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Abstract : Background: Cake is one of the most common bakery products consumed by people in the world. It is high in lipid content and caloric value and over consumption amount of it leads to obesity. Jackfruits seed flour (JSF) has high levels in protein and fiber, while low in fat and caloric value. Objective: The current study aimed to evaluate the physico-chemical properties, functional, organoleptic characteristics and sensory evaluation of butter cake supplemented with different levels of JSF. Methodology: Samples of ripe jackfruit weighed (20-30 kg) were obtained from Agricultural Research Station in Kom Ombo, Aswan Governorate in summer 2015. Seeds were isolated manually and weighed, cleaned, peeled off dried and ground into flour. 10, 15, 20 or 25% of wheat flour (WF) of butter cake formulation were replaced with JSF and compared with control (100% WF). Physico-chemical, functional and organoleptic properties were studied. Results: The proximate chemical analysis showed that JSF contained 9.42, 12.14, 1.01, 3.14, 71.2 and 3.09% of moisture, protein, fat, crude fiber, carbohydrate and ash; respectively Protein, carbohydrate and crude fiber of cake content were increased as JSF proportion increased, while fat and moisture were decreased. The functional properties of composite flours were increased with increase in the incorporation of JSF with WF. The organoleptic characteristics results reflected that there was a significant difference in cake that WF was replaced with 15% JSF which was more acceptance than other samples in color, flavor and texture. Conclusion: In conclusion, the study showed that the jackfruit seeds
flour powder incorporation with wheat flour could be used to improve the significant improvement physico-chemical properties, functional, organoleptic and sensory characteristics of butter cake.

**Key words:** Physico-Chemical Properties – functional properties – organoleptic characteristics – butter cake – jackfruit.

**Introduction:**
Jackfruit is an evergreen tree, producing more yield than any other fruit tree species and bears the largest edible fruit (Alagiapillai, et al., 1996). It grows well not only under humid and warm climates of hill slopes, but also in arid plains making it as one of the most suitable fruit crops for dry land horticulture (Swamy, 1993). Jackfruit contains high levels of protein, starch, calcium and thiamine (Burkill, 1997). It is composed of rind, edible bulbs and seeds. Seeds make up around 10 – 15% of the total fruit weight and have high carbohydrate and protein contents (Ocloo et al., 2010). Seeds from ripe fruits are edible and are prepared by boiling or roasting, they have a milky and sweet taste (Morton, 1987). Cakes are a confectionary favorite product for Egyptian people and it used in their breakfast or at tea time (Barakat, 2003), and are important for delivering bioactive compounds into the human diet (Alpaslan, and Hayta, 2006 & Villarroel et al., 2006). Soft wheat flour is usually considered as good quality flour for soft wheat products such as cakes with a good quality property (Finney, 1989). Functional properties are those intrinsic physicochemical characteristics that govern the behavior of nutrients in foods during processing, manufacturing, storage and preparation as they affect food quality and acceptance (Eltayeb et al., 2011). It is further defined as the set of properties that contribute to the desired color, flavor, texture and nutritive value of a product (Thompson and Edaman, 1981); and as any property (except nutritional) of food ingredients, which affect the utilization of foods. Altering level of ingredients and increased in fiber content for the purpose of calorie reduction affected the appearance, flavor and texture of the product. The changed will be noticeable by consumer and thus will influence their preferences on the products (Nancy and Carole, 1986). JSF was good source of fiber which contained high amount of total dietary fiber and crude fiber, and it has been successfully incorporated into bread at level 25% and was accepted by sensory panel (Hasidah and Aziah, 2003). So, the current study aimed to evaluate the
physico-chemical properties, functional and organoleptic characteristics of butter cake supplemented with different levels of JSF.

Materials and Methods:

Materials:
Samples of ripe jackfruit weighed (20-30 kg) were obtained from Agricultural Research Station in Kom Ombo, Aswan Governorate in summer 2015.

Methodology:
Preparation of Jackfruits seeds flour:
Seeds were isolated manually and weighed, cleaned, white arils were peeled off, soaking in 3 percent sodium hydroxide solution for 3-5 minutes to remove brown spermoderm. Seeds were cut into slices, blanched at 70 ºC, dried very well in drying oven at 60ºC for 24 hrs., grinded into powder, sieved and preserved until it was used in physico-chemical, functional and organoleptic properties studied.

