Preparation and Standardization of Coconut, Dry Dates & Jaggery "Ladoo" and its Storage Study

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ABSTRACT
The calcium and iron is common problem in children’s lack of nutrients is one of the factors. Coconut dry dates & Jaggery was used for the development of ready-to-eat Indian traditional sweet meal commonly known as "ladoo" with rich source of calcium, iron, and dietary fibers. In the present study was formulated to develop mineral added nutrient ladoo with the incorporation of dates and Jaggery in different proportion of coconut, jaggery, dates & other nuts. According to 9 points hedonic scale was observed that 32:30:28:10 ratios found best combination. The changes in the quality of coconut dry dates and Jaggery 'ladoo' packed in polypropylene (PP, 75µ) and during storage to establish the shelf life under ambient temperature conditions (20-30 °C). Nutrient analysis protein (8 g), fat (14 g), carbohydrate (46 g), crude fiber (2gm), calcium (2gm), moisture (6.66gm) and ash (2gm) were carried and showed better quality of ladoo. During storage it was observed that the product stored up to 2 months after 2 months the moisture and fat in the product was reduced hence dates and Jaggery supplemented ladoo suitable for children’s.

Keyword: Coconuts, Dates, Jaggery, Calcium, Ladoo, Iron and Polypropylene

INTRODUCTION
It is indigenous traditional food. The past centuries discover the scientific devans mystery deshmane rehman and pratik deshmukh store the knowledge of ladoo. It is a simple and sweet innovative new product. Ladoo is often prepared for festival and family event such as wedding and birth or given as a prasad. Hindu temple especially at tirumala and amaranth. Ladoo is consider as traditional eid festival in some Muslim. Ladoo is a ball shaped sweet popular in the Indian sub constitute. Ladoo is various type found in the india that is khoa, peda ladoo, coconut and dates padel, malai ladoo, besan ladoo, basundi ladoo. The ancient year found the ladoo in world that is Bangladesh, Pakistan, Shri Lanka, India (jangita devi dundoo, madhulkha das 2004)

Ladoo preparation is main ingredient coconut. Coconut tree are the hard losers dry climates and cannot grow there with frequent arrogation. It is growing of 13 meter (98 feet) tall with premace leaves 4-6 cm long. Coconut gives nutritional value 354 kcal in carbohydrate (15.23 gm), fat (33.49gm), protein (3.33 g), vitamin (thiamine, navin, vit-c), minerals (mg ca , iron). India is a 3rd rank in the world in coconut production. Total production coconut in India is 11.1 million ton. (William Bought chitra her colouonery 2003)

Dates cultivated for it's edible sweet fruit. The species in many tropical or subtropical region in worldwide. The leaves long 4-6 meter (13 feet ) single root system and 2 meter (0.7 feet ) crown range . It is used as the snacks food for syrupering. It is nutritive value 1.178 kcal such as carbohydrate 75.03 gm , fat 0.39 gm , protein 2.45 gm , vitamin 0.549 mg (vit-A, vit-C, vit-E) and minerals 0.2 mg (iron, ca , mg, p, k). (Chemnuvi trib 1920-1935)

Jaggery is a traditional non centrifugal cane sugar consumed in Aecia. jaggery is made up type of cane and the palm tree. It is nutritive value38.3 kcal., such as protein 0.1 gm, carbohydrate 9.89 gm, vitamin
0.011 mg (niacin) and minerals 0.30 mg (Fe, Ca, P). (Karta Jis and Das Gupta 1986). Cardium is used as flavoring cooking spices in both food and drink as the medicine. It is expansive spice for import. India is a 4th rank production in world and total production in India is 100 million tone's. (Oscer, Majus, Kloeftr in 1914).

The cashew tree is a tropical evergreen tree that produces the cashew nut and cashew apple. It is used in India as a cuisine. It is the produce cashew oil. It is used in medicine to process of allergic diseases. It is 2nd rank in world production. Total production is 172,719 tone's. The nutritive value is 553 kcal such as carbohydrate 30.19 gm, fat 43.85 gm, protein 18.22 gm, vitamin 34.01 mg, (vit-C, vit-K, vit-E) Minerals 5.20 mg (Ca, iron, mg, p). (Morton Julijaf 1987.).

The almond is used for almond butter and almond milk. It is commonly used for powder from in any other products. It is used culinary uses. It is nutritive value 2.408 kcal such as carbohydrate 21.69 gm, fat 49.42 gm, protein 21.22 gm vitamin 21.2 mg (vit-A, vit-C, vit-D, vit-E) and minerals 3.08 mg (iron, mg, Ca) (Fraz Eugene Konlar 1897, Bailey Z. 1976, Rush forth Keith 1999).

