

Research Article

Amalgamation of *Phoenix dactylifera* L Seed Powder in Food Products

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Abstract

The healing effect on liver diseases, gastrointestinal disorder, diabetes, can be easily cured by the dates seed that belongs to “Ajwa”, which is commonly considered as a waste product in the dates. *Phoenix dactylifera* (dates) is commonly belongs to the order of *arecales* and the family of *arecaceae* is commonly cultivated in the tropical and sub-tropical areas. The incorporation of Ajwa dates seed powder into the wheat flour and the cookies were prepared from the eight formulations. For the comfort of drying the seeds the tray dryer is used, due to the presence of 40% moisture content in seeds. So it is mechanically dried to 11-12% (at 66°C for 3 hr), other than this fat (unsalted butter), sugar, vanilla extract, sodium bicarbonate was mixed. This material is generally blended into the dough. For several analyses such as moisture content, ash content, microbial content, carbohydrates and etc., the sample has taken in 5 different concentrations such as 100%, 80%, 60%, 40%, 20%, and other ingredients were added according to it. In this type of biscuits contain high nutritional values because the seed has high nutrient content such as vitamin, fibre, protein and etc. Commercially this type of biscuits reduces the risk of cancer due to high antioxidant contents.

Keywords: *Phoenix dactylifera* L; Composite flour; Cookies; Amalgamation; Antioxidant.

Introduction

Nowadays, in India biscuits have become one of the favourite food item .they are very delicious and mouth-watering crispy snack made from flour and mixed with several ingredients. Today several upcoming companies and food industries produce cookies with various brands, taste and etc. Cookies are consumed by the people very fondly during the time of snacks, and also everybody was eager to eat new flavoured cookies. The name “COOKIES” has a history; it was originated by the French .it means “an item that is cooked twice”. However, it is originated from French, cookies are consumed by all over the most people, and also India plays a major role in commercial production [1].

The substance was prepared hard because it would survive under any temperature. The nutritional content however varies with the types of flour used, so we have used soft wheat flour for cookies making. This is due to its content of gliadin (a protamine) and glutamine (glutei), in the presence of water, salt and sugars it under goes hydration. It was due to the visco-elastic

matrix known as gluten. It is responsible for the dough nature. They contain significant amount of flours which is mixed with various other ingredients and ultimately undergoes dry-heating process. There are several types of natural fibre rich ingredients are added into the bakery based food products to improve their fibre content. However, majority of the bakery products are high in fat, calories and carbohydrates but they are very lower in fibre content [2]. So, these attributes have set them as unhealthy choice for daily consumption .in order to make it a very healthy food, many ingredients such as cereals, nuts, fruits and vegetables have been used to increase the positive effect on health, though their consumption has been decreasing the several incidences of diseases. So we have used or incorporates our ideas in cookies making.. The dates (*Phoenix dactylifera* L) commonly belong to the order of *Arecales* and the family of *Arecaceae*, monocotyledonous. It is generally cultivated in the tropical and the sub-tropical area. It has high nutritional value. Usually all people eat the fleshy portion of the dates and discard the seed or it is as an animal feed.

But seed has high nutrient content in improving the functionality of the immune system and has high protein content and lower the risk of cancer because it has high antioxidants properties [3] and also the cardiovascular conditions as it contain high level of phenolic content and nutritional compound such as vitamin, fibre, antioxidants, protein and etc.

The date's seed has the healing effects on liver diseases, gastrointestinal disorder and diabetes. The dates seed was made into a fine powdered before it incorporated into the biscuits, the transmate process has carried out by drying of seed in tray dryer. The tray dryer was used because the moderate and low temperature can be maintained for long duration of time and it was useful when the drying rate was small for this comfort the tray dryer is generally used for drying of seed. So, less than always the tray dryer was used. Usually when compare to other variety of dates "AJWA DATES" has more health benefit when compare to other variety of dates .The dates seed contain 40% of moisture in it ,so it was mechanically dried to 11-12% to make it into powdered form in tray dryer at 66 C for 3 hours, to obtain dried seed powdered form. By sieve analysis technique the pore size of the powder was determined.

The powder was generally special sub class of granular material .the prepared dates seed powder was incorporated in the cookies. By this incorporation the comparative studies was carried out at ratio of wheat flour and seed powder. The composition, physical characteristics and sensory qualities of the cookies were compared with wheat flour cookies .wheat dates flour (1:1) cookies had twice the protein value of the wheat flour cookies and high level of calorific value [4]. They found that 50%

level of date's seed powdered incorporation; cookies had higher scores for all the sensory attributes evaluated. Above this level, the cookies received lower sensory scores.

