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A STUDY ON DEVELOPMENT, SENSORY EVALUATION & NUTRIENT ANALYSIS OF RICE FLAKES FLOUR INCORPORATED CHICKPEA CHIPS

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Abstract: Chickpea (Cicer arietinum L.) has been considered as an important nutritional food due to its health promoting properties. Chickpea is developed generally in South Asia and Sub-Saharan Africa. It is a cool season crop. It is widely consumed by the peoples of India due to its high protein content. It is also contains soluble and insoluble fibre , calcium , iron. The fermented chickpea has shown an improved protein quality. Chickpea is of two types kabuli and desi. It is also considered as the traditional ingredient in the Indian cuisine. The essential nutrients for our body can be gained by intaking of food that is food like cereals and pulses. Flaked rice is considered a one of the popular breakfast and snacks which is prepared by the peoples in Asian countries. The plain flakes obtained are used for preparation of different types of sweet and savoury snack foods. In our country the children's are mostly affected with lack of nutrient supplement in the diet. Most of the children's are affected by Protein Energy Malnutrition (PEM). As chickpea is highly rich in protein and the rice flakes is rich in energy, both are combined to reduce the effect of PEM on children's that would be highly effective and can give partial remedy for PEM children's and can also save thousands of life at low cost.

Key words: **Chickpea, Rice flakes, Protein, Energy, Snacks.**

I. INTRODUCTION

The pulses occupy an important place in human dietary needs because these are the most important constituents of vegetarian diet as they contain higher percentage of protein and oil as compared to the cereals and are rich source of energy, vitamins and minerals. In reducing malnutrition and hunger mainly in developing countries along with major cereals such as maize, rice and wheat, legumes plays a crucial role in it as it is rich in grain protein . There are more than dozen legumes, a cool season crop chickpea (Cicer arietinum L.) is the most vital legume in India. Based on seed showcase sort, chickpea is classified into two bunches to be specific desi and kabuli. The desi sort is more conspicuous and accounts up to 80% of global chickpea generation. Chickpea may be a profoundly nutritious grain vegetable trim and is one of the cheapest sources of protein. It is a vital source of vitality, protein, dissolvable and insoluble fiber. Assist, the seed protein contains fundamental amino acids like lysine, methionine, threonine, valine, isoleucine and leucine. On a normal, chickpea grains contain 60-65% carbohydrates, 6% fat, and between 12% and 31% protein – higher than any other beat trim. Rice generation and utilization are among the most elevated in Asian populations. Rice gives up to 50% of the dietary caloric supply and a considerable portion of the protein admissions for almost 520 million individuals living in destitution in Asia. Rice flakes may be a food thing arranged from paddy. It is additionally prevalently known as "Poha". It is expended either after frying in oil or splashed in drain or urad. It could be a fastmoving customer thing and for the most part eaten as breakfast thing. Rice flakes are made from paddy and thus they are simple to process. Most of its arrangements can be made at a brief take note and consequently bulk of the family units store it on standard premise. Rice pieces or poha is a vital breakfast in semi-urban and provincial regions and center course families of urban India. With legitimate capacity, its rack life is 2-3 months. The study was to develop the chickpea chips as energy rich food and to analyze the nutritive value of the food. The study was formulated with the following objectives to develop the chickpea chips incorporated with rice flakes flour, standardize the product, sensory evaluation and nutritive analysis of the product.

II. METHODOLOGY

2.1 .Materials

Ingredients used for the preparation of Chickpea chips are Chickpea flour, Rice flakes flour, Rice flour, White sesame seeds, Powdered sugar, and oil. The Chickpea flour and Rice flakes flour is prepared in the home. The other products were purchased in a retail store. The experimental part of this study was realized on the faculties of Subbalakshmi Lakshmipathy College of Science, for sensory analysis of food. The raw materials such as chickpea flour, rice flour, rice flakes flour, powdered sugar, white sesame seeds, salt, oil, water from departmental stores Madurai. Utensils for making chickpea chips are Measuring cups, mixing bowl, rolling board, rolling bin, fork, knife, plate were used for used for preparing and serving the developed products.

