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BAKED KACHORI

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ABSTRACT

Rajasthani cooking is influenced by both the war-like lifestyles of its inhabitants and the availability of ingredients in this arid region. Food that could last for several days and could be eaten without heating is preferred. Scarcity of water and fresh green vegetables has a major effect on the cooking. It is also known for its snacks like Bikaneri Bhujia, Mirchi Bada and Pyaaj Kachori etc. A kachori can be made with variety of fillings. Due to its popularity the kachori was modified especially for cardiovascular patients. The product was modified using soya granules, moong dal, jowar flour, wheat flour, methi leaves & olive oil to increase its nutritional composition; high biological value protein, low in sodium and potassium, low in fat, easy to digest and good in fiber content. Cooking method was altered as well; baking was done instead of frying. Sensory evaluation of this product was done on a 5 point scale and on the basis of the comments from panel members the product was modified each time. As CVD patients require good fiber, protein, omega 3 and low fat this product had all these nutrients. Rajasthani cuisine is very famous and the product was highly accepted.

Key words: Rajasthani cuisine, Traditional, Kachori, Modified, Cardiovascular patients.

INTRODUCTION

Indian cuisine is largely based on the country's culture and traditions. The Indian cuisine is as diverse as the Indian people and it has a large selection of appetizers, hors d'oeuvres, and snacks. Kachori or Kachauri or Kachodi or Kachuri is a spicy snack popular in various parts of India including Uttar Pradesh, Rajasthan, Delhi, Maharashtra, Madhya Pradesh, Gujarat, Bengal and Orissa. It is a popular snack food in Karachi, Pakistan.

Kachori is supposed to have originated in Uttar Pradesh or Rajasthan. In these states it is usually a round flattened ball made of fine flour filled with a stuffing of baked mixture of yellow moong dal or Urad Dal (crushed and washed horse beans), besan (crushed and washed gram flour), black pepper, red chili powder, salt and other spices.

Additionally in Rajasthani cuisine, the Pyaaj Kachori (onion kachori) is very famous. Another form of Kachori which is famous in Rajasthan is the Mawa Kachori. It is a sweet dish which is dipped in sugar syrup.

Pyaaj Kachori is a kind of Rajasthani Kachori, a fried pastry filled with a spicy onion filling. It is one of the famous spicy snack food from Jodhpur and vicinity. Popularity of this snack dish increased in other parts of North India when Rajasthani restaurants and food outlets opened throughout India. Today it has become local snack dish of several regions of Indian Subcontinent.

In Gujarat, it is usually a round ball made of flour and dough filled with a stuffing of yellow moong dal, black pepper, red chili powder, and ginger paste. In Delhi it is often served as a chaat. Also Delhi has another kind of kachori, called 'Khasta kachori' or 'Raj Kachori'. Some of the variants popular in North India includes a version similar to the Rajasthan version accompanied with a curry made of potatoes and varied spices or even chana (chole), similar to one served in cholebhature.

In a study conducted by Nelia P Steyn et.al in 2011, it was found that there is increasing use of fast foods and street foods, which is posing many questions for public health advocates. Should nutritionists condemn the use of street foods in a country which is undergoing a rapid transition from consumption of traditional foods to more commercially available, ready-to-eat foods? How to "fit" these foods into the food-based dietary guidelines? The reality lies in the fact that street foods along with being highly popular and scrumptious are generally very affordable and have a high energy density. However, they are also usually deep-fried, contain refined flour, trans fatty acids and is typically detrimental for health.

This nutritional transition, particularly noticeable in children, has resulted in high consumption of calories, saturated fats, trans fatty acids (TFAs), simple sugars, and salt, along with low intake of fiber, monounsaturated fatty acids (MUFAs), and polyunsaturated fatty acids (PUFAs).

