

PJN

ISSN 1680-5194

PAKISTAN JOURNAL OF
NUTRITION

ANSI*net*

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Proximate Composition and Fruit Weight of Fresh Date Fruits (*Phoenix dactylifera* L.) Varieties in Wet Season of Nigeria

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Abstract: The aim of this experiment was to examine the proximate composition and fruit weight of some selected fresh date fruits in wet season of Nigeria in June 2014 during the harvest period. The fresh date fruits varieties were selected from gene pool 4 in the experimental field of Nigerian Institute for Oil palm Research (NIFOR) date palm substation, Dutse, Jigawa State. Results showed that variety-01 had the highest moisture content of (73.60±0.20), while Fat content were recorded highest for Variety-05 (2.96±0.03). However the Ash content was observed in Variety-01 (0.95±0.03), Variety-04 (1.22±0.02) and Variety-05 (0.78±0.01), respectively. A high amount of crude Fibre was recorded in variety-05 with (0.64±0.01) while protein content was least in variety-02 and variety-03 with the means (2.73±0.02) and (2.56±0.01). Carbohydrate content was highest in variety-01 (54.15±0.99) and variety-03 (32.65±0.05), respectively. The results generally indicated that date (*Phoenix dactylifera*) fruit were good sources of nutrition and can be used in food formulation and future date palm breeding programmes.

Key words: Date fruits, alternative source of food, palm oil

INTRODUCTION

The Date palm (*Phoenix dactylifera*), commonly known as Dabino by the Hausa tribe, belongs to tree palm family Arecaceae. It is found mostly in canary islands, Northern Africa and West-Africa especially in Nigeria (Al-Shahib and Marshall, 2003). Date palm (*Phoenix dactylifera* L.) is one of the earliest cultivated tree crop (Wrigley, 1995). It is a palm extensively cultivated for its edible fruit (Rani *et al.*, 2007). Because of its high nutritional value, great yields and its long life the date palm has been mentioned as the "tree of life" (Augstburger *et al.*, 2002). Date pulps hold easily digestible sugars (70%), mostly glucose, sucrose and fructose; dietary fibers and enclose less proteins and fats (Al-Farsi and Lee, 2008). Currently, several human health problems are related to diets. Micronutrients are involved in numerous biochemical processes and an adequate intake of certain micronutrients necessary for the prevention of deficiency diseases. Malnutrition is of major concern for many developing countries of world (Ozcan, 2004; Leterme *et al.*, 2006; Kumari *et al.*, 2004). Fruit constitutes an important part of a balanced diet as they are natural sources of food nutrient needed by human and animals. Such food nutrient includes protein, carbohydrate, minerals and dietary fiber. With the global focus on increased food production and emphasis on provision of nutritive food for the world population (Ossi and Ndukwe, 2008). The fruit of the date palms are consumed throughout the world and are

an important part of the diet in the Middle East, (Mohammed, 2009). Date fruits are highly nutritious, being high in carbohydrates, fibre and potassium, certain vitamins and minerals, but are low in fat and virtually free from cholesterol and sodium (Mortazavi *et al.*, 2007).

It is the intention of this research to investigate some selected fresh date fruit of *Phoenix dactylifera* (Dabino) during the wet season commonly found in the experimental field of Nigerian institute for oil palm Research (NIFOR) dutse, Jigawa state, Nigeria. In this study, the proximate composition and weight of fruits were investigated in order to authenticate the level of nutritional composition in the fruit.

MATERIALS AND METHODS

Date fruits were obtained in the Experimental field of the Nigerian Institute for Oil palm Research (NIFOR), Dutse sub-station, Jigawa State. The date fruit samples were packed in opaque plastic bags. The collected date fruits were air dried and stored in airtight jars for further studies.

All chemicals used during the present study were of the analytical reagent grade. The moisture content, ash content, crude protein, crude fiber, crude fat and total carbohydrates of dates were determined using standard methods described by Association of Official Analytical Chemists (AOAC, 2000).

The ash content, crude lipid, crude fiber, nitrogen content, crude protein were also estimated by

multiplying the value obtained for percentage nitrogen content by a factor of 6.35 to determine moisture content, 2 g of fresh fruits were weighed in Petri dishes and dried in an oven at 105°C for 24 h, cooled in a desiccators and then weighed. The percentage loss in weight was expressed as percentage moisture content (AOAC, 2000; Ademoroti, 1996). Residual moisture contents were determined on 2 g of the fresh fruit. Ash content was determined by the incineration of two grams of each powder sample in a muffle furnace (Lenton furnaces, England) at 600°C for 2 h, the residue weight was expressed as percentage ash content (Harbone, 1973). For the weight of fruit, the fresh date fruits were weighed using electronic weighing balance in (grams).