2.2 Preparation of Rice flakes flour

The white Rice flakes were taken in a bowl. The taken rice flakes is blended in a grinder. The flakes were blended smoothly. Then the flour is shifted to sieving which will help us to get a fine flour. Then the smooth fine Rice flakes flour is shifted to a dry bowl .

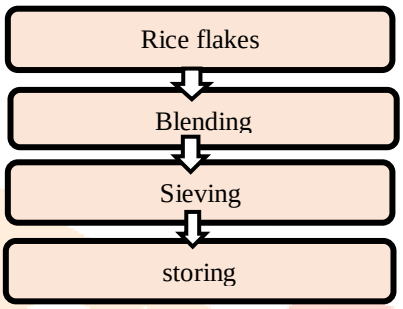


figure 1

2.3 Preparation of chickpea flour

The chickpea flour is prepared from whole chickpea. It is take in a bowl of 500g. It is now blended in a blender to make into a flour. The flour is then sieved to get a fine flour. It is the shifted to a dry jar.

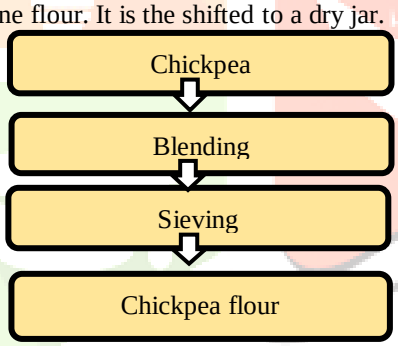


figure 2

Therapeutic Uses

2.4 Therapeutic use of Chickpea

The therapeutic value of chickpea is hypoglycemic and hypocholesteremic effects. Chickpea (Cicer arietinum L.) is the 2nd biggest vegetable crop within the world on the premise of add up to generation after soybean and bean, which is primarily developed in warm climates of India, Pakistan, Iran, Ethiopia, Mexico, and Mediterranean region.

It could be a wealthy vegetable in protein (19-29 g/100 g) , complex carbohydrates (60-65 g/100 g) and a source of B-complex vitamins and minerals. In any case, indeed in spite of the fact that its tall protein digestibility, chickpea too contains anti-nutritional components such as protease inhibitors, tannins, phytic corrosive, and saponins.

On the therapeutic level, chickpea seed is utilized for its anthelmintics properties as well as for the treatment of bronchitis, disease, skin maladies, and liver contaminations. It is considered to be the foremost cholesterol-lowering g nourishment compared to other vegetables.

2.5 Therapeutic use of Rice flakes

The rice flakes are rich in fibre so it controls blood sugar level in the human body. It will be a surprise to many as poha is good probiotic food too.

Poha contains 76.9% carbohydrate and 23% fat. So it will be a good breakfast with healthy carbs which provide energy to our body.

As poha is light, it is easily digestible. Poha is rich in iron as pregnant mothers and lactating mothers are advised to eat poha to reduce the risk of gestational anemia.

2.6 Preparation of Chickpea chips

Weigh the amount of flours. Mix the dry ingredients in the mixing bowl except sesame seeds. Mix well. Add oil to it. Add water gradually and mix the ingredients and make it into soft dough. Take a rolling board and rolling bin. Take a dough in a small amount and roll it into a round shape. Dust the rolling board with flour and place the dough and start rolling the dough until it became thin. Take a fork and prick the dough & sprinkle the white sesame seeds on the dough and press it gently. Cut the dough into square shape. Fry the chips in an oil for 3-5min in a medium flame, until it turns light brown colour. Remove it from the oil and put it on the tissue paper or paper to remove the excess oil from the chips.

table no 1 – Ingredients taken for different sample

S.NO	INGREDIENTS	QUANTITY			
		Control	**S1**	**S2**	**S3**
1.	Chickpea flour	80g	50g	60g	70g
2.	Rice flour	12g	5g	6g	7g
3.	Rice flakes flour	-	37g	26g	15g
4.	Powdered sugar	3g	3g	3g	3g
5.	White sesame seeds	1g	1g	1g	1g
6.	Salt	1g	1g	1g	1g
7.	Oil	3ml	3ml	3ml	3ml

