

Preparation of energy bar using figs and dates and analysis of its nutritional status

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ABSTRACT

Figs (*Ficus carica*) and dates (*Phoenix dactylifera*) are amongst the oldest fruits consumed by humans known to have endless benefits. Both these dried fruits are high in fiber and excellent sources of anti – oxidants. Dates have various properties such as anti – inflammatory, reduces risk of cancer and heart diseases. A study revealed that consumption of dates show better memory and learning ability. Figs are featured as super foods because of their high mineral and soluble fiber content. Figs are rich in vitamins and are natural laxatives as they contain pre biotic that keeps good bacteria in the gut and Improves digestion. Other dry fruits used in the bar are almonds and walnut which are helpful in weight loss, reduces stress and control blood pressure. Seeds used are sesame, chia and flax which are a great source of vegetarian protein, healthy fat, fibers and numerous other benefits. This bar is a meal replacement bar which should provide high amount of protein and carbohydrates and comparatively less fats. Oats is used as a base which also has a well- balanced nutrient composition.

Key words: Figs, dates, energy bar, energy, nutrition.

1. INTRODUCTION

In the contemporary world with a busy work schedule, nutrition and healthy eating becomes the last priority. A healthy diet is required for the well-functioning of the body of an individual but, due to certain circumstances it's quiet often that people tend to neglect consuming essential nutrients and rather than health eating, they tend to binge eat junk, or eat packaged chips, extruded products etc [1]. It is also because the options available in the market to buy healthy snacks and food are very limited. And yet

more often, most of the conveniently available food products, end up being the unhealthiest and the healthiest of food land up being either too expensive or not easily accessible [2].

Pertaining to this issue observed we have developed an energy bar which is an 'On The Go' healthy snack replacing all the junk alternative available and to satisfy the untimely hunger pangs, that is not only healthy and nutritious but also delicious

The product is carefully crafted by using all natural ingredients. Dates and figs are the primary

ingredients used. Dates have endless benefits and contains substantial amount of carbohydrates, proteins, vitamins, high fiber, antioxidants [3]. Figs are a great source of minerals, vitamins and contribute to health and wellness. Dates and Figs are packed with fructose and dextrose and are known to be a great energy booster. Other dried fruits used are, Almond, Cashew and Walnut; which are an everyday dried fruits one should never skip [4]. These nuts are known to be a powerhouse of goodness and are also considered as brain fruits. These nuts help in maintaining healthy cholesterol levels and also maintain normal blood pressure. Seeds like; chia seed, flaxseed and sesame seed which are present in the energy bar adds to the overall nutritional profile. Seeds are a great source of vegetarian protein, healthy fats, fiber and antioxidants.

This energy bar has a balanced carbohydrate matrix which delivers rapid energy as well as assists in providing the most healthy energy source. This energy bar is a meal replacement bar which provides with adequate amount of carbohydrates, proteins and fats [5]. This can be taken by anyone and everyone. We have prepared two types of energy bars; one plain and the other with nuts and seeds keeping in mind each ones choice.

2. MATERIALS AND METHODS

2.1. Selection of ingredients:

The ingredients selected were on the basis of availability. The ingredients used in the preparation of the Energy bar were dates, figs, oats, walnut, cashew, almond, flax seeds, chia seeds, sesame seeds were purchased from local supermarket and stored in clean, dry, air tight container.

2.2. Amount of each ingredient used in Energy bar- 1 and Energy bar- 2:

Different ingredients were used to prepare two different energy bars. The bars were prepared with fixed amount to ingredients with different combination as mentioned in table 1 and 2. The Dates and figs were used in various combinations for better taste and texture.

Variations tried:-

- i. Figs: Dates- 20:80
- ii. Figs: Dates- 40:60
- iii. Figs: Dates- 80:20

2.3. Sensory Evaluation

Sensory evaluation is carried out to know the level of acceptance by consumers. It is used to analyze and interpret the responses to product that are perceived by sense of smell, color, nature, texture, taste and touch. It is done on a scale of likes and dislikes; starting with 'like extremely' and 'dislike extremely'.

