

developed product.

2. Methodology

The methodology involved in the conduct of the present study such as study area, design is explained below.

3. Place of Study

This study was carried out at various sports academies in Chennai.

4. Study Design

The present study follows an experimental study design

Formulation of Anti-oxidant Rich Nutri- bars



Step 1: Selection and Procurement of antioxidant rich ingredients

The ingredients which are underutilized are selected based on their anti-oxidant properties. The ingredients such as rolled oats, pumpkin seeds, dehydrated carrots, flaxseeds, peanuts, almonds, honey, dates syrup are procured from a departmental store at Chennai. Rolled oats (50 kg bag) was sponsored by Bagrry's Oats Company from Mumbai.

These ingredients were selected since they are underutilized, easily available, ready-made foods and easily consumable. Main Objective of the present study is to formulate a recipe which provides considerable amount of antioxidants and in turn be helpful for athletes.

Step 2: Standardization of the Nutri – bars

The Selected ingredients which are underutilized are standardized based on the anti-oxidant properties. The dry ingredients are mixed and baked into granola (nutri- bars). The nutri- bars are made up into 50 gm (each bar weight) and two bars are provided for the athletes.

Step 3: Procedure for the preparation of Nutri- bars

Method

- Mix all dry ingredients in a bowl.
- Add honey and dates puree to the dry ingredients, mix well
- Spread a baking sheet over the baking tray, and add the mixture and hold it tightly
- Preheat the oven and bake at 180^oC and cool it and cut into bars

- Pour the choco mixture over it.

Step 4: Estimation of nutrient analysis in the developed biscuits

The prepared bars using antioxidant rich ingredients were subjected to nutrient analysis. Micro nutrients such as Total carotene, vitamin A, C, E and Macro- nutrients such as energy, proteins, carbohydrates and fats are also analysed.

Nutrients	Composition/100gm
Energy	524.5 kcals
Protein	24.48gms
Carbohydrates	39.14gms
Fats	30.87gms
Vitamin A	15.6 mcg
Vitamin E	20.2 mg
Vitamin C	50.6 mg
TOTAL	115.8 mg

The anti-oxidants were analyzed using DPPH method.

Step 4- Assessment of shelf life of the developed bars

The anti-oxidant rich bar was also analyzed for shelf life of about fifteen days at room temperature.

Organoleptic evaluation by the panel members

Acceptability test was conducted for the prepared bars in three variations by evaluating the different sensory attributes like appearance colour, flavour, texture, taste and overall acceptability by five panel members. Five point hedonic scales were used to evaluate the nutri- bars.

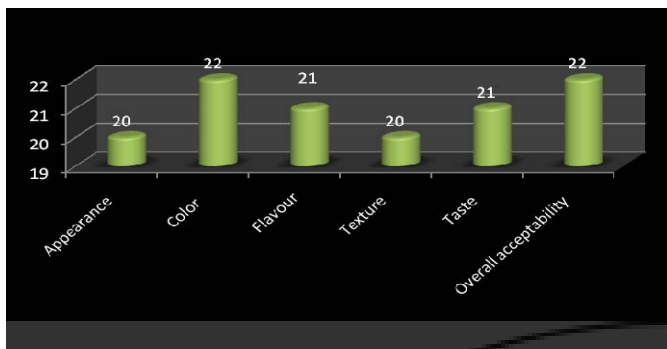
Organoleptic evaluation by consumers

The Nutri- bar was also subjected to organoleptic evaluation by the athletic population. The focus group considered were young adults with an age ranging from 18-25 yrs. (Staci Nix, 2005). Acceptability test was rated by 20 athletes of St. Joseph's academy. They were asked to score products using the score card. The attributes score for appearance, colour, flavour, texture, taste and overall acceptability. The score was given us very good (5), good (4), fair (3), average (2) and poor (1) for the sensory evaluation.