2.7 Preparation of chickpea chips

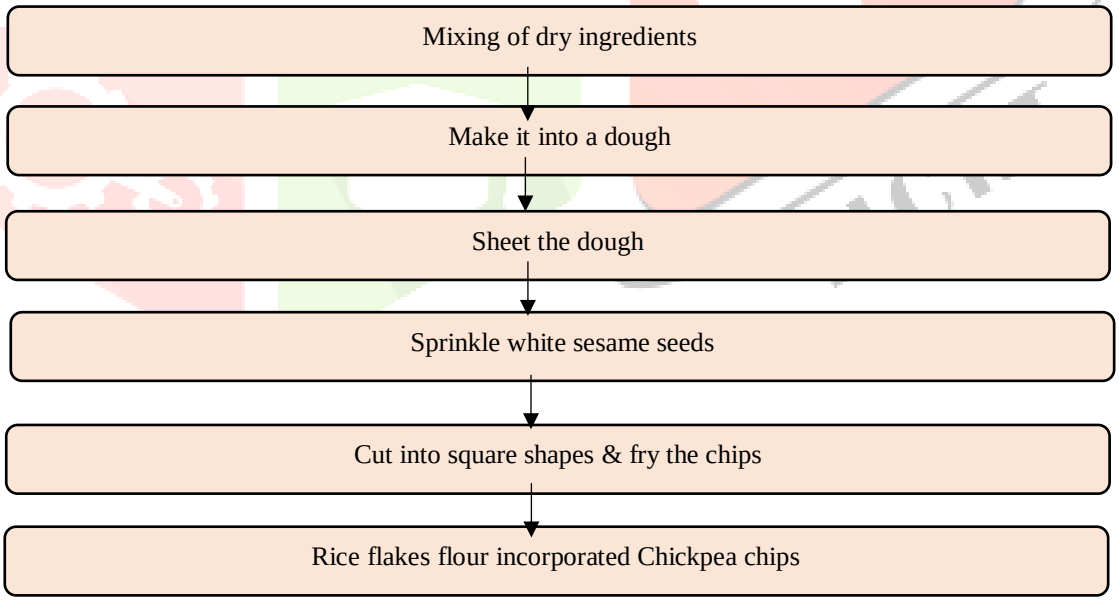


figure 3

figure 3, represents the preparation method for Rice flakes flour incorporated with Chickpea Chips

2.8 Standardization of Chickpea chips

table no 2- Standardization of chickpea chips

S. No	INGREDIENTS	QUANTITY
1	Chickpea flour	50g
2	Rice flour	5g
3	Rice flakes flour	37g
4	Powdered sugar	3g
5	White sesame seeds	1g
6	Salt	1g
7	Oil	3ml

figure 4
Raw materials for the preparation of chickpea chips

figure 5
Sheeting of the dough

figure 6
Final products for sensory evaluation

2.9 Cooking Characteristics

While cooking sample 2 and sample 3 the taste and texture of the chips become harder due to addition of high amount of Rice flakes flour added to it. Considering this factor sample 1 is acceptable for making chickpea chips with adequate amount of Rice flakes flour that is crisp and light brown. The cooking time of samples is tabulated below.

table no 3

COOKING CHARACTERISTICS OF THE SAMPLES

Sample	Cooking time
Control	4-5 minutes
Sample 1	5- 6 minutes
Sample 2	5- 6 minutes
Sample 3	5- 6 minutes