2.4. Qualitative Analysis

The presence of various components such as carbohydrates, fats, protein and metal ions were detected by carrying out simple color change

Table 1. Ingredients was for Energy bar -1

S. no.	Ingredient	Amount(g)
1.	Figs	40
2.	Dates	60
3.	Oats	10

Table 2. Ingredients was for Energy bar 2

S. no.	Ingredient	Amount(g)
1.	Figs	40
2.	Dates	60
3.	Oats	10
4.	Walnut	10
5.	Cashew	10
6.	Almond	10
7.	Flax seeds	05
8.	Chia seeds	05
9.	Sesame seeds	05

reactions; they are as follows:

- a. Test for proteins: The test performed by Biuret test to check the peptide bonds, the blue color confirms its presence
- b. Test for carbohydrates: The test performed by Benedict's test and Molisch's test. In benedict's test the presence of brick red precipitate confirmed the test whereas in Molisch's test the violet ring appears at the junction of two liquids.
- c. Test for fats: The test performed by Phenolphthalein test by titration method the disappearance of pink color confirms its presence.

2.5. Quantitative Analysis

Quantitative analysis is carried out to estimate the amount/quantity of each component present in the product. Different processes are carried out in laboratory with utmost safety and by following all the rules and regulations. The processes used for estimation are as follows:

a. Estimation of Ash

Ash is defined as the inorganic substance remaining in the residue after igniting the sample at a high temperature [6]. The sample is ignited in a muffle furnace at around 700- 800 ° C.

b. Estimation of Moisture

Moisture content is the water content present in % in the sample to the dry mass of the sample [7]. Determination of moisture is essential as it plays an important role in determination of shelf life of a sample. Here, the sample is dried in hot air oven at around 70- 80 ° C, weighed at equal intervals of time until the weight becomes constant.



Fig 1. Energy bar -1



Fig 2. Energy bar -1

c. Estimation of Protein

Protein content is determined by Folin- Lowry method by colorimetric technique/assay [8]. It involves a reaction in which deep blue color solution is obtained and its absorbance is measured at 660nm. The unknown concentration of the sample is determined by calibration curve method.

d. Estimation of Fats

Fat determination is done by Soxhlet extraction method [9]. As it is known, that fats are soluble in organic solvents hence, petroleum ether is used as the extracting solvent. Here powdered form of the sample is required for extraction.

e. Estimation of Fiber

Determination of fiber content is done by enzymatic-gravimetric method [10]. Here the defatted sample is treated with the digestive enzymes and the residue

after digestion is weighed. This gives the amount of crude fiber present in the sample.

- f. Carbohydrates (g/100g) can be determined by computing the above found components by equation (1):

$$\text{Carbohydrates} = 100 - [\text{Ash} + \text{Moisture} + \text{Protein} + \text{Fat} + \text{Fiber}] \quad \dots\dots\dots\text{Eq. 1}$$

- g. The total energy (Kcal) of the product is calculated by the equation (2):

$$\text{Total Energy} = \{[\text{Protein}(\text{g}) \times 4] + [\text{Carbohydrates}(\text{g}) \times 4] + [\text{Fats}(\text{g}) \times 9]\} \quad \dots\dots\dots\text{Eq. 2}$$

3. RESULTS AND DISCUSSIONS

The energy bars were tested on different levels to approve its quality with respect to health. Different variations of figs and dates were tried which shows that the ration of figs: dates (20:80) variation when tried, the nature and texture of the bar was soggy because of high amount of dates. This soggyiness may result in early deterioration of the product.

This (40:60) variation when tried resulted in a very good texture, nature and consistency of the product. As a result, this variation was carried ahead for analysis. This (80:20) variation when tried, the bar became very hard and difficult to chew because of high amount of figs.

Similar to the earlier bar, but with added roasted and ground, nuts and seeds as mentioned above. These were also converted into bars of 40g each using suitable moulds (Fig 1 & 2).

3.1. Sensory evaluation:

A survey was carried out among 100 people. The results were drawn out according to their liking and

Preference	Energy bar 1 (E1)	Energy bar 2 (E2)
Extremely like	69	78
Good	10	8
Average	13	9
Extremely dislike	8	5

disliking of the product on the basis of texture, color, taste and smell and the overall acceptance of the product was then concluded (table 2).