METHODOLOGY
MATERIALS
Dry Coconut, Dry Dates & Jaggery
Coconut, dry dates, jaggery and minor ingredients Almond, cashew nut, ghee, cardamom were purchase from the local market Saralgaon Maharashtra.

Flowchart 1: Flowchart for the Preparation Dry Coconut, dry dates & jaggery ladoo

Selection of raw material (coconut, dry dates, almond, cashew nut, cardamom, ghee)  
↓  
Pitted coconut & dry dates  
↓  
Cutting small size almond & cashew nut  
↓  
Mixing (well for various proportion)  
↓  
Frying (for head in 5 min at 45-50°C temp)  
↓  
Remove for all ingredient in dish  
↓  
Take pan with a small amount ghee in dish  
↓  
Addition of jaggery  
↓  
Syruping (92° brix t. s. s & drop test)  
↓  
Addition of frying material  
↓  
Mixing properly & stop heat  
↓  
Sizeing (small shaped ball)  
↓  
Cooling  
↓  
Packaging  
↓  
Storage (at 22 to 28°C temp & room temp)

Process of Making Dry Coconut, Dry Dates & Jaggery Ladoo (250gm)
The measure ingredient by the weigh balance. (Dry Coconut, Dry Dates, Jaggery, Almond, Cashew nut, Cardamom & ghee). To scrape & pitted the coconut & dry dates then after the cutting small size almond & cashew nut. After mixing the ingredient in various proportion. The scrap of coconut & dry dates in pan with ghee frying at 45-45°C for 5 min. The removing the scrap dry dates & coconut in dish. Then take the pan with small amount ghee. After the addition of jaggery in pan. To prepare the syrup without water of the jaggery at the 92° brix T.S.S. by refractometr or drop test. Then after the addition of frying ingredient in jaggery syrup. To check the mixing well properly & stop the heating. Then sizing the ball shaped by the handling process. Then preparing ladoo is cool at room temp (22-28°C temp). Then preparing ladoo is packaged in polyethylene bag (75 micro m). The prepared ladoo put the store condition at room temperature.

Treatments of Ladoo
Table 1: The control and variation treatment of coconut and dates ladoo.

<table>
<thead>
<tr>
<th>Test Material</th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coconut (%)</td>
<td>30</td>
<td>26</td>
<td>28</td>
<td>32</td>
<td>34</td>
</tr>
<tr>
<td>Dates (%)</td>
<td>30</td>
<td>34</td>
<td>32</td>
<td>28</td>
<td>26</td>
</tr>
<tr>
<td>Jaggery (%)</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Almond (%)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Cashewnut (%)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Ghee (%)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Cardamom (%)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

(All sample are taken in grams).
The ladoo preparation is a constant for all material in T0 sample (30:30:30:3:3:3:1). This proportion is used for standardization of ladoo. Then the prepared ladoo was evaluated for overall acceptability. The variation for the coconut and dates proportion. Then variation of other test is some other like that T1 (26:34:30:3:3:3:1), T2 (28:32:30:3:3:3:1), T3 (32:28:30:3:3:3:1), and T4 (34:26:30:3:3:3:1). All above mentioned ingredients in varied ratio were mixed to each other threads consistency and small round balls (ladoo) were carried out Sensory Evaluation process.

Sensory Evaluation-
Sensory quality of coconut and dates ladoo was evaluated by a semi-trained panel of 10 members by nine point hedonic scale.

Table 2: Mean value for sensory evaluation of coconut and dates ladoo by nine point hedonic scale.

<table>
<thead>
<tr>
<th>Samples</th>
<th>Parameters</th>
<th>Colour</th>
<th>Texture</th>
<th>Taste</th>
<th>flavour</th>
<th>Overall acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>T0</td>
<td></td>
<td>8.4±0.55</td>
<td>8.6±0.55</td>
<td>8.2±0.44</td>
<td>8.2±0.45</td>
<td>8.5±0.35</td>
</tr>
<tr>
<td>T1</td>
<td></td>
<td>7.2±0.45</td>
<td>7.2±0.84</td>
<td>7.4±0.55</td>
<td>7±1</td>
<td>7.5±0.12</td>
</tr>
<tr>
<td>T2</td>
<td></td>
<td>7±1</td>
<td>6.4±1.14</td>
<td>7±1</td>
<td>7±1</td>
<td>6.8±0.92</td>
</tr>
<tr>
<td>T3</td>
<td></td>
<td>8±0.71</td>
<td>7.6±1.14</td>
<td>7±1</td>
<td>7±1</td>
<td>7.9±0.69</td>
</tr>
<tr>
<td>T4</td>
<td></td>
<td>7.4±0.83</td>
<td>7.2±1.30</td>
<td>6.6±0.89</td>
<td>6.2±1.48</td>
<td>6.8±0.77</td>
</tr>
</tbody>
</table>