5. Observations and Discussion

Table1: Organoleptic scores of Nutri- bars

Attributes	Max Score	Nutri- bars
Appearance	30	20
Color	30	22
Flavour	30	21
Texture	30	20
Taste	30	21
Overall acceptability	30	22
Total score	180	126

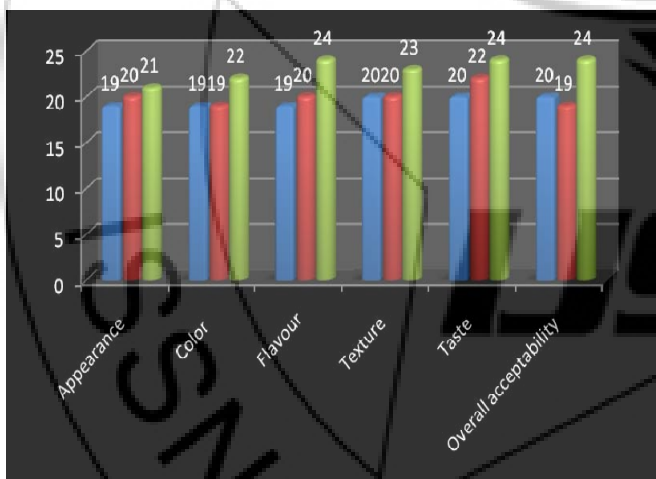


Organoleptic evaluation of Nutri bars

Table 2: Three variations of Nutri- bars

Attributes	Max Score	A1	A2	A3
Appearance	30	19	20	21
Colour	30	19	19	22
Flavour	30	19	20	24
Texture	30	20	20	23
Taste	30	20	22	24
Overall acceptability	30	20	19	24
Total score	180	117	120	138

It was thus observed that sample A3 scored highest in attributes of appearance, colour, flavor, texture, taste and overall acceptability. The product was accepted well with a total score of 24.



Comments received for sample a through organoleptic evaluation included A3 is accepted as best than A1 and A2. On a positive note, comments included that the sample was acceptable and tasted good.

High intensity exercise causes a substantial breakdown of muscle protein, quantity of protein needed to maximise this adaptation to exercise. Almonds provide a source of protein, as well as the antioxidant vitamin E. Almonds contains healthy monounsaturated fats and fibre. Almonds also contains other important vitamins and minerals such as potassium, magnesium, iron, phosphorous and riboflavin (vitamin B2). (Lemon PW, et al. 1995).

Table 3: Comparison of nutrient analysis of Anti- oxidant rich bar with recommended levels

Nutrient	Recommendation	Nutri- bars	% Met
Energy (k.cal)	3000	524.5 kcals	17.4
Protein (g)	84	24.48gms	29
Carbohydrate (g)	450	39.14gms	8.6
Fat (g)	96	30.87gms	32
Vitamin –A (µg)	900	15.6 mcg	2.1
Vitamin – C (mg)	90	20.2 mg	22
Vitamin – E (mg)	15	50.6 mg	>100

The energy requirement for athletes is 3000k.cal, 84g of protein, 450g of carbohydrate, and 96g of fat. The vitamin A requirement is 900 µg, 90mg of vitamin C and 15mg of vitamin E.

Compared to the requirements, the nutri bars have got better nutrient properties. 14 percentage of energy, 29 percentage of protein, 10 percentage of carbohydrate, 32 percentage of fat, 2.1 percentage of vitamin –A, 22 percentage of vitamin – C, >100 percentage of vitamin – E was met. Total antioxidant levels are fixed at 115.6 mg/100 gm. Two bars (50 gm weight) can be supplemented to meet up the recommended intake. Vitamin E recommendations are above 100% to reduce the oxidative stress involved in athletes.

6. Conclusion

The present study looked into the avenues of nutrition in athletes with positive outcomes, proving the role of nutrition in athletes and the formulation of a biscuit, takes nutrition a step further in an athlete’s performance. Out of the three variations, third one was found to be having better quality and antioxidant properties. The recommendation of athlete should be kept in mind, in prescribing these nutri- bars so that they meet up the requirement of the athletes. Biscuits have a better keeping quality and it is prepared out of underutilized which could be nutritionally effective for endurance athletes. Nutri bars also provide easy consumability during training and post competition for athletes. Therefore, nutri- bars could be a better option for supplementing antioxidant for the athletes.