They observed that the blend (70:30) produced the most acceptable cookies. The objective of this study was therefore to produce cookies from varied ratio of wheat flour and Ajwa dates seed powder in order to improve on the nutritional quality; and to increase the protein content and sensory qualities of cookies from the composite blends.

Materials and methods

Raw materials

The raw materials required for production of cookies were wheat flour, powdered sugar, ajwa dates seed powdered, unsalted butter, sodium bicarbonate (baking powdered), vanilla extract, milk and salt.

Preparation of date's seed powder

The fresh date's seed variety "AJWA DATES" was processed into powder form. The dates seeds were removed from dates by pit removal technique, the removed seeds were washed in water by manually, then sun drying was carried out to remove the excess water content present in the seeds. The dewatered seeds were allowed to dry in a tray dryer at 66°C for 3 hr, to reduce the moisture content of seed from 40% to 11% to prevent lumbs formation in seed powder [5]. Then the dried seeds were milled into fine partials, the partials were sieved to get uniform size of powder material. Then the sieve analysis was carried out to ensure the partial size, it was of (200 µm) and later finally packaged in air tight containers and kept under refrigerated storage until ready for further procedures.

Table 1. Recipe for cookies production

Sample	Wheat flour (%)	Dates Seed powder (%)	Fat (g)	NaCl (g)	Sugar (g)	Vanilla Extract (ml)	Sodium bicarbonate (tsp)
1	100	-	20	1	30	1	2
2	80	20	20	1	30	1	2
3	70	30	20	1	30	1	2
4	60	40	20	1	30	1	2
5	50	50	20	1	30	1	2

Quantity of sterile water used for mixing is 70 -80 ml

Blend formulation and biscuit production

Blend was prepared by mixing the wheat flour with Ajwa dates seed powder in the percentage as shown in table 1, using a Kenwood mixer (model HM400). The cookies were produced from the eight formulations using the method of Ihekoronye (1999). The ingredients used were 20% sugar, 27% fat, 2.0% sodium bicarbonate, 0.1 % salt, 7.5% milk and 70 -80 ml of water [5]. (because as the ratio of dates seed powder increased it required more water during mixing. Sugar and fat (butter) are mixed together and then wheat flour, dates seed powder of variety "Ajwa", common salt, sodium bicarbonate, vanilla extract, milk and water were added to prepare dough. The dough was mixed continuously for 10 minutes until uniform smooth paste was obtained using hand [6]. The paste was rolled on a flat rolling board, sprinkled with some flour to a uniform thickness using a wooden hand roller. Square shaped cookies were cutted (using a square cookies cutter of diameter of 3 cm), the cutted cookies were placed on a greased baking tray and it kept at normal room temperature for 1½ hours to allow proper dough leaving. Then these trays of the eight blends were baked at once in an oven at temperature of 160°C for 20 min [7]. Upto brown colour was formed, once the brown colour was formed cookies were removed and allowed to cool them for more than 30 min to maintain its consistency as shown in Figure 1. And then store the cookies in an air tight container.

Analysis

Chemical analysis

The proximate compositions were determined according to the standard methods of AOAC for baked goods. The crude protein was determined by multiplying the total nitrogen by 6.25 [8].

Moisture and ash evaluation of cookies

The moisture and ash analysis for cookies is analysed using AOAC method, the moisture analysis was done by using "HOT AIR OVEN" at 103°C for 3 hrs, the moisture analysis was done by placing a 3g of sample was placed in a dish and it was uniformly spread, then the dish is placed in an oven. The ash content of the cookies was obtained by placing the sample in a muffle furnace at 550°C for 2 hrs.

Sensory evaluation of cookies

The organoleptic evaluation of the cookies samples was carried out for consumer acceptances and preference using 10-trained panel list (students and staff of the department of food technology, DSIRT, Tamilnadu, India). They were to evaluate the sensory properties based on the colour, aroma, taste and overall acceptability using nine point hedonic scale where 1 represents "extremely dislike" and 9 represents "extremely like" [9].



Figure 1. Cookies prepared from different blends of composite flour

Results and discussion

Chemical composition

The result of the proximate analysis on the cookies was shown in Table 2. Increase in the level of wheat flour resulted in decrease in the protein content by 12.23 % in 100% wheat flour [10]. This must be due to somewhat low protein content in wheat flour. By addition of 20% dates seed powder in 80% of wheat flour somewhat increases level of protein can be achieved, by addition of wheat flour and ajwa seed powder in the ratio of 70:30 composition, the protein level increases from 12.23% to 14.02%, [11]. On further increase in the ratio of cookies the protein content was decrease as shown in Figure 2. This was similar to the earlier findings where the protein content of cookies reduced with supplementation with starch based product.