3.2. Qualitative and Quantitative tests:

Two different energy bars were prepared using different dry fruit and seeds combination named as energy bar1 and energy bar 2. The qualitative and quantitative tests were performed for both the energy bars. From the qualitative analysis, the presence of protein, carbohydrate, fats, fibers were confirmed (table 3).

The quantitative analysis of both the bars was tested. It was observed that the bars content good amount of protein, carbohydrate, fibers and minor content of

Test	Observation	Inference
Benedict's test	Brick red ppt	✓
Molisch's test	Violet ring appears at the junction of two liquids	✓
Phenolphthalein test	Pink color disappears	✓
Biuret test	Blue color appearance	✓
Metal ions: Calcium, Iron	-	✓

Table 5. The different components present in Energy bar- 1 are as follows:

Component	In 40g	In 100g	% in each serving
Protein	9.2g	23g	23%
Carbohydrate	14.06g	35.1g	35.1%
Fat	3.56g	8.9g	8.9%
Fiber	6.64g	16.6g	16.6%
Ash	3.52g	8.8g	8.8%
Moisture	3.0g	7.5g	7.5%

Energy(Kcal) : 125.08Kcal 312.7Kcal
fat, moisture.

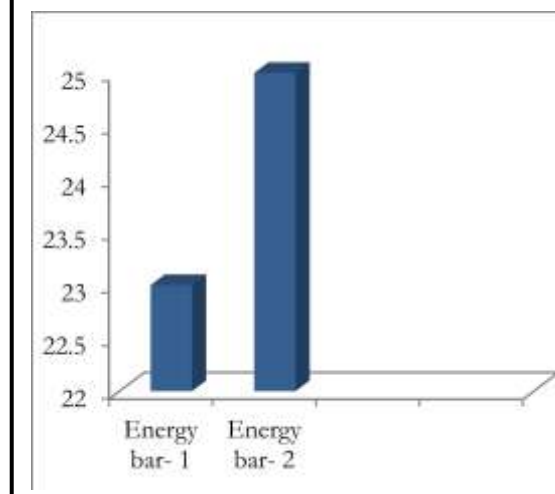
The energy bars are very good substitute of handy food for quick hunger. It perfectly is to satisfy the hunger and also provide essential nutrition's like the protein, vitamins, carbohydrates, fats and fibers. The prepared energy bars have all these essential nutrients. Adequate amount of protein, carbohydrate, fibers, fats and other energy are found in good amount making our bars great for consumption (table 4 and 5). It is observed in many other snack and energy bars which are loaded with a lot of combinations of fruit, nuts, grains etc. that these are good for health and consumption in busy schedule [11-12].

The protein content in energy bar 1 & 2 was 23 % and 25% respectively (figure 3). The protein amount

Table 6. The different components present in Energy bar- 2 are as follows:

Components	In 40g	In 100g	% in each serving
Protein	10g	25g	25%
Carbohydrates	14.04g	35.1g	35.1%
Fat	4.56g	11.4g	11.4%
Fiber	7.32g	18.3g	18.3%
Ash	2.56g	6.4g	6.4%
Moisture	1.52g	3.8g	3.8%
Energy(Kcal)	137.2Kcal	343Kcal	

