part

of date fruit and, as the main waste in the date processing industry, has attracted the attention of many researchers [1]. Date seed is a waste product that is high in polyphenols (such as hesperidin, quercetin, and kaempferol), phenolic acid (allergic, epicatechin, catechol, and chlorogenic), carotenoids, total dietary fiber (such as pectin, β -glucan, and

arabinoxylan), fat, protein, minerals, and various other nutrients and functional elements [2,3]. Despite the valuable nutritional composition of date pits as a source of carbohydrates, dietary fiber, protein, oil, natural antioxidants, and bioactive polyphenols, they remain underutilized and are widely treated as a waste product. Many studies have hypothesized that consuming date seed powder can be beneficial for enhancing nutritional and oxidative stress, anti-inflammatory status, mental health, sports performance, and fatigue during a High-intensity interval training protocol in recreational runners [3]. Moreover, previous human and animal studies investigating the effects of date seeds have reported positive results on antioxidant defense systems and improvement in oxidative stress indices, inflammation, hyperglycemia, memory, and learning impairments, as a low-cost supplement [4-8].

Rahman et al. [9] reported that roasted and powdered date seeds are used by some rural communities as coffee substitutes and in coffee-like preparations in Arabian markets. Date seed oil is used in cosmetic formulations such as body creams, shaving soap, and shampoos, as well as in pharmaceutical products [10] and have also been used in traditional medicine to relieve toothaches. In addition, date seed oil contains all phytochemicals, which could be used for many applications, such as food product formulations, pharmaceuticals, hair

cosmetics, and beauty products.

It is also used as an ingredient in eye shadows in traditional cosmetics. Date seed oil has a high amino acid and riboflavin (vitamin B2) content that can effectively curb hair loss [11]. Moreover, date seed products (seed powder, bread, and extract paste) are known to be safe for human consumption [6]. The seed powder employed as a coffee substitute in coffee drinks may also contain various essential minerals and constituents at optimum levels.

Date seed can be an excellent slow-release energy feed for camels during long desert journeys. It can also be used in poultry feeds, provided that its low energy content is taken into account in feed formulation and compensated by the addition of fat. Ground date seed is a replacement for maize grain for rabbits. Date seeds could replace up to 75% of a wheat bran-barley mixture in diets for young carp [12]. Despite the valuable nutritional composition of date pits as a source of carbohydrates, dietary fiber, protein, oil, natural antioxidants, and bioactive polyphenols, they remain underutilized and are widely treated as a waste product.

METHODOLOGY

This study aimed to evaluate the awareness of the uses and benefits of date palm seeds in Makkah City, Saudi Arabia, among the population aged ≥ 18 years to raise the awareness of using date palm seeds to gain from its benefits. The

study comprised a structured questionnaire packet that inquired about demographic information (gender, marital status, education, age, employment, monthly income (Saudi riyals), and some questions to evaluate respondent's awareness of the uses and benefits of date palm seeds, including:

1- Are you aware that date seeds have benefits?

2- Are you aware that rural communities use roasted and powdered date seeds as coffee substitutes and in coffee-like preparations in Arabian markets?

3- Do you know date seed oil contains a significant phenolic compound with diverse pharmacological effects, such as anti-mutagenic, anti-carcinogenic, and anti-inflammatory activities?

4- Do you know date seed oil is used in cosmetic formulations such as body creams, shaving soap, shampoos, and pharmaceutical products?

5- Do you know date seeds have also been used in traditional medicine to relieve toothaches?

6- Do you know date seed products (seed powder, bread, and extract paste) are safe for human consumption?

7- Do you know date seeds are used as an ingredient of eye shadows in traditional cosmetics?

8- Do you know date seed can be an excellent feed for animals such as camels, poultry, young carp, and rabbits?

The survey was conducted from July 25 to August 25, 2023. All data were collected using an online self-reported questionnaire using Google Forms. Given the high internet usage among people in the KSA, the link of the online questionnaire was distributed to the population via various media platforms, including email, Google Drive and WhatsApp groups, and their responses were collected.

The collected data (n = 200) of the participants was analyzed using IBM SPSS Statistics 23 Version.

RESULTS AND DISCUSSION

The following is a comprehensive description of the study sample, shown in Tables 1 and 2 and Chart (1), in terms of: From Table (1) it is clear the numbers of male and female respondents were approximately equal. It is clear that the majority of the respondents were married and only a quarter of the respondents were single. It also shows that the majority of the respondents had bachelor degrees, while over a third had only high school level of education.

Table (1): Distribution of the demographic information for research sample individuals according to gender, marital status, and education.

Demographic information	Number	Percentage (%)
Gender		
Men	96	48
Women	104	52

Demographic information	Number	Percentage (%)
Total	200	100
Marital status		
Single	51	25.5
Married	89	44.5
Divorced	37	18.5
Widowed	23	11.5
Total	200	100
Education		
High School	79	39.5
Bachelor	108	54
Postgraduate	13	6.5
Total	200	100

Table (2): Distribution of the demographic information for research sample individuals according to age, employment, and monthly income.

