Seed’s Viability of Two Types of Dates
(*Phoenix dactilyfera* L.) from Fruit in Indonesian Market

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Abstract—This research aims to know the seed viability of the two types of Dates on the Indonesian market. This study was conducted in 2014 and 2015, in the laboratory of Mathematics and Natural Science Faculty, Yogyakarta State University. Two types of seeds are selected is derived from Dates fruit, which are large with a lighter color, and the small size with a darker color. Represented by varieties of dates: Sayer (oval-cilindrical, ±3cm, dark orange brown/more light than another) and Lulu (round, ±2cm, dark maroon reddish/more dark than Sayer’s). The parameters measured were seed fresh weight, seed dry weight, and seed moisture. Viability test using germination testing (by germination percentage and germination rate); conducted on plastic tray with cotton sheet and fabric covered; fill with 100 grains of seeds. Repeated 4 times. Incubation at room temperature (±30°C). The results were analyzed by compare mean - independent samples t test of SPSS 18th. The results showed that the viability of both of Date’s seeds is high. Sayer’s have better viability than Lulu’s. This fact indicates that the date palm seed that comes from the fruit market in Indonesia, can be used as seeds material or seedlings.

Keywords: Dates fruits, Indonesian market, seedling, seed’s viability.

I. INTRODUCTION

Dates are the fruit of which is identical to the month of fasting; as suggested (‘sunnah’) eaten to break the fast. Therefore, many available in the market at the time leading up to and during the month of fasting, and at the time of the return of the haji- as souvenirs. Fruit or plants Palm Dates appears about 21 times in the Holy Koran, and about 300 times in the Hadiths [1]. For Christians there is a ritual ‘Palm Sunday’[2].

In the market there are several types of dates are offered; with a variety of shapes, sizes and color of the fruit. Slightly rounded to elongated oval; lengths 3 - 7 cm; with a golden yellow to dark brown - black skin [3].

During this time, the procurement of fruit Dates by imports from countries of the Middle East region; have not heard of the domestic production. Based on the origin of fruit - Middle East, habitat is the semi-arid region and indicate that the plant palm Dates are adaptive to the type of plants that dry soil conditions and high ambient temperature / extreme.

Our country is a country that allows a wide variety of plants can grow and develop properly. If we can produce date palm, certainly a lot of advantages and benefits that can be obtained. Date palm plant is difficult to grow in Indonesia [4]; but there are people who reported the emergence of seedlings after a month of seeds thrown to the corner of the yard; even in another report says that a palm plant tree can produce fruit.

Generally, after eating palm seeds directly thrown away, or has not been utilized; for example as planting material or seed.

Therefore, it is important to determine the feasibility of a date palm seeds from the fruit obtained from the local market.
II. LITERATURE VIEW

A. Dates Palm

Dates palm (*Phoenix dactylifera* L.) also known ‘Kurma’ (Indonesian) is a perennial plant within the family of Palm, which has been cultivated since 2400 BC [1], as a major food crops, and has a high economic value [5]. Date palms are medium-sized, growing singly or forming a clump with several stems from a single root system. Although treelike in form, they do not grow woody tissue, but are able to support themselves with fibrous, stout, overlapping stems, and may grow to 15–25 m tall (50–80 feet). Leaves are 3–5 m long, with spines on the petiole, and pinnately compound, with about 150 leaflets; leaflets are 30 cm (~12 inches) long and 2 cm wide. They are wind-pollinated and dioecious (male and female flowers on separate plants), but in commercial production, they are often hand-pollinated for better fruit production, and propagated by cuttings, to minimize the number of male (non-fruiting) trees [3].

B. Dates Palm Variety

There are thousands of types of dates [3] there were around 2000s varieties [6]. Various types of fruit dates are popular in the Indonesian market, among others: Ajwa dates (‘kurma Nabi’), Date crown Dabbas, Date crown Khalas, Date crown Khenaizi, Lulu (Date Crown Lulu), Medjool California, Egypt (Golden Valley), Nagel, Safavid, Sayer (Emirates gold), and Tunisia (Tunisia Date Sunfruit).

Lulu (Date Crown Lulu) from Dubai; looks like Ajwa dates, round, small size and dark color (dark maroon), the texture of soft fruit - not fibrous, sweet. Dates Sayer (Emirates gold) is derived from the Emirates; oval-oblong, medium size, brown-orange older [3], the texture of the fruit a bit soft - fibrous soft, sweet taste (often for material palm juice). There are about 23% of production dates are of this type; and have high value [3].