(Mean value for sensory evaluation of iron rich supplements by score card method)

Nutrient analysis
Nutritional evaluation of the most accepted coconut date ladoo was done. In the present study, coconut date ladoo was analyzed in once for moisture, crude oil protein, crude fat and crude fibre by AOAC (1995). Carbohydrate was estimated by difference. Ascorbic acid content in the fresh samples was determined using method given by AOAC (1995). Total iron and ionisable iron were determined according to the procedure given by Pranati (2005). All nutrients were estimated in once

Storage studies
The best accepted ladoo was stored for 60 days at room temperature in polypropylene bags. Observations were recorded at intervals of 15 days, 30 days, 45 days and 60 days for microbial and sensory characteristics.

RESULTS AND DISCUSSION
Dry Coconut (Cocos nucifera), & Dry dates (Phenix dacliylifera) & Jaggery is an ancient fruit that is widely consumed in the form of ladoo. Coconut & Dry dates is a fruit tree of culinary, pharmaceutical, nutraceautical and industrial uses. Coconut & Dry dates has a long history in Ayurvedic medicine as it was traditionally used to treat sores, dermatitis, diarrhea, dysentery, ear infection, child malnutrition, adolescent, lack of calcium & iron nutrient and to facilitate digestion. Coconut seeds are used for the oil extraction. That oil is called Coconut oil & derived the coconut fresh is called as copra and used in cooking, frying, soaps cosmetics, medicines, and costly. Dry Coconut, Dry dates & Jaggery ladoo is an important culinary agent and is used as festival for meal by people living in Maharashtra, costal Karnataka Goa, Tamil nadu and Kerala India. In any season the prepared ladoo are ground in blender with sugar and cardamom and consumed as a meals. Addition of Ladoo is supposed to enhance the taste of coconut-based curries and to remove the unpleasant smell of mackerel and sardines. Ladoo's are also used in some festival such as rakshbandhan, dipawali, ramjan, eid as prashad dishes. The prepare ladoo is benefit to our body gives nutritive value. These ladoo are used with or like an delivery women, lack of calcium & iron child after meal digestive. The dry coconut, dry dates & jaggery ladoo are supposed to be digestive and to relieve gastric problems. The coconut is also used in cosmetics, medicines, and costly confectionery preparations in foreign countries. The ladoo acts as anti-oxidant and appetite stimulant and helps in improvement child malnutrition and cholesterol. The ladoo is digestive tonic and used to improve height of child health.

The efforts were also made to analyze the various physiochemical properties of raw material viz. Dry coconut, dry dates, jaggery and lauric acid etc. The prepared extract was utilized with varying proportion in standardization of coconut, dry dates, jaggery ladoo.
Preliminary efforts for consumer acceptability were also done by sensory evaluation with the help of semi trained panel. The organoleptically selected sample was then evaluated for effect of ladoo and artificial sweeteners on physicochemical and organoleptic quality of prepared dry coconut, dry dates, & jaggery ladoo. Selected beverage was assessed for physicochemical properties along with the active constituent. Further the energy value of the product and its techno economic feasibility were also determined.

**Physico chemical properties of ladoo**

The data on chemical properties ladoo moisture, fat, protein, carbohydrates, ash and crude fiber was carried out and the results obtained were tabulated in Table 3. It was evident from Table 3 that moisture content in ladoo was found to be 6.66% and fat content was low in concentration 12.00%. Ladoo was found carbohydrate content 46.00% and ash content of ladoo was found to be 2.57% and crude fibre content was 10.00% respectively.