This nutrition transition has the potential to cause obesity and other diet-related non-communicable diseases such as type 2 diabetes mellitus, hypertension, and cardiovascular disease, predominantly in urban areas but also in semi-urban and rural areas.⁸ Thus to deal with this problem we have conducted the current study to modify the kachori's to make a product which at the cost of not being as delectable, is much healthier, can be stored and used on a daily basis for children and adults.

Traditionally the kachori recipe contains refined flour as its main ingredient, moong dal, carrom seeds (ajwain), sauf, methi seeds, other spices, baking soda, salt and oil for frying. We have modified it and replaced the main ingredient refined flour with Jowar and wheat flour and added soya granules, methi leaves, sesame seeds, olive oil, as well. Also, as method of cooking instead of deep frying these kachori's are baked.

In the modified product ingredients taken are Jowar, wheat flour, soya granules, fenugreek leaves, ginger, red chilies & other spices as well. Jowar is the Indian name for sorghum, a cereal grain native to Africa. Also known as white millet, whole jowar kernels can be steamed, boiled, added to soups and stews or ground into flour that can be used as a substitute for wheat flour in baked goods. Jowar is a gluten-free, high-protein, cholesterol-free source of a variety of essential nutrients, including dietary fiber, iron, phosphorus and thiamine. Fenugreek is known to have anti-diabetic, antioxidant, anti-neoplastic, gastroprotective, hepatoprotective, hypercholesterolemic and hypoglycemic properties due to its rich composition of phytochemicals. Meat alternatives that come from soy beans are complete proteins. This means they have all the essential amino acids present. Amino acids are the building blocks that create protein. Protein is a macronutrient that the body needs in large amounts for cell repair, immune function and muscle growth.

Hence keeping all these aspects in mind we modified the traditional kachori to make it palatable as well as nutritious and effective in controlling CVD in people. CVD is a serious disease and needs to be controlled as it is linked with other co morbidities.

MATERIALS AND METHODS

This product was innovated in the year 2013-2014 in Msc. Clinical Nutrition and Dietetics class at Dr. B.M.N

College of Home Science, SNDT University under the guidance of Dr Rupali Sengupta. The products underwent a sensory analysis by trained panel members on the basis of appearance, colour, texture, taste, and after taste on a 5 point scale. At every sensory evaluation analysis product was modified as per the recommendations from the trained panel.

METHOD FOLLOWED IS GIVEN BELOW

- Selection of the traditional food
- Modification in the selected traditional product
- Standardization of the modified product
- Sensory Evaluation Technique (A 5 point scale)
- Evaluation of acceptability of the modified product

Table 1 - Ingredients of Traditional & Modified Product

Traditional Recipe		Modified Recipe	
Ingredients	Quantity	Ingredients	Quantity
Refined flour (Maida)	1 cups	Jowar	30g
Melted ghee	¼ cup	Wheat flour	90g
Salt	½ tsp	Olive oil	5 tbsp
Moong dal	1/4 cup	Sesame seeds	1 tbsp
Cumin seeds	2 tsp	Moong dal	70gms
Hing	1/4tsp	Soya granules	20gms
Ginger chilli paste	1 tsp	Methi leaves	15gms
Chilli powder	1 tsp	Red chili powder	4tsp
Amchur	1 tbsp	Turmeric	1tsp
Besan	1 tbsp	Garam masala	2tsp
Oil for frying		Amchur	4tsp
		Hing	1/4tsp
		Lemon juice	1
		Dhania	3tsp
		Jerra	2tsp
		Ginger garlic paste	5tsp
		Salt to taste	

Table 2 - Nutrient Composition of Traditional Product

Ingredients	Quantity	Energy	Carbohydrate	Protein	Fat	Dietary Fiber	Na	K
Refined flour	200g	696kcal	147.8g	22g	1.8g	0	37.2	520
Moong dal	50g	166.66kcal	28.3g	11.66	0.805	4g	14	421
Ghee	50gms	450kcal	0	0	50g	0		
Besan	15g	50kcal	8.5g	3.5g	0.25g	4.2g	11.19	242.4
Oil (frying)	250ml	2250kcal	0	0	250g	0		
Total	565g	3612.66kcal	184.6g	36g	302.9g	8.2g	62.39	1183.4