Proximate chemical analysis:
All samples were analyzed in triplicate for proximate composition according to A.O.A.C. (2010) in Regional Center for Food and Feed laboratory. Protein was carried out using semi-micro kjeldahl according to A.O.A.C. method No.984.13 (2010). For moisture content determination, the samples were dried at 105ºC oven for 12 hrs. For ash content, samples were burnt for 4 hrs, at 550C at Muffle furnace. The weight of the remaining residue was used to calculate the ash content. The content of total carbohydrates was determined by difference (Egan et al., 1981) according to the formula:-

Total carbohydrates % = 100 – % of (moisture + lipid + protein + ash) on wet weight basis or
Total carbohydrates % = 100 – % of (lipid + protein + ash) on dry weight basis

Physiological properties:

pH value: The pH value was determined by blending 10g of the homogenized sample with 90 ml distilled water (Kirk and Sawyer, 1991) and measuring using a pH meter (Model No. pH-8414).
Functional properties:
The functional properties of flours were analyzed as follows:

- **The water and oil absorption capacity (WAC and OAC):** both water and oil absorption was measured in triplicates according to method described by Sosulski and McCurdy (1987).

- **Bulk density (BD):** bulk density was determined as the method described by Narayana and Narasinga Rao (1984).

- **Swelling power (SP):** swelling power % of flour was determined as the method described by Schoch (1964).

Preparation of butter cake:
Butter cake was prepared and baked according to method of Saba (2003) in nutrition laboratory, Home Economics Department, Faculty of Specific Education, South Valley University, Qena, Egypt. Butter cakes were divided into five treatments as follow: control butter cake (100% WF), wheat flour was partially substituted by 10, 15, 20 and 25% of JSF. The value addition was done by JSF powder with the incorporating in the WF at a concentration of 10% (90% WF+10% JSF) "A", 15% (85% WF+15% JSF) "B", 20% (80% WF+20% JSF) "C", and 25% (75% WF+25% JSF) "D"; respectively.

Table (1): Basic Recipe for cake formulation

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat flour (72% extraction)</td>
<td>200</td>
</tr>
<tr>
<td>Sugar powder (g)</td>
<td>120</td>
</tr>
<tr>
<td>Butter (g)</td>
<td>100</td>
</tr>
<tr>
<td>Milk (ml)</td>
<td>12</td>
</tr>
<tr>
<td>Fresh whole egg (g)</td>
<td>80</td>
</tr>
<tr>
<td>Baking powder (g)</td>
<td>8</td>
</tr>
<tr>
<td>Vanilla (g)</td>
<td>2</td>
</tr>
<tr>
<td>Salt (g)</td>
<td>1</td>
</tr>
</tbody>
</table>

All previous ingredients were purchased from the local market, Qena, Egypt.

Organoleptic characteristics:
Cake samples were evaluated organoleptically (height, weight, volume and specific volume) as follows: the weight of cake was determined after cooling for one hour. Cake volume was measured by rape seed displacement method as described by
A.A.C.C. (2002). Specific volume of cake was calculated by dividing the volume (cm$^3$) by their weight (g).

**Sensory evaluation:**
The sensory characteristics were evaluated according to Salem (2011). 45 untrained panelists from faculty staff members and students of Faculty of Specific Education, South Valley University. Panelists were asked to select the most acceptable samples. The characteristics were scored from 20 points for each according to the method of A.A.C.C. (2002).

**Statistical analysis:**
All determinations were done in triplicate and subjected to statistical Analysis of Variance (ANOVA) by using SPSS version 17.0 (Pallant, 2005). The results were expressed as mean±standard deviation and values of P<0.05 were considered statistically significant.