Design of the study

Formulation and standardization of chickpea chips

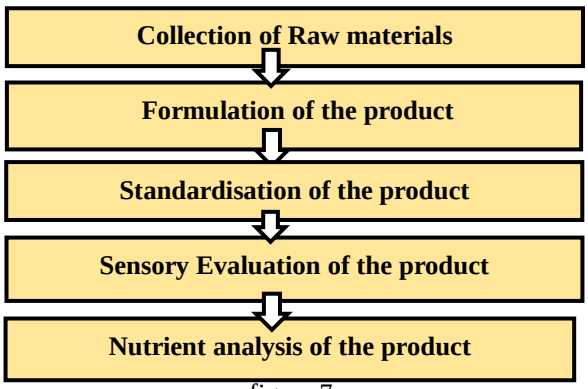


figure 7

2.10 Sensory evaluation

Sensory evaluation to 25 semi-trained and trained panel members. The chickpea chips are prepared in different proportions was evaluated by panel members. The samples were rated on the following attributes of appearance, color, flavor, texture and taste using a five-scale hedonic rating scoring test method. Using the score of above attributes the overall acceptability of the product was determined. The chips which gained maximum ratings by the evaluation done by panel members was said to be the most acceptable chips.

2.11 Nutrient analysis

Nutritional value of the product is assessed by chemical or instrumental analysis for specific nutrients. The formulated chickpea chips were analyzed for selected nutrients such as energy, protein, fat, moisture, carbohydrate and energy.

1.Determination of moisture

The moisture content in the sample was determined by using Hot air oven – Model TECHNICO. The procedure is appended in appendix

2.Determination of fat

The fat content in the sample was determined by using Socsplus apparatus.

3.Determination of crude protein

The crude protein content in the sample was determined by using Kelplus Digestion & Distillation apparatus

4.Determination of Total ash

The total ash content in the sample was determined by using Muffle furnace.

5.Determination of acid Insoluble ash

The acid insoluble ash in the sample was determined by using the Muffle furnace.

6.Determination of crude fiber

The crude fiber in the sample was determined by using fat removed sample with 1.25 % H_2SO_4 acid and 1.25% sodium hydroxide and the resulting residue in the hot air oven.

7.Determination of energy

The energy in the sample was determined by summing the determined percentage of Protein, Fat and Carbohydrate in the sample with respective factor.

III. RESULT AND DISCUSSION

The result of the present study entitled **"a study on development, nutrient and sensory evaluation of rice flakes flour incorporated chickpea chips (Cicer arietinum L)** is presented in the following headings.

3.1 Sensory evaluation of the formulated products
3.2 Nutrient analysis of the formulated products

3.1 Sensory evaluation of the formulated products

The chips sample is evaluated for their sensory characteristics namely appearance, color, flavor, texture and taste and overall acceptability by the 25 trained, semi-trained and untrained members. The members were asked to record their observations on the sensory sheets based on points and the result are shown in the following table.

table no 4-Sensory table

Sensory attributes	Colour	Flavour	Texture	Taste	Appearance	Overall mean score
Control	4	4	4.2	4.1	4	4.0
Sample 1	4.3	4	4.5	4.4	4.3	4.3
Sample 2	4.2	4	4.2	4.1	4.4	4.2
Sample 3	4.2	4	4	4.3	4.1	4.1

Control = chickpea flour 87g
Sample 1 = chickpea flour 50g + 37g rice flakes flour
Sample 2 = chickpea flour 60g + 26g rice flakes flour
Sample 3 = chickpea flour 70g + 15 rice flakes flour

From the above table no 4 , it is shown that the sample 1 is highly acceptable among all the other sample 2, sample 3 and control.

