

COMPARATIVE STUDIES ON COMPOSITION OF COMMERCIAL INDIGENOUS AND IMPORTED DATE VARIETIES

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Some varieties of dates produced in different parts of Pakistan and the imported popular varieties were assessed for nutrients and minerals. Comparison of the values showed that as far as the common fruit quality characteristics such as proteins, fats and carbohydrates are concerned, there were only slight differences among the indigenous and imported varieties. In some respects, some of the indigenous grown varieties were superior to imported ones while the imported varieties had a slight edge over the locally produced fruit as far as minerals (Na & K) were concerned.

Key words: Dates, Minerals, Nutritional value.

Introduction

Dates (*Phoenix dactylifera* L.) require a hot, dry climate and abundance of water for cultivation. Some parts of Pakistan have these necessary conditions and suitable soil for the date cultivation. It is estimated that the total production of Pakistani dates is 234, 200 tonnes per year (Anon 1985). Dates are considered a major source of readily available energy and other nutrients. In spite of considerable production level of dates, it appears that adequate attention has not been given to evaluate the nutritive value of the dates grown in various parts of the world. However, few reports appear in the literature regarding the chemical composition of different varieties of the dates (Salem and Hegazi 1971; Hussain 1976; Sawaya *et al* 1982; Fayadh and Showiman 1990). The aim of the present work was to compare the nutritive value of indigenous and imported varieties of the dates available in Pakistan.

Materials and Methods

Four indigenous date varieties i.e. Asseel, Begum Jangi, Faslee, Rabai and three imported date varieties i.e. Ajwa (Saudi Arabia), Basra (Iraq) and Omsila (Oman) were analysed to evaluate their nutritional value. The dates were de-pitted manually to collect the flesh which was analysed for moisture, crude protein, crude fat, ash (total minerals), vitamin C and tannins according to the standard methods (AOAC 1984). Neutral detergent fibre (NDF), acid detergent fibre (ADF), hemicellulose and lignin contents were

determined according to the method as described by Van Soest and Wine (1967) while cellulose was estimated by Kurschner and Hanak method (1930). For the determination of mineral elements (Na, K, Ca, Mg, P, Fe, Zn, Cu and Mn), the ash was dissolved in 5 ml of 20% HCl and the volume was made up to 50 ml. All minerals except Na, K and P were determined with the atomic absorption spectrophotometer (Model Hitachi 170-10). Na and K were determined with a flame photometer (Beckman Aline Flame). Phosphorus was determined spectrophotometrically using the procedure of Watanabe and Olsen (1965). Total available carbohydrates were calculated according to the following difference formula: Total available carbohydrates = 100 - (Protein % + Fat % + Fibre % + Moisture % + Ash %).

Results and Discussion

Table 1 shows the chemical composition of dates belonging to different indigenous and imported varieties. It can be seen that, in general, the range of the crude protein contents (N x 6.25) in the indigenous and imported date varieties is 3.2-5.2 %. The crude protein content is higher in the imported Basra dates, closely followed by Omsilla variety. However, minimum amount of protein i.e. 3.2 % is present in case of Ajwa which is also another imported variety of dates. The protein content is found to be more or less similar (3.9 - 4.1 %) in case of indigenous varieties and fall within the range reported by other workers (Huda *et al* 1976; Kamal and Kramer 1978; Fayadh and Showiman 1990). In case of fat and ash content, the local Asseel dates are closer to the imported Ajwa counterparts while the minimum amount of fats is present in

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Table 1
Chemical composition of indigenous and imported date varieties

| % Age* | Indigenous varieties | | | | Imported varieties | | |
|-------------------------------|----------------------|-------------|--------|-------|--------------------|-------|---------|
| | Asseel | Begum Jangi | Faslee | Rabai | Ajwa | Basra | Omsilla |
| Moisture | 9.5 | 12.7 | 15.0 | 11.6 | 9.2 | 10.0 | 13.7 |
| Ash (total minerals) | 2.0 | 1.6 | 1.7 | 1.6 | 1.8 | 2.1 | 1.7 |
| Crude Protein | 4.0 | 4.1 | 3.9 | 3.9 | 3.2 | 5.2 | 4.6 |
| Crude Fat | 2.0 | 3.0 | 1.8 | 2.2 | 2.2 | 0.7 | 3.1 |
| Total available Carbohydrates | 73.7 | 68.9 | 68.9 | 71.4 | 75.1 | 66.6 | 67.6 |
| Vitamin C | 1.3 | 1.2 | 1.4 | 1.2 | 0.9 | 0.8 | 0.6 |
| Tannin | 1.8 | 1.7 | 1.8 | 1.6 | 1.0 | 1.2 | 0.9 |

* Average of three replicates on dry matter basis.