**Results and Discussion**

**Physico-Chemical properties:**
Proximate chemical composition of WF and JSF are listed in Table (1). JSF was significantly showed the highest percent of protein (10.8%), crude fiber (3.14%) "The fiber content was directly influence the functional properties like water absorption, stabilizing texturizing and thickening capacities (Kunzek et al., 2002)" and ash (3.09%), while, WF was significantly showed the highest percent of fats (1.39%) and moisture (12.59%). The lower the moisture content of flour, the better its shelf stability and the quality. Moisture content of flour generally is depended upon the duration of the drying process (Abraham and Jayamuthunagai, 2014). WF scored the highest caloric value (342.31 kcal/100g). Similar finding was obtained by (Ocloo et al., 2010). Such results were different with those obtained by Vanna et al. (2002) & Mohammad et al. (2014) & Shrivastava and David (2015), the differences in these compositions may be due to varietal reasons as, agro-ecological conditions and methods of analysis.

pH value of WF and JSF were 6.3 and 5.78; respectively. The functional properties of dough are affected by pH value,
increasing the pH enhanced the functional properties of the acetylated gluten (Majzoobi and Abedi, 2014).

**Table 2:** The average of physical properties chemical composition of WF and JSF

<table>
<thead>
<tr>
<th>Sample</th>
<th>pH</th>
<th>Moisture%</th>
<th>Protein%</th>
<th>Fats%</th>
<th>Crude Fiber%</th>
<th>Ash%</th>
<th>Carbohydrate%</th>
<th>Caloric value kcal/100g</th>
</tr>
</thead>
<tbody>
<tr>
<td>WF</td>
<td>6.3±0.26</td>
<td>12.59±0.53</td>
<td>10.80±0.08</td>
<td>1.39±0.02</td>
<td>2.17±0.3</td>
<td>1.40±0.62</td>
<td>71.6±0.03</td>
<td>342.31±0.15</td>
</tr>
<tr>
<td>JSF</td>
<td>5.78±0.66</td>
<td>9.42±0.07</td>
<td>12.14±0.26</td>
<td>1.01±0.21</td>
<td>3.14±0.02</td>
<td>3.09±0.45</td>
<td>71.2±0.36</td>
<td>306.03±0.03</td>
</tr>
</tbody>
</table>

Data followed by different letters in the same column are significantly different at p≤0.05. JSF: jackfruit seed flour. WF: wheat flour

**Functional properties:**

The functional properties of composite flours such as water absorption capacity, oil absorption capacity, bulk density, swelling capacity, foam capacity, and foam stability, were increased with increase in the incorporation of JSF with WF. The water absorption capacity (WAC) of the WF and JSF were 25.7 and 27.4%; respectively, similar finding was obtained by Ocloo et al. (2010). Increasing WAC of JSF than WF may be due to increasing JSF protein content as reported by Butt and Batool (2010) who showed that WAC variation in different flours may be due to different protein concentration, whereas, protein has both hydrophilic and hydrophobic nature and therefore they can interact with water in foods. Incorporation of jackfruit seed flour has shown some significant impacts on WAC and OAC. The percentage of WAC% of studied flour samples A, B, C, and D were 25.9, 26.1, 26.3 and 26.7%; respectively.

Oil absorption is an important property in food formulations because fats improve the flavor and mouth feel of foods (Adepeju et al., 2011). OAC% of WF and JSF were 18.3 and 23.6% resp. similar finding by Odoemelam (2005). As observed from Table (3) the higher percent of JSF in batter the higher OAC percent, where OAC% of Flour of samples A, B, C, and D were 18.5, 18.6, 19.0 and 19.2%; respectively, that was may be due to increase JSF protein which was consider the major chemical component affecting of oil absorption capacity as.
reported by Jitngarmkusol et al. (2008) and Eltayeb et al. (2011).

As cleared from the same table BD of WF and JSF were 0.35 and 0.69 g/ml; respectively. Increasing jackfruit levels from 10 to 25% significantly increased bulk density of blended samples. Bulk density gives an indication of the relative volume of packaging materials required. It is also important in determining raw material handling and application in wet processing in the food industry (Ajanaku, et al., 2012).