C. Dates Palm Germination

Seed germination of dates is ‘remote germination’, where the seedling axis develops at some distance from the actual seed. The first structure to emerge from the seed is called the cotyledonary petiole. It resembles, and many people mistake it for, the first seedling root. The cotyledonary petiole grows downward into the soil (sometimes very deeply) and swells at its base. From this swelling emerges the first seedling root (radicle) and seedling shoot (plumule). The actual cotyledon or seed leaf remains inside the seed, functioning as an absorptive organ called the haustorium. The haustorium transfers nutrients from the endosperm to the young seedling. In palm seeds with remote germination, the radicle persists for some time and produces lateral roots [7].

![FIGURE 1. CROSS SECTION OF DATES SEED](SOURCE: S.S. GHOSH, ET AL. 1987: 330)
III. METHOD

A. Tools and Materials

Tools used include: an analytical balance, oven, desiccator, thermometer room, beaker / baker glass 1000ml, measuring cup 50ml and 250ml, funnel glass, tea strainer, glass stirrer, pHmeter, petridish, spray bottles, scissors, length measuring tools, stationery, and image recording devices.

Materials used include: Sayer and Lulu palm fruit, distilled water, labels, filter paper, tissue paper, plastic trays, aluminum foil, plastic wrap, cotton sheets, and cloth napkins.

B. Method

Viability test carried out using test methods germination. Seed samples tested were from fruit types Sayer & Lulu, which has the physical characteristics (shape, size and color) are different. Germination test using a plastic tray with a media sheet coated cotton cloth (napkin), so it is not easily damaged when penetrated sprouts; filled 100 grain seeds and each repeated four times (according to ISTA & BPSP).

Parameters measured were fresh weight (g), dry weight (g) and grain moisture content (%) at the beginning (new peel from the fruit, and after washing) and at the time after immersion (I and II), and the percentage of germination and speed germination (on the 7th day, 14, 21, and 28). Measurement of dry weight and moisture content of the seeds with the oven method (60 °C; 3hr). Water content is obtained by the formula 'dry weight basis'.

C. Procedures

The procedure consists of the implementation of the preparation phase (separation and washing seeds), soaking phase (first and second), and a germination test phase.

The preparation phase: separated the seeds from the fruit, washed, then filtered and drained. The first soaking stage: the seeds soaked in bakerglass containing distilled water for a day at room temperature (30-32°C); then washed, and filtered. The second soaking stage: the seeds soaked in bakerglass containing distilled water (4 days; at room temperature); then washed, filtered and drained. Seeds ready to germinate. Phase germination: seeds placed neatly in a plastic tray which was covered with a cotton sheet coated cloth napkins, then shut 'plastic wrap'; incubated at room temperature and kept moist by adding 50 ml of distilled water every day.

The technique of collecting data through observation and measurement of the seeds, and the seeds are germinated (already appeared apocole / cotyledonary). The data collected was processed and statistically analyzed by t test, using the compare mean - independent sample T-test of SPSS 18.
IV. RESULTS AND DISCUSSION

The average value of Fresh Weight, Weight and Moisture Content Dry Beans Sayer at the beginning before immersion is higher. These data indicate that the size of Sayer seed heavier than Lulu.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Dates type</th>
<th>Fresh weight (g)</th>
<th>Dry weight (g)</th>
<th>Water content (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before washing</td>
<td>Sayer</td>
<td>0.83 *</td>
<td>0.77 *</td>
<td>6.5085 *</td>
</tr>
<tr>
<td></td>
<td>Lulu</td>
<td>0.61</td>
<td>0.58</td>
<td>4.8235</td>
</tr>
<tr>
<td>After washing</td>
<td>Sayer</td>
<td>0.76 *</td>
<td>0.67 *</td>
<td>11.4135 *</td>
</tr>
<tr>
<td></td>
<td>Lulu</td>
<td>0.62</td>
<td>0.56</td>
<td>8.3195</td>
</tr>
<tr>
<td>After soaking I</td>
<td>Sayer</td>
<td>0.77</td>
<td>0.62</td>
<td>20.2615 *</td>
</tr>
<tr>
<td></td>
<td>Lulu</td>
<td>0.76</td>
<td>0.63</td>
<td>17.8530</td>
</tr>
<tr>
<td>After soaking II</td>
<td>Sayer</td>
<td>0.97</td>
<td>0.66</td>
<td>31.3705</td>
</tr>
<tr>
<td></td>
<td>Lulu</td>
<td>0.93</td>
<td>0.63</td>
<td>32.4955</td>
</tr>
</tbody>
</table>