Table 3 - Nutrient Composition of Modified Product

Ingredients	Quantity	Energy	Carbohydrate	Protein	Fat	Dietary Fiber	Na	K
Jowar flour	30g	100kcal	21g	2.5g	0.5g	2.91g	2	2.91
Fenugreek	15g	7.35kcal	0.9g	0.66g	1.35g	1.2g	19	39.3
Wheat flour	90g	300kcal	63g	7.5g	1.5g	11.25g	18	283
Soya granules	20g	90kcal	4g	9g	4gms	0	0	0
Moong dal	70g	233.33	39.66g	16.33g	1.8g	11.7	19.6	590
Olive oil	50ml	450kcal	0	0	50ml	0		
Total	230	1180.68kcal	128.56g	37g	59.15	27.06g	58.6	915.21

Table 4 - Comparison between Nutrients of Traditional & Modified Product

Nutrients	Traditional Food	Modified Food
Energy	3612.66kcal	1180.68kcal
Carbohydrate	184.6g	128.56g
Protein	36g	37g
Fat	302.9	59.5g
Dietary Fiber	8.2g	27.06g
Na	62.39	58.6
K	1183.4	915.2

Table 5 - Standardized Product Ingredients & Recipe

Moong dal	70gms
Soya	20gms
Spices	
Haldi	1tsp
Red chilli powder	4tsp
Amchur powder	4tsp
Hing	1/4tsp
Lemon juice	1
Garam masala	2tsp
Dhania powder	3tsp
Jeera powder	2tsp
Ginger	1" piece
Garlic	4-5 cloves
Methi leaves	15gms
Salt to taste	
For the dough	
Wheat flour	90gms
Jowar flour	30gms
Olive oil	5tbsp
Sesame seeds	1tbsp

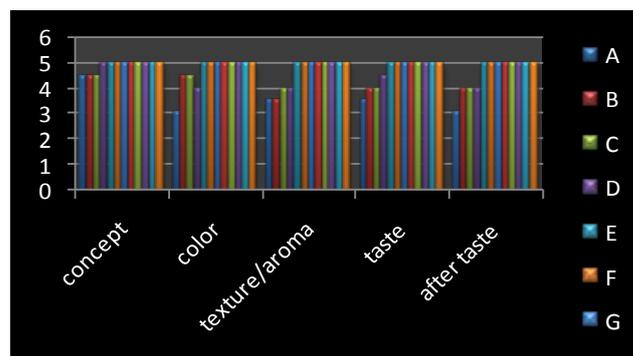
METHODOLOGY

- Soak soya and moong dal separately for 10-15 mins and then drain.
- Take 2 tsps olive oil in a kadhai add green chilli, ginger, garlic cloves and then add moong dal. Roast it for a while and in the end add soya.
- After its done take it out in a grinder add cumin seeds, dhania seeds, red chilli powder, amchur

powder, lemon juice, churan, haldi, salt, garam masala, and methi leaves and grind it.

- Now take both the flours (jowar and wheat) knead a dough using olive oil and wrap it with muslin cloth.
- Roll out dough stuff it with the grounded filling and close it. Make rectangular shaped or any other shaped kachori's. sprinkle sesame seeds over it.
- Grease the baking tray and set the oven to 250* for 9-10 mins and cook till done.
- You can serve it with curd, imli chutney, coriander chutney or make a hung curd dip.

SENSORY ANALYSIS OF STANDARIZED BAKED KACHORI



SCORES: POOR = 1, FAIR= 2, GOOD = 3, VERY GOOD = 4, EXCELLENT = 5

FUNCTIONAL FOODS

Functional Food Science in Europe (FUFOSE) proposed a working definition of functional food. A food that beneficially affects one or more target functions in the body beyond adequate nutritional effects in a way that is relevant to either an improved state of health and well-being and/or reduction of risk of disease. It is consumed as part of a normal food pattern. It is not a pill, a capsule or any form of dietary supplement.