Swelling power (SP) of flours samples increased with increase in the level of incorporation ratio of JSF. SP of flours depends on size of particles, types of variety and types of processing methods or unit operations (Suresh et al., 2015). Data in Table (3) showed that SP in blending samples ranged between 4.47 and 4.55 ml and sample had the highest value "D" 75%WF+25%JSF", whereas, SP of WF and JSF were 4.47 and 4.72; respectively

Table (3): The average of functional properties of WF and JSF

<table>
<thead>
<tr>
<th>Sample</th>
<th>WAC %</th>
<th>OAC %</th>
<th>BD (g/ml)</th>
<th>SP (ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WF</td>
<td>25.7±0.161</td>
<td>18.3±2.303</td>
<td>0.35±0.58</td>
<td>4.47±0.028</td>
</tr>
<tr>
<td>JSF</td>
<td>27.8±1.062</td>
<td>23.6±0.160</td>
<td>0.69±0.41</td>
<td>4.72±0.181</td>
</tr>
<tr>
<td>A&quot;90% WF+10% JSF&quot;</td>
<td>25.9±0.113</td>
<td>18.5±0.008</td>
<td>0.39±0.088</td>
<td>4.47±1.212</td>
</tr>
<tr>
<td>B&quot;85% WF+15% JSF&quot;</td>
<td>26.1±0.23</td>
<td>18.6±0.614</td>
<td>0.43±1.52</td>
<td>4.51±0.47</td>
</tr>
<tr>
<td>C&quot;80% WF+20% JSF&quot;</td>
<td>26.3±0.050</td>
<td>19.0±1.117</td>
<td>0.46±2.01</td>
<td>4.54±1.036</td>
</tr>
<tr>
<td>D&quot;75% WF+25% JSF&quot;</td>
<td>26.7±1.211</td>
<td>19.2±0.089</td>
<td>0.48±0.53</td>
<td>4.55±0.881</td>
</tr>
</tbody>
</table>

Table (3): The average of functional properties of WF and JSF

Data followed by different letters in the same column are significantly different at \( p \leq 0.05 \)     JSF: jackfruit seed flour     WF: wheat flour     WAC: water absorption capacity     OAC: oil absorption capacity     BD: bulk density     SP: sweling power     A: 90% WF+10% JSF     B: 85% WF+15% JSF     C: 80% WF+20% JSF     D: 75% WF+25% JSF

Proximate chemical analysis of chemical composition of different butter cake formulations:

Data listed in Table (4) showed the effect of the incorporation of JSF with the WF. There were significant differences for all parameters considered between control butter cake (100% WF) and other cakes at \( (P<0.05) \). As observed from Table (4) the proximate values of composite cake increased with
increasing jackfruit seed flour substitution except moisture and fat content. Moisture content of control cake (18.13%) was in high significant difference with other samples; this may be the increase wheat flour content. On the other hand, protein and crude fiber contents of sample "D" were higher than other samples, and that was a result of high its content of JSF. These results were in agreed with those obtained by Amin, (2009) and Khan et al., (2016).

Table (4): The average of chemical composition of different butter cake formulations

<table>
<thead>
<tr>
<th>Sample</th>
<th>Moisture %</th>
<th>Protein%</th>
<th>Fats%</th>
<th>Crude Fibers%</th>
<th>Ash%</th>
<th>Carbohydrate%</th>
<th>Caloric value</th>
</tr>
</thead>
<tbody>
<tr>
<td>WF cake</td>
<td>18.13±0.13</td>
<td>6.84±0.07</td>
<td>22.39±0.19</td>
<td>0.59±0.83</td>
<td>0.66±0.28</td>
<td>51.93±0.63</td>
<td>434.4±0.33</td>
</tr>
<tr>
<td>A</td>
<td>16.79±0.46</td>
<td>7.01±0.33</td>
<td>21.38±0.28</td>
<td>0.79±0.47</td>
<td>1.36±0.42</td>
<td>52.67±0.73</td>
<td>431.1±0.89</td>
</tr>
<tr>
<td>B</td>
<td>16.35±0.23</td>
<td>7.16±0.52</td>
<td>21.27±0.27</td>
<td>0.85±0.04</td>
<td>1.72±0.19</td>
<td>52.64±0.27</td>
<td>430.6±0.23</td>
</tr>
<tr>
<td>C</td>
<td>15.96±0.61</td>
<td>7.21±0.06</td>
<td>21.18±0.13</td>
<td>1.35±0.66</td>
<td>1.81±0.30</td>
<td>52.54±0.61</td>
<td>429.6±0.74</td>
</tr>
<tr>
<td>D</td>
<td>15.75±0.34</td>
<td>7.27±0.49</td>
<td>20.95±0.78</td>
<td>1.54±0.51</td>
<td>2.12±0.38</td>
<td>52.37±0.98</td>
<td>427.1±0.52</td>
</tr>
</tbody>
</table>