Demographic information	Number	Percentage (%)
Age		
Below 30 years	59	29.5
From 30 to 40 years	78	39
41 years or more	63	31.5
Total	200	100
Employment		
Employed	134	67
Unemployed	66	33
Total	200	100
Monthly income (Saudi Riyal)		
Less than 5000	47	23.5
From 5000 to 10000	84	42
Over 10000	69	34.5
Total	200	100

Table (2) shows that the largest group of participants majority of participants, over 70% were over 30 years old, while less than 30% were below 30. It also shows the distribution of the research sample individuals according to their employment status, where a large majority. Nearly 70% were in work. The table shows the largest group in the study

their salary was between 5000 and 1000 Riyals, while only a small percentage their salary was less than that while over a third their salary was over 10000 Riyals per month.

Chart (1) shows that the response to the first question indicated that a considerable majority were aware of the benefits of date seeds, although over a

third of the participants were not aware, while the response to question (2) shows that only just over half of the respondents

by 46.5% were aware of this use of date seed, while almost half had not heard of it 53.5%.

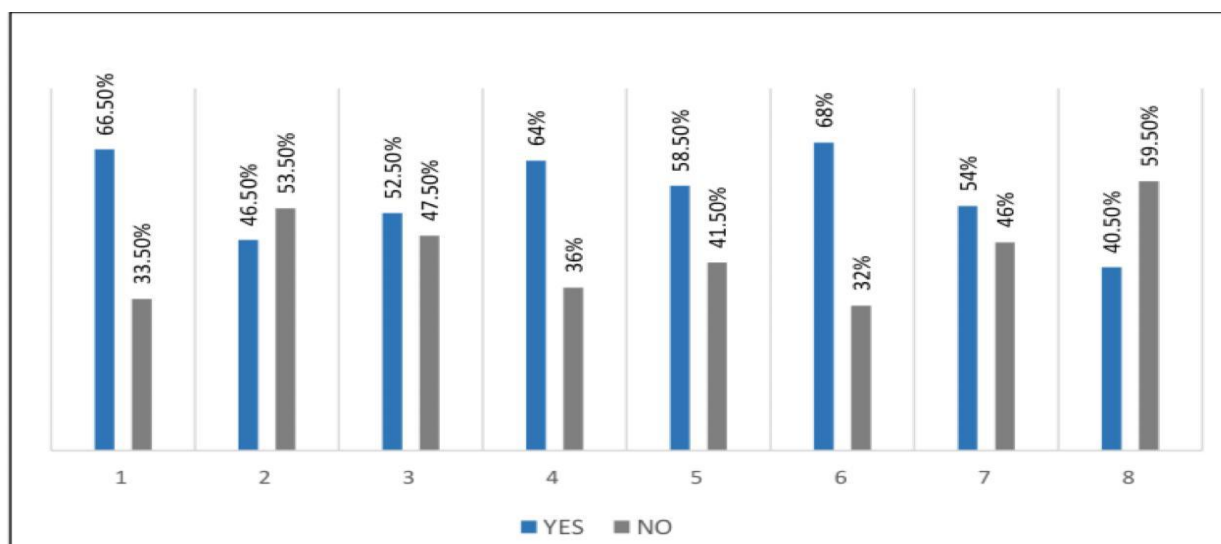


Chart (1): Distribution of the research sample individuals' responses to the questions as in methodology

Similarly, to the response to question (2), the response to question (3) shows that although a small majority of respondents were aware of these beneficial compounds on date seeds, a substantial minority were not aware of this fact. From the response to question (4), it is clear that a large majority of the participants were already aware that date seed oil is used in cosmetic formulations, although about a third of the participants said they were not aware of this use of date seed oil. From the response to question (5), it is clear that the majority of respondents were aware of this use of date seeds, although quite a large number, over 40% were unaware of this application.

The response to question (6) shows that a considerable majority of the respondents were aware that date seed

products (seed powder, bread, and extract paste) are safe for human consumption, and only just under a third were not aware of this fact. The response to question (7) shows the majority of the respondents were aware that date seeds are used as an ingredient of eye shadows in traditional cosmetics. However, a substantial majority, 46%, were not aware of this use of the product. From the response to question (8), it is clear most respondents were unaware is this potential use for date seeds. while only a minority of around 40% had heard of it.

The first hypothesis:

There is a correlation relation between awareness of the uses and benefits of Date Palm seeds (*Phoenix dactylifera*) and the variables of the study.

To verify the validity of this hypothesis, a correlation matrix was created between the evaluation of the uses and benefits of Date Palm seeds (*Phoenix dactylifera*)

and the variables of the study, and the following table shows the values of the correlation coefficients:

Table (3): the correlation matrix between the evaluation of the benefits and uses of date palm seeds and the variables of the study

Variables	Evaluation of the uses and benefits of date palm seeds
Gender	0.156
Marital status	0.124
Education	0.967**
Age	0.883**
Employment	0.639*
Monthly income	0.769**

** significant at 0.01 * significant at 0.05 without stars not significant

From Table (3), it is clear that there is a direct correlation relation between the respondents' awareness of the uses and benefits of date palm seeds (*Phoenix dactylifera*) and some of the study variables, at the significance levels of 0.01 and 0.05. From this result, it can be suggested that if the level of education is higher, the individual's awareness of the uses and benefits of Date Palm seeds (*Phoenix dactylifera*) is likely to increase. Similarly, awareness of these benefits is associated with increasing age and being in employment and is also associated with higher monthly incomes. However, this study found there is no correlation

between gender or marital status and the awareness of the uses and benefits of date palm seeds.