FENUGREEK

Fenugreek is a herb that is widely used in cooking and as a traditional medicine for diabetes in Asia. It has

been shown to acutely lower postprandial glucose levels, but the long-term effect on glycemia remains uncertain. Results from clinical trials support beneficial effects of fenugreek seeds on glycemic control in persons with diabetes. Fenugreek have also been documented for health benefits including amelioration of abnormalities in lipid homeostasis due to its hypolipidemic properties. However, molecular mechanisms underlying the hypolipidemic effect of fenugreek seeds remain obscure. Hypolipidemic effect was studied by quantifying decrease in accumulation of fat or by western blot analysis of adipogenic and lipogenic factors. At molecular level, Fenugreek inhibited accumulation of fat in differentiating and differentiated 3T3-L1 cells via decreased expression of adipogenic. Fenugreek treatment decreased significantly cellular triglycerides (TGs), and cholesterol concentrations. Under sterol enriched condition, Fenugreek upregulated low-density lipoprotein receptor (LDLR) expression resulting in enhanced LDL uptake. Treating fat supplement fed C57BL6/J mice with Fenugreek for 15 days resulted in decrease of serum TG, LDL-cholesterol (LDLc), and body weight in a dose- and time-dependent manner ($P < 0.05$). Results indicate that hypolipidemic effect of Fenugreek is due to inhibition of fat accumulation and upregulation of LDLR. Taken together, the study suggests that TEFS may have potential application in the management of dyslipidemia and its associated metabolic disorders.

JOWAR

Jowar is the Indian name for sorghum, a cereal grain native to Africa. Also known as white millet, whole jowar kernels can be steamed, boiled, added to soups and stews or ground into a flour that can be used as a substitute for wheat flour in baked goods. Jowar is a gluten-free, high-protein, cholesterol-free source of a variety of essential nutrients, including dietary fiber, iron, phosphorus and thiamine.

A 1-cup serving of jowar contains 12 grams of dietary fiber. This amount supplies approximately 48 percent of the Food and Nutrition Board's recommended daily allowance of fiber for the average adult. Compared to other cereal grains like barley or rice, jowar contains a much higher concentration of fiber. According to a 2009 study published in "Nutrition Reviews," a diet rich in high-fiber foods like jowar may lower your risk of obesity, stroke, high blood pressure, heart disease, diabetes, elevated blood cholesterol and digestive problems like diverticular disease, colon cancer, constipation and hemorrhoids. Jowar contains 8.45 milligrams of iron in every cup, or nearly 47 percent of the required daily intake of iron for women and over 100 percent of the RDA for men. Iron is necessary for the body to produce red blood cells and adenosine triphosphate, or ATP, the main source of cellular energy. Without adequate iron, you may be more likely to develop anemia or neurological disorders like attention-deficit hyperactivity disorder. The iron in jowar is non-heme iron, a form of the mineral that is not

absorbed as easily as the heme iron in animal-based products. You can increase the iron you absorb from jowar by eating it with meat or a source of vitamin C.