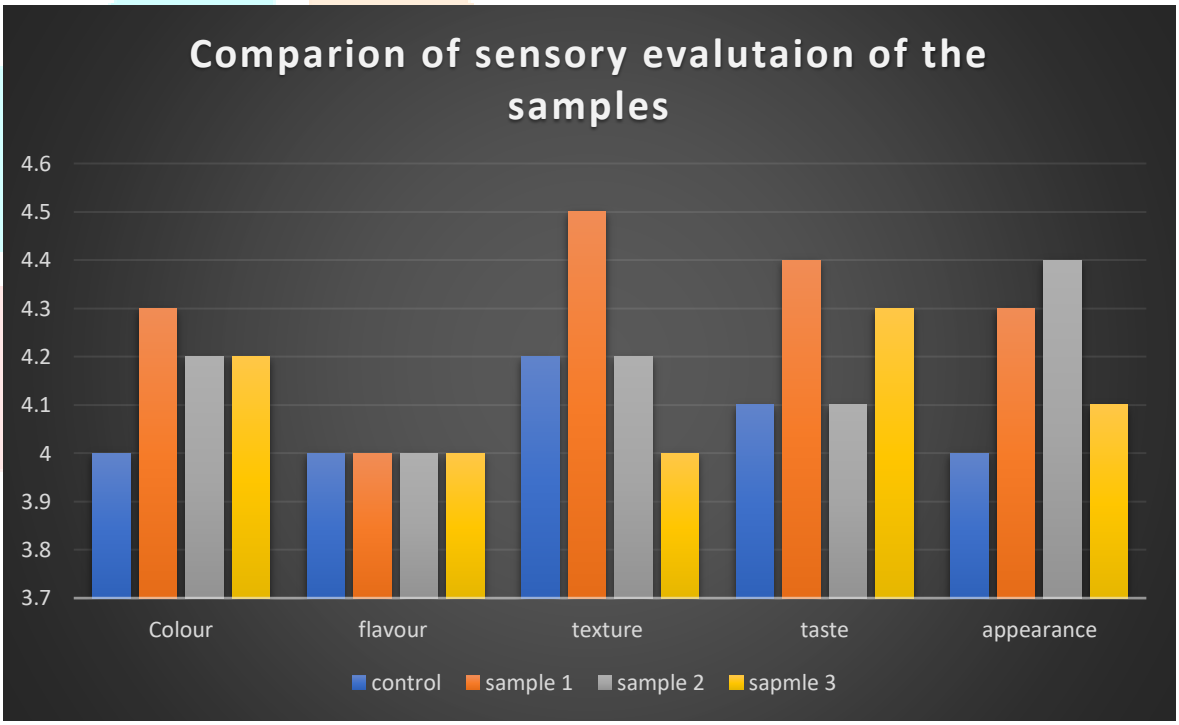


figure 8

figure 8 and table indicates that the sample 1 had the highest mean score in overall acceptability followed by control, sample 2 and sample 3. Sample 1 was accepted by the panel members were expected as it was the most preferred chips in appearance, flavor, consistency and taste were comparatively higher mean value of other samples.