Statistical analysis: All experiments were conducted in triplicate and statistical analysis were subjected to Analysis of Variance (ANOVA) and Duncan multiple Range Test (DMRT) was used to separate the means. Results were expressed as Mean±SD. A value of $p < 0.05$ or 95% confidence interval was used to denote statistical significance using the statistical package for social sciences (SPSS) version 16.0 Programme.

RESULTS AND DISCUSSION

Moisture contents were generally high and varied between 73.60 ± 0.20 in variety-01 to 58.25 ± 0.25 in variety-05. The determination of moisture content in plants is important because many of the physical properties of foods are known to vary with moisture content. Low value of moisture contents showed that these dates can be stored for a long period of time without spoilage and it will not be susceptible to microbial growth (Oloyede, 2005). From the research obtained in this study, it can be concluded that unlike the dry season fruits, the wet season fruit cannot be stored for a very long time because of the high amount of moisture contained in it. With respect to fat contents, no statistical differences were observed among variety-02, variety-03 and variety-05 respectively (Table 1), while variety-01 and variety-04 had the least (1.65 ± 0.13 and 1.55 ± 0.00), respectively. Fat is very essential for normal growth and development, maintaining of cell membranes, providing taste, consistency and stability of foods and absorption of some vitamins and carotenoids (USDA, 2014).

A very low amount of ash was observed in this study, with Variety-02 and Variety-03 having the highest amount (1.70 ± 0.10 and 1.80 ± 0.10) statistically, as no significant differences were observed in the varieties at $p > 0.05$. it was indicated that the total inorganic mineral in date is low because of the low ash contents present (Oloyede, 2005).

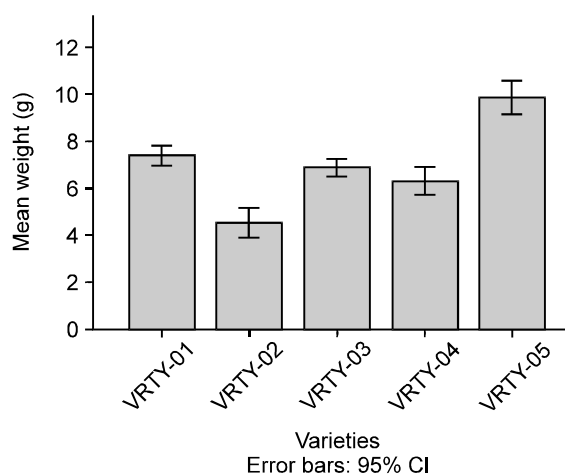


Fig. 1: Fruit weight of the Fresh date varieties Studied

The lowest crude fiber content was in variety-03 (0.21 ± 0.01) and variety-05 (0.29 ± 0.01) and the highest was in variety 02 (0.64 ± 0.01). The importance of fibre to the body cannot be over emphasized, because it helps in blood sugar control, low risk of heart diseases, hypertension, diabetes, colon and breast cancer (Ishida *et al.*, 2000).

Protein contents of the date fruits ranged from (3.16 ± 0.0) in variety-05 which is d the highest to (1.95 ± 0.16) in variety-01 which is lowest. Protein in the body are of major concerns, as it helps in growth, tissue repair, immune function, making essential hormones and preserving lean muscle mass. WHO/FAO suggests a daily intake of 0.88 g of protein per kg body weight for children in the age range of 1-10 years. The amount of protein observed in the fresh dates satisfies recommended daily allowance of protein for children's as well as adults.

There were significant differences observed in Total carbohydrate, variety-01 and Variety -03 was highest with the means (54.15 ± 0.99) and (32.65 ± 0.05) while it was lowest in the variety-02 (29.99 ± 0.00).

The highest weight of fruit was observed in Variety-05, followed by variety-01, while variety-02 had the least weight of fruit among the varieties studied. Carbohydrates are most important source of energy for human body which the human digestive system changes into glucose (blood sugar) that are then used for energy for the cells, tissues and organs. The carbohydrate values obtained for different date varieties are in conformity with the values given by Mohammed (2009) on date fruits.