Figure 3. Protein content of both energy bar

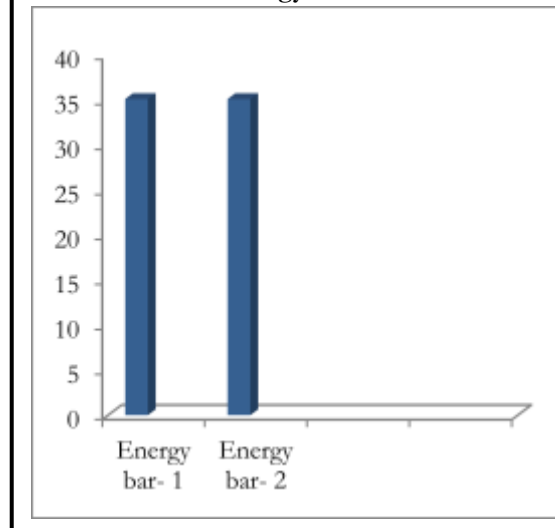


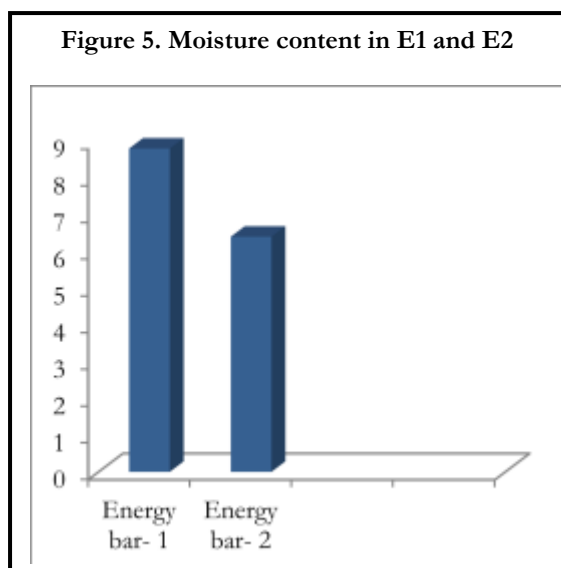
was higher in energy bar2 than 1. The reason can be the presence of flax seed in the energy bar 2. As flaxseed have good amount of proteins [13].

The carbohydrate level in both the bars was equal that is 35.1 % (figure 4). The presence of carbohydrate in energy bar helps in building up the active energy. The athletes or physically active individuals take sufficient amounts of carbohydrate to immediately replenish endogenous content [14].

In studies it is reported that energy bars with high ratio of protein: carbohydrate may improve post meal and diurnal glucose profiles in type-2 diabetes and

Figure 4. Carbohydrate content (g) of both energy bar

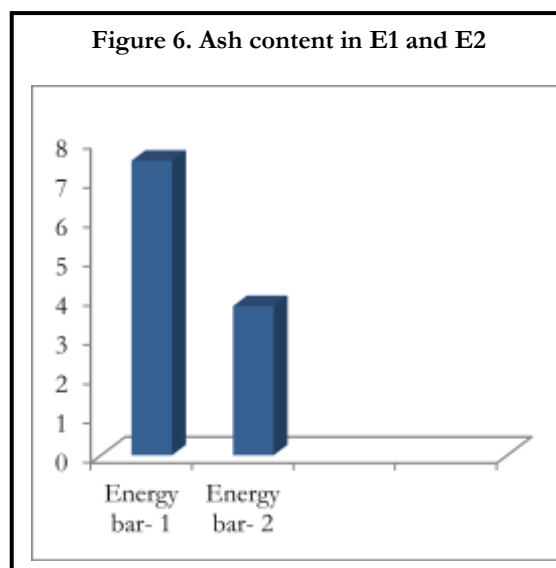




insulin resistance patients [15].

The moisture content of both the energy bar (E1 & E2) was found to be 7.5 % and 3.8% respectively (Figure 5). The moisture content obtained from the in this study was with similar range to the previous studies in fruit-based snack bars [16]. The significantly presence of moisture content in both the energy bar can be due to the presence oats in both the bars. The presence of oats with just dates and figs in E1 show more moisture content than E2 with more contents. The oats have higher water holding capacity which helps in retaining the moisture [17].