NOTE: SIGNIFICANTLY DIFFERENCE AT 95%

The average value of Fresh Weight and Dry Weight of Seed Sayer and Lulu after soaking, both the 1st and 2nd (the last before dikecambahkan) there is no difference. This shows that seed weight at the same time will be tested germination (homogeneous weight).
In both types of beans Dates, although the value of Weights Fresh, Weights Dry and Moisture Content at the beginning of the test germination (after soaking second) is the same (at level of 95%), but the value of the percentage of germination seeds Dates Sayer has a value higher than Lulu (see Figure 4).

This is presumably because seeds Sayer Dates have a larger size so as to have components that are needed to grow a larger [5].

The average value of Water content after soaking the 2nd (the last before germination) no difference; although previous direction (Figure 5); it appears that Seed Water Content of Sayer Dates (blue) from the beginning has also been more than Lulu. In fact, then at the end of the second immersion levels are the same, there is a high rate of imbibition at times last.

Water absorption quickly, before the membrane had a reorganization could lead to a 'displacement' component of the membrane [7]. Water absorption occurs slowly can restore normal membrane to form [9].

The high rate of imbibition may adversely affect, among other things because it causes the seeds do not have time to 'get ready', and can cause damage due imbibisi to the cell membrane; it is mainly on long beans / aging (though the reason for the latter is not appropriate for Lulu; as well Sayer and Lulu is a seed 'new').

Imbibisi make hydration to the previous seed membrane disorganization in the dry state into a reorganization.
The magnitude of the rate of imbibition in the last few days before the germination test, this, allegedly also led Lulu beans take longer to begin to germinate than Sayer (see Figure 5).

**TABLE 1. AVERAGE OF GERMINATION OF DATES SEEDS**

<table>
<thead>
<tr>
<th>Time (days)</th>
<th>Dates type</th>
<th>Germination (%)</th>
<th>Germination rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>7hr</td>
<td>Sayer</td>
<td>20.7500</td>
<td>5.0208</td>
</tr>
<tr>
<td></td>
<td>Lulu</td>
<td>8.5000</td>
<td>2.3086</td>
</tr>
<tr>
<td>14hr</td>
<td>Sayer</td>
<td>34.2500</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>Lulu</td>
<td>13.0000</td>
<td>2.6823</td>
</tr>
<tr>
<td>21hr</td>
<td>Sayer</td>
<td>37.2500</td>
<td>6.5547</td>
</tr>
<tr>
<td></td>
<td>Lulu</td>
<td>14.7500</td>
<td>2.7780</td>
</tr>
<tr>
<td>28hr</td>
<td>Sayer</td>
<td>66.0000</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>Lulu</td>
<td>36.5000</td>
<td>3.5621</td>
</tr>
<tr>
<td>50hr</td>
<td>Sayer</td>
<td>77.5000</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>Lulu</td>
<td>55.7500</td>
<td></td>
</tr>
</tbody>
</table>

*NOTE: SIGNIFICANTLY DIFFERENCE AT 95%*

Dates seed viability test results in this study can be categorized as high, because it germinated in early germination. In fact, according to some research reports, dates started to germinate between days 26-28 (in Bangladesh) or between 14-21 (in Florida) under ideal conditions [10]. In addition, the date stones Sayer and Lulu has a germination percentage above 50% within 50 days (see Figure 4); given the naturally most families viability palm has a low (less than 20%) and requires a period of 100 days to germinate [11].
V. CONCLUSIONS & SUGGESTIONS

From these results it can be concluded that:
1. Viability of palm seeds derived from two types of fruit on the market; Sayer and Lulu, were high.
2. Viability of palm seeds types Sayer higher than Lulu types based on the percentage germination and speed germination.

Suggestions based on the conclusion, Sayer date stones from the fruit can be used as planting material. In addition, the results of this research has the potential to be developed into some further research. Development could add a few things, among others:
1. germination period is extended to 100 days.
2. The parameters of moisture content during the second immersion was measured daily.
3. parameter biomass or seed germination.
4. biochonic aspects, and
5. increase the types of dates, so they can represent 25% in local market

REFERENCES