The carbohydrate content initially increased as the dates seed powder ratio increases from 68.7% to 73.21% in Cookies with 30% of seed powder; on further increases in the seed powder in cookies the rate of carbohydrate content decrease as shown in Figure 3.

Table 2. Chemical composition of cookies

Sample	Ash content (%)	Moisture Content (%)	Protein content (%)	Carbohydrates Content (%)
1=100% WF	2.73	6.25	12.23	68.69
2=80% WF:20% DSP	1.57	5.14	13.04	71.23
3=70% WF:30% DSP	0.94	4.98	14.02	73.21
4=60% WF:40% DSP	2.42	1.09	12.16	69.01
5=50% WF:50% DSP	1.65	0.54	11.53	64.81

WF=Wheatflour, DSP=Dates seed powder.

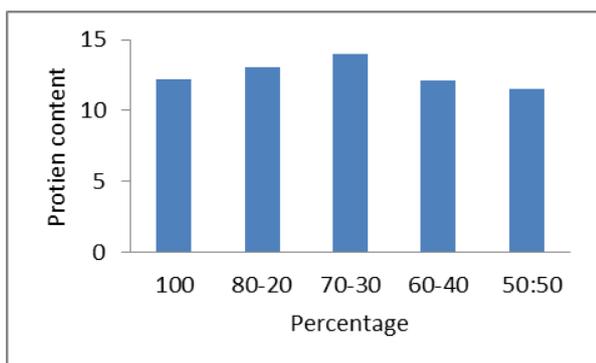


Figure 2. Protein content

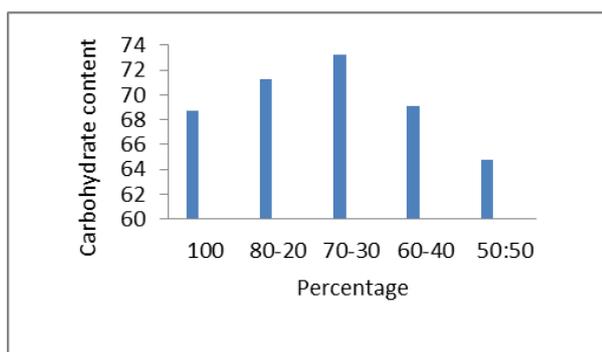


Figure 3. Carbohydrates content



Figure 4. Carbohydrates test

On addition of dates seed powder to the cookies the moisture content of the cookies was decreases as shown in Figure 8. At 70:30 ratio the moisture of the cookies was approximately 5.so, at this ratio was cookies were made The ash is generally defined as, Once our body digests the carbohydrates, protein, vitamin and fats and they burn out physiologically, ash is what is left over, more specifically what is left over was the minerals. By this the content of the ash for the cookies at different ratio was determined as shown in Figure 6. At various ratios the ash content was roughly in 70:30 ratios.



Figure 5. Ash content present in cookies

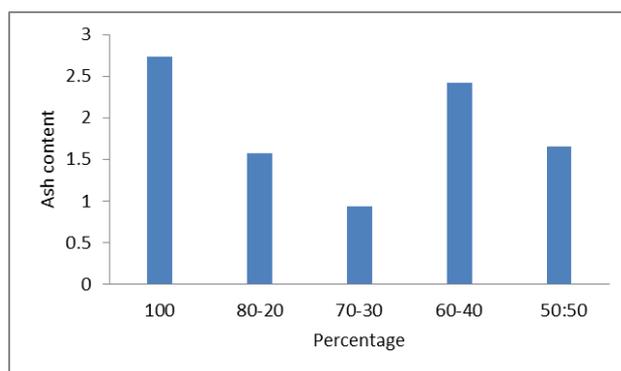


Figure 6. Ash content of the cookies

Moisture and ash evaluation

Generally, the moisture content of the cookies was between the 1-5% according to the fssai standard. When there is higher starch content in the flour increased the moisture content of the Cookies, for this reason the moisture content is high for cookies with 100% of wheat flour,[12].

Sensory qualities

Sample of the cookies prepared from the “ajwa” variety dates seed powder with wheat flour was undergoes sensory testes. The mean sensory scores are presented in Table 3. Increase in the substitution level of dates seed powder resulted

in decrease in crispness and colour score. The panel scores for crispness decreased with increase in the ratio of the dates seed powder from 8.0 to 5.5 for cookies [13]. This shows that the more the dates seed powder the less the crispness. There was a general decrease in the score of colour, aroma and overall acceptability with increase in the supplementation level with date's seed powder. In term of colour score, it was evidence from Table 3, that the composite cookies 4 and 5 differed from the rest composite cookies [14].