The second hypothesis:

The participation percentage of the factors affecting awareness of the uses and benefits of Date Palm seeds (*Phoenix dactylifera*) varies.

To verify this hypothesis, the relative importance was calculated using the regression coefficient (Regression Stepwise) for the factors affecting the evaluation of the uses and benefits of Date Palm seeds (*Phoenix dactylifera*), as shown in Table 3.

Table (4): The relative importance of variables using the regression coefficient of evaluation of the benefits and uses of date palm seeds

The evaluation of the uses and benefits of Date Palm seeds	Independent variable	R	R Square	F	Sig	Beta	t	Sig
	Education	0.928	0.861	172.960	0.01	0.725	13.151	0.01
Employment	0.908	0.824	131.073	0.01	0.674	11.449	0.01	
Gender	0.875	0.765	91.343	0.01	0.599	9.557	0.01	
Age	0.846	0.716	70.728	0.01	0.539	8.410	0.01	

From Table (4), it is clear that education was one of the most influential factors on the participants; awareness of the uses and benefits of date palm seeds (*Phoenix dactylifera*) by 0.861 R, followed by employment by 0.824 R, followed by gender by 0.765 R, and in the last rank the Age by 0.716 R.

CONCLUSION

Our results indicated that there is a direct correlation relation between the respondent's awareness of the uses and benefits of date palm seeds (*Phoenix dactylifera*) and some of the study variables at the significance level of 0.01, 0.05. This means, if the level of education is higher, the awareness of information about the uses and benefits of date palm seeds (*Phoenix dactylifera*), is greater while there is no correlation relation between gender or marital and the respondents; awareness of the evaluation of the uses and benefits of date palm seeds (*Phoenix dactylifera*).

The results show that education was one of the most influential factors in the subjects' awareness of information about the uses and benefits of these seeds.

There should be more studies about the uses and benefits of date palm seeds for humans and animals and how to improve awareness of using it to improve the health of the population economically and to encourage people and companies to use a waste product from one of the country's main agricultural products.

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التغذية وعلوم الأظعمة

تقييم مقدار الوعي بفوائد واستخدامات نوى التمر هدى محمد البرناوى

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<p>الملخص العربي: تعتبر شجرة نخيل التمر (<i>Phoenix dactylifera</i> L) من المحاصيل المهمة في معظم دول الشرق الأوسط. نواة التمر، والمعروفة أيضًا بالبذور، هي منتجات ثانوية لمصانع معالجة التمر. تعتبر نواة التمر من المصادر الرئيسية للنفايات أثناء الحصاد والتصنيع، على الرغم من استخدام مسحوقها كبديل للقهوة وتأثيراتها المفيدة في تعزيز التغذية، واستخدام زيت نوى التمر في مستحضرات التجميل. هدفت هذه الدراسة إلى تقييم مستوى الوعي باستخدامات وفوائد بذور نخيل التمر بين سكان مدينة مكة المكرمة بالمملكة العربية السعودية، وذلك لزيادة الوعي باستخدام هذه البذور والاستفادة من فوائدها. أشارت نتائجنا إلى وجود علاقة طردية بين تقييم استخدامات وفوائد بذور نخيل التمر وبعض متغيرات الدراسة عند مستوى دلالة 0.01، و0.05. يشير هذا إلى أنه مع زيادة المستوى التعليمي، سيكون هناك وعي متزايد بمعرفة استخدامات وفوائد بذور نخيل التمر (<i>Phoenix dactylifera</i>). كما لم تجد الدراسة أي علاقة بين الجنس أو الحالة الاجتماعية ووعي الأفراد باستخدامات وفوائد بذور النخيل. إلا أن النتائج أظهرت أن التعليم كان من أهم العوامل المؤثرة في التوعية بمعرفة استخدامات وفوائد بذور التمر (<i>Phoenix dactylifera</i>) بنسبة 86.1%، يليه التوظيف بنسبة 82.4%، يليه الجنس بنسبة 76.5%، وفي المركز الأخير العمر بنسبة 71.6%. نوصى بإجراء المزيد من الدراسات حول استخدامات وفوائد بذور التمر للإنسان والحيوان، لرفع مستوى الوعي باستخداماتها.</p>	<p>نوع المقالة بحوث أصلية</p>
<p>المؤلف المسئول هدى البرناوى hmbarnawi@uqu.edu.sa الجوال 966 56 302 9123 26</p>	<p>DOI:10.21608/mkas.2024.26 2148.1274</p>
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الكلمات الكاشفة: التغذية، الغذاء، اللب، النخيل، البذور