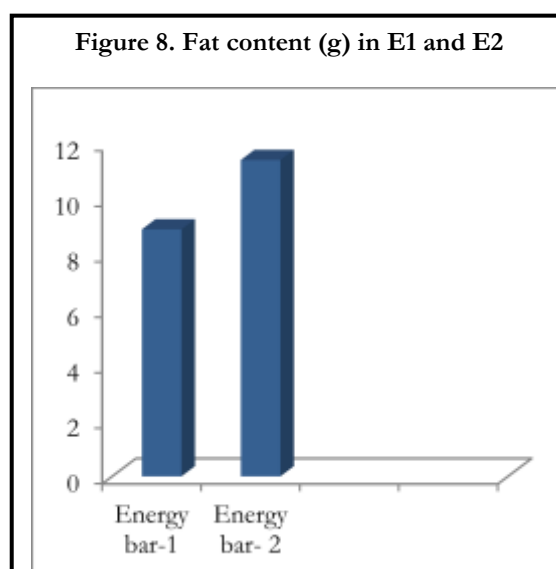
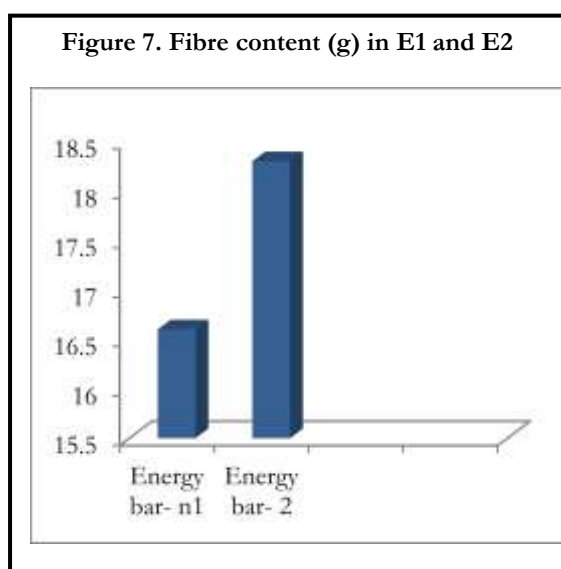
The ash value of E 1 and E 2 is 8.8 % and 6.4% respectively (figure 6). The comparable work with

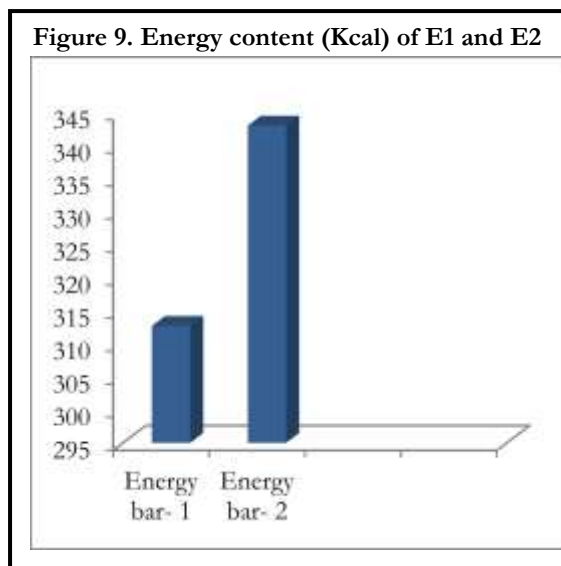


other energy bar had 1.13% ash content [18] and energy bar with apple had 1.02% ash [19]. The higher content of ash indicates that the energy bar may be consisting of various essential minerals [20].

The fiber content of energy bars E1and E2 are about 16.6% and 18.3% respectively (figure 7). Fibers help in prevention of various diseases and keeping the body healthy. The energy balance is maintained like digestive health, heart and diabetes problems rationalize the demand of increasing fiber dietary [21]. Oats, chia seeds and flexseed are rich sources of dietary fibers among cereals [22].

The fat content in E1 and E2 are 8.9% and 11.4% respectively (figure 8). Walnuts, amonds, cashew and





sesame seeds are good sources of polyunsaturated and monounsaturated fats which are good for the heart [23].

The energy content of E1 and E2 are 312.7Kcal and 343Kcal respectively (figure 9). It is higher than other energy bars prepared by fruits and cereals [24].

4. CONCLUSION

The study titled 'Preparation of energy bar using Figs and Dates and analysis of its nutritional status' is done with the objective to primarily meet the consumer need and provide them with the best product. This will really help people to go healthy instantly rather than relying on junk.

The reason for preparing two recipes of the energy bar is because everyone should get the product of their choice. Energy bar – 1 can be taken by elderly people and small children which will be easier for them to chew and Energy bar – 2 can be taken by anyone.

It can be concluded that, the product provides adequate amount of carbohydrates, fats, proteins, fiber and most importantly energy and can be used as a meal replacement bar.

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5. ACKNOWLEDGEMENT

NA

6. CONFLICT OF INTEREST

NA

7. SOURCE/S OF FUNDING

NA

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