The weight of fruit was found to be highest in variety-05 followed by variety-01 and the lowest fruit weight was found to be variety-02, the differences in weight could be

Table 1: Proximate composition of the date fruits studied

Constituents	Variety-01	Variety-02	Variety-03	Variety-04	Variety-05
Moisture	73.60±0.20 ^d	70.14±0.01 ^c	62.76±0.10 ^b	62.30±0.00 ^b	58.25±0.25 ^a
Fat	1.65±0.13 ^a	2.62±0.02 ^b	2.44±0.01 ^b	1.55±0.00 ^a	2.96±0.03 ^b
Ash	0.95±0.03 ^a	1.70±0.10 ^b	1.80±0.10 ^b	1.22±0.02 ^a	0.78±0.01 ^a
Crude-fibre	0.34±0.01 ^b	0.64±0.01 ^c	0.21±0.01 ^a	0.47±0.01 ^b	0.29±0.01 ^a
Protein	1.95±0.16 ^a	2.73±0.02 ^b	2.56±0.01 ^b	2.25±0.00 ^a	3.16±0.00 ^b
Carbohydrate	54.15±0.99 ^c	29.99±0.00 ^b	32.65±0.05 ^c	14.31±0.09 ^a	14.66±0.01 ^a

as a result to which the date fruit of the varieties are being productive, fertile or efficient, which is also supported by the findings of (Mohammed *et al.*, 2009).

Conclusion: The study analyzed the proximate composition and fruit weight of fresh date fruit. It can be deduced that fresh date fruits can be used as an alternative source of food and should be included into our diet.

ACKNOWLEDGEMENTS

The authors wish to thank the Executive Director of NIFOR and the Officer in Charge of NIFOR date-palm substation, for support and permission to publish this paper.

REFERENCES

- Ademoroti, C.A.M., 1996. Environmental Chemistry and Toxicology. Foludex press Ltd., Ibadan, p111-117.
- Al-Farsi, M.A. and C.Y. Lee, 2008. Nutritional and functional properties of dates: a review. Crit. Rev. in Food Sci. and Nutr., 48: 877-887.
- Al-Shahib W. and R.J. Marshall, 2003. The fruit of the date palm; its possible use as the best food for the future. Int. J. Food Sci. Nutr., 54: 247-259.
- AOAC, 2000. Official methods of Analysis, (17th ed.). AOAC International, Gaithersburg, MD: Association of Official Analytica Chemist.
- Augstburger, F., J. Berger, U. Censkowsky, P. Heid, J. Milz and C. Streit, 2002. Date Palm. Naturland. Germany.
- Harbone, J.B., 1973. Phytochemical Methods; A guide to modern Technique of plant Analysis, Chapman and Hall. London, p33-185.
- Ishida, H., H. Suzano, N. Sugiyama, S. Innami, T. Todokoro and A. Maekawa, 2000. Nutritional evaluation of chemical component of leaves stalks and stems of sweet potatoes (*ipomoea batatas* pair). Food Chem., 68: 359-367.
- Kumari, M., S. Gupta, A. Lakshami and J. Prakash, 2004. Iron availability in green leafy vegetables cooked in different utensils. Food Chem., 86: 217-222.
- Leterme, P., A. Buldgen, F. Estrada and A.M. Londono 2006. Mineral contents of tropical fruits and unconventional foods of the Andes and the rain forest of Colombia. Food Chem., 95: 644-652.
- Mohammed, S.A., 2009. Physiochemical composition of date fruit (*Phoenix dactylifera* L.) from offshoots and cultured cells at different stages. J. Food Technol., 7: 102-105.
- Mortazavi, S.M.H., K. Arzami and M. Barzegar, 2007. Effect of vacuum and modified atmosphere packaging on the post-harvest quality and shelf life of Date fruits in Khalal stage. Proceedings of 3rd International Conference on Date Palm. Acta. Hort. 736. pp: 471-477.
- Oloyede, O.I., 2005. Chemical profile of Unripe Pulp of *Carica papaya*. Pak. J. Nutr., 4: 379-381.
- Ossi, C.D. and C.M. Ndukwe, 2008. The nutritional evaluation of cola lepidota, Book of proceeding International Conference, Chemical Society of Nigeria, 52: 150-154.
- Ozcan, M., 2004. Mineral contents of some plants used as condiments in Turkey. Food Chem., 84: 437-440.
- Rani, C.I., T. Kalaiselvi and V. Jegadeeswari, 2007. The date palm. Accessed at www.technopreneur.net/information-desk/.../2007/.../Date_palm.pdf.
- United States Department of Agriculture (USDA), 2014. Classification for kingdom plantae down to family solanaceae, Natural Resources Conservation Service. Available at: <https://plants.usda.gov/java/classificationServer?Source=profile&Symbol=solanaceae&display=63>.
- Wrigley, G., 1995. Date palm. In: Smartt J and Simonds NW (Eds), Longman, London, 2nd ed. Evol. Crop Plants, pp: 399-403.