**Table no.3 : Chemical properties of ladoo**

<table>
<thead>
<tr>
<th>Chemical parameters</th>
<th>Results (100gm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture</td>
<td>6.66±0.83g</td>
</tr>
<tr>
<td>Fat</td>
<td>12±0.76g</td>
</tr>
<tr>
<td>Protein(N×6.25)</td>
<td>8±1.3g</td>
</tr>
<tr>
<td>Carbohydrate by Difference</td>
<td>46.00±1.6g</td>
</tr>
<tr>
<td>Total Ash</td>
<td>2±2.26g</td>
</tr>
<tr>
<td>Crude fiber</td>
<td>10±0.53g</td>
</tr>
<tr>
<td>Calcium</td>
<td>24.81±1.23mg</td>
</tr>
<tr>
<td>Energy</td>
<td>483.23±1.06kcal</td>
</tr>
</tbody>
</table>

**Organoleptic evaluation of base Dry coconut, Dry dates and jaggery ladoo store at room temperature (22-28°C)**

During storage of ladoo from 0 to 60 days there was decrease in sensory score for overall acceptability was found from 7.6 to 5.5 on 60th day of storage. There was significant increase and decrease in Sensory score for Texture and decrease in sensory score for Colour, flavour, taste and overall acceptability were reported by the panel members. There was no significant evidence of microbial spoilage.

It could be concluded from the table that Dry coconut, Dry dates and jaggery ladoo can be stored for 60 days at room temperature (22-28°C) without affecting sensorial parameters. However its acceptability score was slightly decreased and liked moderately. Similar results were reported during storage of low calorie ladoo.

**Table no. 4: Organoleptic evaluation of base Dry coconut, Dry dates and jaggery ladoo store at room temperature (22-28°C).**

<table>
<thead>
<tr>
<th>Day(s)</th>
<th>Colour</th>
<th>Texture</th>
<th>Taste</th>
<th>Flavour</th>
<th>Overall acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 day</td>
<td>8±0.5</td>
<td>8±0.55</td>
<td>7.6±0.46</td>
<td>7±0.45</td>
<td>7.6±0.1</td>
</tr>
<tr>
<td>15 days</td>
<td>7.8±0.69</td>
<td>8.2±0.15</td>
<td>7.6±0.48</td>
<td>6.8±0.15</td>
<td>7.4±0.1</td>
</tr>
<tr>
<td>30 days</td>
<td>7.4±0.33</td>
<td>8.4±0.69</td>
<td>7.1±0.15</td>
<td>6±0.36</td>
<td>6.2±0.1</td>
</tr>
<tr>
<td>45 days</td>
<td>7±0.4</td>
<td>8.2±0.11</td>
<td>6.5±0.19</td>
<td>5.5±0.96</td>
<td>5.8±0.1</td>
</tr>
<tr>
<td>60 days</td>
<td>6.5±0.13</td>
<td>8±0.19</td>
<td>6±0.42</td>
<td>5±0.4</td>
<td>5±0.1</td>
</tr>
</tbody>
</table>

**CONCLUSION**

Dry Coconut, dry dates & jaggery ladoo is an ancient fruit that is widely consumed in the form of ladoo. Dry Coconut & dry dates is a fruit tree of culinary, pharmaceutical, nutraceuticals and industrial uses. Coconut & dry dates has a long history in Ayurvedic medicine as it was traditionally used to treat sores, dermatitis, diarrhea, dysentery, ear infection, child malnutrition, adolescent, lacks of calcium & iron nutrient of children to facilitate digestion. Coconuts are used for the oil extraction. That oil is called coconut oil and used in curries, cosmetics, medicines, and costly confectionery preparations in foreign countries. Ladoo is an important culinary agent and is used as an acidulate for curries by people living in Maharashtra, costal Karnataka, tamilnadu, jammu Kashmir & Goa, India. In winter the coconut & dry dates are ground in blender with sugar and cardamom and consumed as a meal.

Sensory evaluation of Dry coconut, dry dates & jaggery ladoo was carried out was sample T3 observed highest score followed by T1, T2 and T4. The control sample had scored higher for appearance followed by T3 and T1. The taste of the samples significantly affected with addition of fresh ladoo.
It was evident from Table 3 that moisture content in ladoo was found to be 6.66 per cent and fat content was in concentration 12.00 per cent. Ladoo was found carbohydrate content 46.00 per cent and ash content of ladoo was found to be 2.00 per cent and crude fibre content was 14.00 per cent respectively. These all chemical parameters were found more or less similar with result.

The formulation and standardization of recipe for Dry Coconut dry dates & jaggery ladoo was carried out successfully. The health benefits of ladoo are well known so the product is having some enrichment than the other marketed products. The economic feasibility can be found Rs.222.68 /kg that is more chipper than marketed ladoo, so the product can be satisfy the consumer in aspects of quality, cost, health.

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