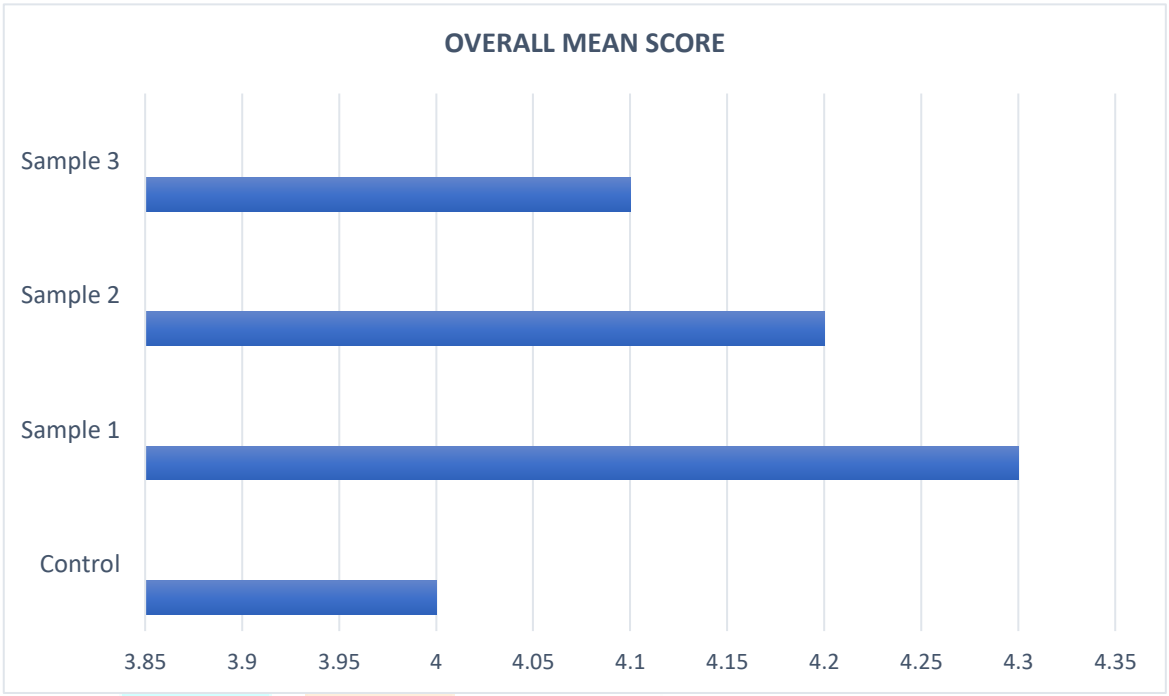


figure 9

This figure 9 shows the overall mean score of the control, sample 1, sample 2 and sample 3. Sample 1 has the highest mean score value compared to others.

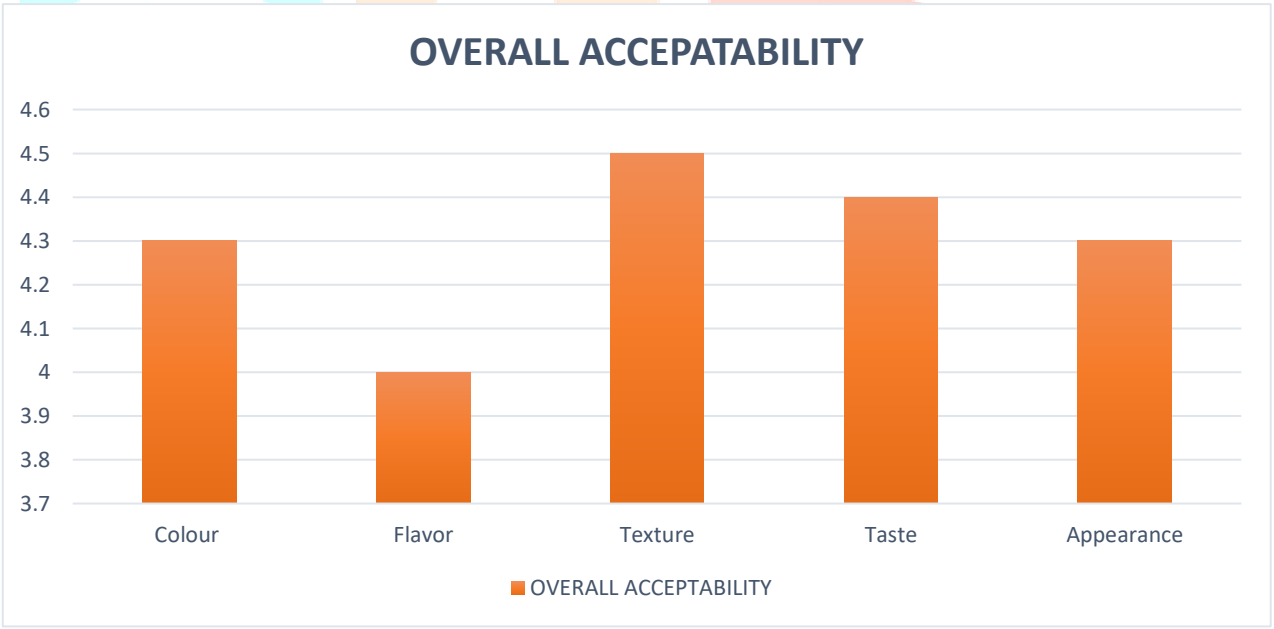


figure 10

This figure 10 shows the overall acceptability of the sample 1 that is color, flavor, texture, taste and appearance.