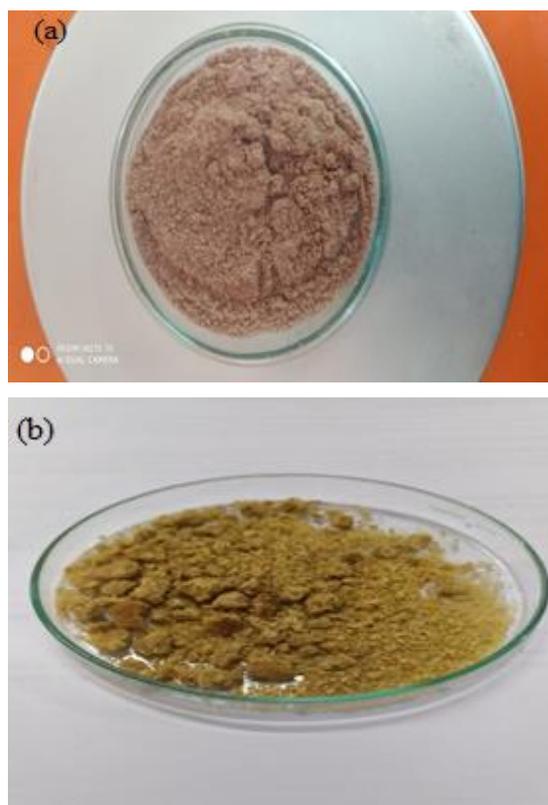


Figure 7. Moisture content present in the cookies (a) before drying (b) after drying

Table 3. Sensory score of the cookies

Sample	Crispness	Taste	Aroma	Overall acceptability	Shape (flatness)	Colour
1=100% WF	8.0	7.0	7.5	8.5	8.5	7.0
2=80% WF:20% DSP	7.3	6.9	7.0	6.7	7.8	7.0
3=70% WF:30% DSP	7.5	6.3	7.0	8.2	8	7.9
4=60% WF:40% DSP	6.4	6.0	6.8	6.7	6.7	6.9
5=50% WF:50% DSP	5.9	5.5	6.5	5.7	5.8	6.5

Values are means of 10 panellist scores

Conclusions

Substituting wheat flour with date seed powder produced cookies no significant difference in physicochemical and sensory qualities from biscuit from 100%wheat flour up to 30% substitution level. However the level of date's seed powder

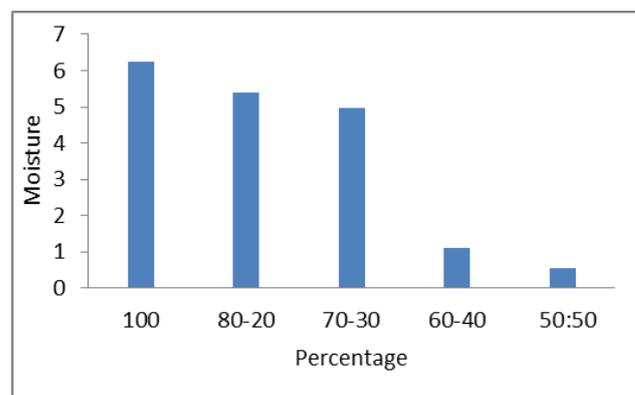


Figure 8. Moisture content present in the cookies

They were lighter in colour and were scored lower than the rest. However, sample 2 and 3 were rated not significantly difference from the control sample 1. Shape is one the features that characterizes a good cookies, they should be well formed, and crispness should be good. The shape of cookies from composite flour blend 2, 3, 4, 5 were scored high when compare to cookies without the dates seed powder.

On the basis of aroma and overall acceptability, there was no significant statistical difference between the control and cookies from composite flour up to 30% level. This means that cookies from date's seed powder substitution will be acceptable in terms of colour, aroma and overall acceptability up to supplementation level of 30% dates seed powder[5].That biscuit from composite of plantain/wheat flour supplementation was acceptable up to 30% supplementation level.

increase upto certain levels the protein content and carbohydrates content increases significantly. Therefore cookies with comparable nutrient content to 100% wheat flour could be produced with date's seed powder. This means that cookies from wheat, dates seed powder composite will be acceptable in terms of colour, aroma and overall

acceptability up to the ratio of 70:30 composite levels.

Conflict of interest

Authors have declared no competing of interests.

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