Table 2
Insoluble polysaccharides in indigenous and imported date varieties

| % Age * | Indigenous varieties | | | | Imported varieties | | |
|-------------------------------|----------------------|-------------|--------|-------|--------------------|-------|---------|
| | Asseel | Begum Jangi | Faslee | Rabai | Ajwa | Basra | Omsilla |
| Neutral detergent fibre (NDF) | 8.8 | 9.7 | 8.7 | 9.3 | 8.5 | 15.4 | 9.3 |
| Acid detergent fibre (ADF) | 3.3 | 3.7 | 3.4 | 4.3 | 4.7 | 4.9 | 3.8 |
| Cellulose | 2.5 | 2.8 | 2.5 | 2.7 | 2.7 | 2.8 | 2.4 |
| Hemicellulose | 5.6 | 6.0 | 6.3 | 4.9 | 3.8 | 10.5 | 5.6 |
| Lignin | 0.8 | 0.8 | 0.8 | 0.9 | 0.9 | 1.0 | 0.9 |

* Average of three replicates on dry matter basis.

the imported Basra variety. These results also reveal that the total available carbohydrate content of Ajwa variety is comparatively higher than the locally produced varieties. Vitamin C and tannin contents are found to be lowest in case of imported Ajwa variety closely followed by Basra and Omsilla. However, there is not much difference in vitamin C and tannin content of the local varieties.

The results of the analysis of insoluble polysaccharides of the indigenous and imported dates varieties are shown in Table-2. It is apparent from these results that the highest amount of neutral detergent fibre (NDF) especially the hemicellulose (10.5%) is present in Basra variety while the amount of hemicellulose is minimum (3.8%) in Ajwa variety. Acid detergent fibre is found to be comparatively higher in imported varieties than the local varieties. There is no significant variation as far as cellulose and lignin are concerned. Results of macro-mineral analysis show that K is the most abundant mineral element present in the indigenous and imported varieties (Table 3). Magnesium, followed by calcium and phosphorus is the next

highest in concentration in decreasing order. Sodium is the lowest concentration in all the varieties. In comparison to imported varieties, the local varieties other than Faslee date variety, are clearly deficient in K content and accordingly inferior in this regard. Because of the detrimental effect of some of the mineral constituents in cardiovascular diseases, the low content of Na is a desirable attribute (Bhutani *et al* 1989). The lowest concentration of Na (10 mg 100g⁻¹) is recorded in case of imported Basra variety while it is highest (20 mg 100g⁻¹) in the local variety i.e. "Faslee". The concentration of Mg and P is found to be the highest in imported variety (Ajwa) while the Basra variety is next to it. Among the micro elements, Fe is present in higher concentration in all the date varieties followed by Zn, Mn and Cu (Table 3). In comparison to local varieties, the imported varieties contain significantly high amount of Fe, Zn, Cu and Mn and are superior in this respect. The local variety "Faslee" contains the least amount of all these micro elements.

Table 3
Macro and micro minerals in indigenous and imported date varieties

| Concentration mg 100 g ⁻¹ * | Indigenous varieties | | | | Imported varieties | | |
|---|----------------------|----------------|--------|-------|--------------------|--------|---------|
| | Asseel | Begum Jangi | Faslee | Rabai | Ajwa | Basra | Omsilla |
| Macro elements | | | | | | | |
| Na | 12.5 | 13 | 20.1 | 8.9 | 10.4 | 10.0 | 17.2 |
| K | 986.0 | 907.0 | 1024.0 | 784.0 | 1359.0 | 1060.0 | 1176.0 |
| Mg | 133.3 | 134.8 | 155.6 | 118.0 | 204.4 | 188.5 | 134.0 |
| Ca | 105.1 | 71.9 | 127.2 | 88.5 | 56.1 | 75.4 | 51.1 |
| P | 66.1 | 54.7 | 72.0 | 65.3 | 88.2 | 82.4 | 58.9 |
| Micro elements | | | | | | | |
| Fe | 4.5 | 6.8 | 1.1 | 2.3 | 6.2 | 6.5 | 4.1 |
| Zn | 2.2 | 0.4 | 0.3 | 1.3 | 2.4 | 1.5 | 2.1 |
| Cu | 0.5 | 0.5 | 0.1 | 0.6 | 0.6 | 0.5 | 0.5 |
| Mn | 0.5 | 0.5 | 0.8 | 0.6 | 0.7 | 0.7 | 0.6 |

*Average of three replicates on dry matter basis.

It can be concluded from this study that only minor differences have been encountered in the composition and nutritional constituents of the indigenously grown varieties and the imported varieties. Imported varieties invariably have an edge of superiority over the local varieties particularly in respect of sodium, potassium, phosphorus and magnesium content which, in general, are the minerals of vital importance for the maintenance of health. Based on these data, it can be said that the imported varieties of dates do not show any great precedence in their overall nutritional constituents that have been investigated, over their indigenously grown counterparts.

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