Data followed by different letters in the same column are significantly different at p≤0.01
WF: 100% WF A: 90% WF+10% JSF B: 85% WF+15% JSF C: 80% WF+20% JSF D: 75% WF+25% JSF

Organoleptic characteristics:

Data in Table (5) showed that height, volume and specific volume in samples "A", "B" and "C" increased by increasing JSF substitution by 10, 15 and 20% than control cake and sample "D". Whereas, sample "B" scored the highest values of it and the mean values of height, volume and specific volume were 5.24 cm, 141.65cm³ and 2.09 cm³/g; respectively. Volume is important characteristic in the evaluation of cakes and its quality. The volume of a cake is the most important physical quality parameter used for the evaluation of a cake. It is a quantitative measurement and correlates well with dough handling properties, crumb, texture, freshness and technological versatility (Pomeranz, 1980). Those results were in agreement with that obtained by Khan et al. (2016). While, sample "B" were the lowest value of weight (67.48 g). Control cake recorded the
highest value of weight (74.13 g), such result may be due to the increase moisture content which absorb more starch.

**Table (5): Mean of organoleptic characteristics of different butter cake formulations**

<table>
<thead>
<tr>
<th>Sample</th>
<th>Height (cm)</th>
<th>Weight (g)</th>
<th>Volume (cm³)</th>
<th>Specific volume (cm³)/g</th>
</tr>
</thead>
<tbody>
<tr>
<td>WF cake</td>
<td>5.12±0.32</td>
<td>74.13±1.26</td>
<td>135.41±0.26</td>
<td>1.82±0.32</td>
</tr>
<tr>
<td>A</td>
<td>5.16±1.01</td>
<td>70.95±0.91</td>
<td>139.12±0.05</td>
<td>1.96±1.34</td>
</tr>
<tr>
<td>B</td>
<td>5.24±0.4</td>
<td>67.48±1.11</td>
<td>141.65±0.39</td>
<td>2.09±0.84</td>
</tr>
<tr>
<td>C</td>
<td>5.19±0.07</td>
<td>69.77±0.88</td>
<td>141.33±0.25</td>
<td>2.02±1.09</td>
</tr>
<tr>
<td>D</td>
<td>5.09±0.41</td>
<td>73.57±0.33</td>
<td>134.19±1.11</td>
<td>1.82±0.62</td>
</tr>
</tbody>
</table>

Data followed by different letters in the same column are significantly different at p≤0.05

WF: 100% WF  A: 90% WF+10% JSF  B:85% WF+15% JSF  C: 80% WF+20% JSF  D: 75% WF+25% JSF

**Sensory evaluation:**

The mean scores for color, flavor, texture, taste and overall acceptability of the cakes are presented in Table (6), the crust crumb of control sample and sample "A" were more bright brown than samples, while deep brown color of crust and crumb was found in sample "D" and recorded the lowest acceptance in preferred color. Sample "B" which consisted of (85% WF+ 15% JSF) recorded the highest acceptance percent among consumer in crust and crumb color. The statistical analysis revealed that there were significant differences (P<0.05) in color between the control cake sample and sample "B".

Also, sample "B" recorded the best texture. Texture for both control sample and sample "A" was same.

On contrast, more poor texture of composite cake was found with more substitution of seed flour in samples "C" and "D" that result may be due to increase crude fiber content.

The overall acceptability of cake showed that sample "B" scored the highest overall acceptability with mean value (19.14%) followed by sample "C", sample "A", control sample then sample "D" which were the lowest overall acceptability. There was significant difference (p>0.05) samples "B" and other samples.
Table (6): Mean panelists acceptance scores for sensory attributes of different butter cake formulations