3.2 Nutrient analysis of the formulated product

Nutrient composition

3.1 Nutrient composition of Chickpea

table no 5

NUTRITIONAL COMPOSITION OF CHICKPEA

Nutrients	Composition
Moisture	8.56±0.37
Protein	18.77±0.42
Ash	2.78±0.13
Total fat	5.11±0.11
Total fibre	25.22±0.39
Insoluble fibre	22.70±0.60
Soluble fibre	2.52±0.87
Carbohydrate	39.56±0.16
Energy	1201±9

3.2 Nutrient composition of Rice flakes

table no 6

NUTRITIONAL COMPOSITION OF RICE FLAKES

Nutrients	Composition
Moisture	10.36±0.53
Protein	7.44±0.35
Ash	0.85±0.13
Total fat	1.14±0.11
Total fibre	3.46±0.32
Insoluble fibre	2.65±0.34
Soluble fibre	0.81±0.12
Carbohydrate	76.75±0.96
Energy	1480±16

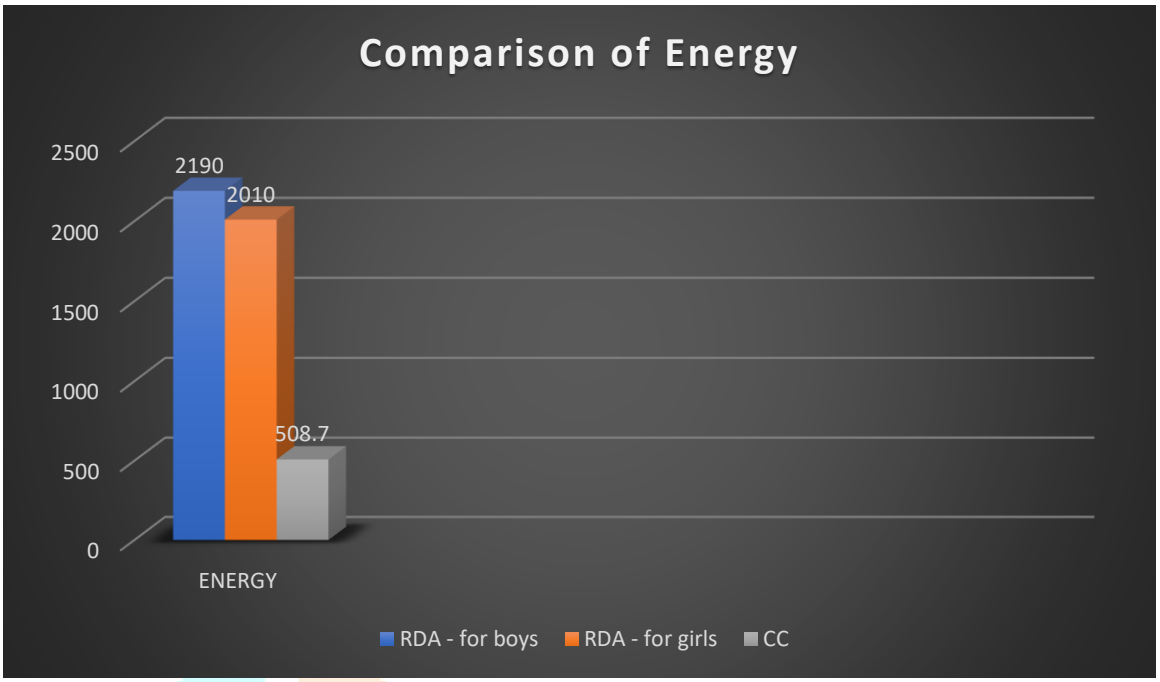
The nutritional value of the standardized chickpea chips is listed in the above table

table no 7

Nutrients	Nutritional value of Chickpea Chips
Energy	507.8 Kcal
Carbohydrate	66.4%
Fibre	15.1%
Protein	7%
Fat	23.8%

From the above table 7 , the standardized chickpea chips is considered as the energy rich food and also it considered as fibre rich food.

The comparison of energy in standardized chickpea chips and the RDA of 10- 12-year boys and the RDA of 10- 12-year girls.



RDA – Recommended Dietary Allowance ; CC – Chickpea Chips

figure 11

From the above figure 11, it is shown that the energy of the formulated product meets 20% of energy of the 10- 12 year boys and 10- 12 year girls in Recommended Dietary Allowance.

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