<table>
<thead>
<tr>
<th>Sample</th>
<th>Color</th>
<th>Taste</th>
<th>Odor</th>
<th>Texture</th>
<th>Overall acceptability</th>
<th>Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Degree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WF cake</td>
<td>15.3±2.41</td>
<td>17.36±3.13</td>
<td>18.88±1.91</td>
<td>17.68±1.28</td>
<td>18.43±0.77</td>
<td>87.66±0.41</td>
</tr>
<tr>
<td>A</td>
<td>15.8±2.62</td>
<td>18.09±0.88</td>
<td>18.84±0.76</td>
<td>17.68±3.17</td>
<td>18.47±2.01</td>
<td>88.86±1.03</td>
</tr>
<tr>
<td>B</td>
<td>18.88±4.09</td>
<td>19.3±2.22</td>
<td>19.12±3.46</td>
<td>18.83±0.63</td>
<td>19.14±1.24</td>
<td>95.27±2.2</td>
</tr>
<tr>
<td>C</td>
<td>16.88±2.38</td>
<td>18.11±1.61</td>
<td>18.43±1.41</td>
<td>17.09±2.09</td>
<td>18.88±0.91</td>
<td>89.39±0.08</td>
</tr>
<tr>
<td>D</td>
<td>15.06±1.34</td>
<td>17.21±2.58</td>
<td>18.37±2.44</td>
<td>16.56±1.43</td>
<td>17.68±2.89</td>
<td>84.88±3.28</td>
</tr>
</tbody>
</table>

Data followed by different letters in the same column are significantly different at p≤0.05
WF: 100% WF     A: 90% WF+10% JSF
B: 85% WF+15% JSF   C: 80% WF+20% JSF
D: 75% WF+25% JSF

As showed in figure (1) sample "B" achieved the highest sum of total acceptance (95.27%) that were the most preferred (p>0.05), followed by sample "C" (89.39%), followed by sample "A" (88.88%), followed by control sample (87.66%) and finally, sample "D" that were the lowest (84.88%).

![Sum of total panelists acceptance](image)

**Fig. (1): Sum of total panelists acceptance**

**Conclusion**

Generally, according to this study it could be concluded that the jackfruit seeds flour incorporation with wheat flour has significant affects in improvement physico-chemical properties, functional, organoleptic and sensory characteristics of butter cake. Replacement of 15% of wheat flour with jackfruit seed flour scored the highest acceptance between panelists.
References:


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تقييم الخصائص الفيزيوكيميائية، الخصائص الوظيفية والحساسية للكيك الدم

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مدرس التغذية وعلوم الأطعمة، كلية الزراعة، جامعة جنوب الوادي، مصر.

الملخص:

يعد الكيك من أكثر المنتجات المغذية استهلاكاً في العالم، وهو يتميز بارتفاع محتواه من الدوّن والكربوهيدرات. ويجد زيادة الكيلوغرامات من البروتينات والألوف الغذائية بينما يخفض محتواه من الدوّن والكربوهيدرات إلى حد كبير. هدفت هذه الدراسة إلى تقييم الخصائص الفيزيوكيميائية والخصائص الوظيفية والحساسية للكيك الدم المدمج بنسب مختلفة من دقيق بذور ثمار الكاكاو فروت والثوم فروت. وقد تم حساب إعدادات دقيق بذور ثمار الكاكاو فروت، وبذور ثمار الكاكاو فروت، وبذور ثمار الثوم فروت. وتم الحصول على عينات من ثمار الكاكاو فروتなしجة، والتي تتألف من دقيق بذور ثمار الكاكاو فروت، والذي يتراوح وزنه 0.0210 كجم من محلة البحوث الزراعية بمنطقة كوم الساحل، حسب منحة من محاور، Cobra 1000، 2016. وقد استُخدم دقيق بذور ثمار الكاكاو فروت في إعداد الكيك الدسم نسب 0.10.15، 0.20. 0.25% من دقيق بذور ثمار الكاكاو فروت وقائمة الكيك الناتجة بالعينة الصادقة (كيم)، مع دقيق بذور ثمار الكاكاو فروت. وقد تم دراسة خصائص الفيزيوكيميائية، والوظيفية والحساسية لذات الكاكاو فروت، وذات الكاكاو فروت. أظهرت النتائج التحليل الكيميائي لذات الدقيق بذور ثمار الكاكاو فروت، علّة كلاً من الدوّن والكربوهيدرات والألوف، بنسبة 9.42% 71.7% 71.7% 3.2% على التوالي. كما أظهرت النتائج زيادة محتملة في الكاكاو الدم المدمج بذور ثمار الكاكاو فروت، وبذور ثمار الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكاو فروت، بما في ذلك انخفاض نسبة الدوّن والكربوهيدرات، وذات الكاكاو فروت، وذات الكاكا