SOYA GRANULES

Meat alternatives that come from soy beans are complete proteins. This means they have all the essential amino acids present. Amino acids are the building blocks that create protein. Protein is a macronutrient that the body needs in large amounts for cell repair, immune function and muscle growth. A 3.5-ounce serving of soya chunks contains over 54 grams of protein. This is more than the same serving size of meat and eggs. The recommended daily intake of protein is 56 grams for men and 46 grams for women. What separates meat alternatives from actual meats is their carb contents. Regular meat is carb-free, but soya chunks contain a high amount. This is because they derive from beans, which are carb-containing foods. A 3.5-ounce serving of soya chunks contains just under 30 grams of carbs. The recommended intake of carbs for the average adult is 130 grams. Carbs are a primary source of fuel for the body. Athletes who train rigorously for an extended period of time need a higher amount to meet these demands. A daily intake of 250 grams is more optimal. The calories in a food derive from protein, carbs and fat. Because soya chunks have only a negligible amount of fat, the calories come from the carbs and protein. A 3.5-ounce serving has about 336 calories. Based on a 2,000-calorie diet, this comprises about 18 percent of your total intake. Iron is an electrolyte mineral needed for oxygen transport in the body. Being deficient in iron can lead to physical weakness, fatigue and a compromised immune system. Soya chunks have a very high concentration of iron. A 3.5-ounce serving contains just over 21 milligrams. Males aged 19 and older and females 51 and older need 8 milligrams a day. Women from 19 to 50 however, need 18 milligrams a day. One serving of the chunks provides more than 100 percent of the recommended daily intake for both genders. Calcium is another electrolyte that helps strengthen bones and teeth and also aids in muscle contractions. Soya chunks contain over 530 milligrams of calcium per 3.5-ounce serving. The daily recommendation for this mineral is 1,000 milligrams for men 19 to 70 and women 19 to 50. Women aged 51 and older, and men aged 71 and older should get 1,200 milligrams a day.

RESULTS AND DISCUSSIONS

The modification of the traditional kachori was seen as a successful attempt towards a much bigger goal. Deduction from the sensory analysis of the standardized recipe was that the concept was found favourable to a large extent by maximum members. Texture and aroma of the product were given mixed results and were admittedly average. The color while not being too appealing the taste and after taste were mostly found to be at a scale of 4 and above, concluding it was well accepted in terms of flavour and palatability.

As evident in the graphical representation, the modified kachori's have much lesser calories as compared to the traditional kachori's, almost by 50%, the carbohydrate intake too has been drastically reduced. Protein being almost similar quantity, however typically millet protein contains high quantity of essential amino acids especially the sulphur containing amino acids (methionine and cysteine)¹⁶ which is of beneficial to health. But the reductions in the fat are more than to 50% of the original intake in fat. Additionally modified products are baked instead of deep frying. Deep frying is very detrimental to the body, preventing it reduces the intake of trans fats, saturated fats, empty calories, risk to heart, joints, brain, kidney and liver.

Intake of dietary fiber is very less in the traditional kachori's whereas in the modified kachori's is supplemented with 27.06gms of dietary fiber. Fiber supplementation in CVD individuals significantly enhances weight loss. Fiber intake lowers blood pressure and serum cholesterol levels. Increased intake of soluble fiber improves glycemia and insulin sensitivity in non-diabetic and diabetic individuals. Increased fiber intake benefits a number of gastrointestinal disorders including the following: gastroesophageal reflux disease, duodenal ulcer, diverticulitis, constipation, and hemorrhoids. Prebiotic fibers appear to enhance immune function. Dietary fiber intake provides similar benefits for children as for adults. The recommended dietary fiber intakes for children and adults are 14 g/1000 kcal.¹⁵

The fenugreek leaves contain three very important component of significant medicinal importance namely, complex carbohydrates (Galactomannan), steroidal saponin (Diosgenin) and amino acid (Isoleucine). It also contains other components like lecithin and choline that help to dissolve cholesterol and fatty substance, minerals B-complex, iron, phosphate, para-benzoic acid, vitamins A and D. As with most spices it contains many antioxidant and anti-inflammatory compounds such as apigenin, genistein, kaempferol, quercetin, rutin, selenium and superoxide-dismutase. It also contains compounds such as trigonelline that has shown to prevent the degeneration of nerve cells in neuro-degenerative diseases. Prebiotics are the non-digestible fibers which have the potential to exert a positive effect on human

Fried foods contribute greatly to the snack foods industries and are specially liked for their crispy texture and Uniqueflavour. Addition of fructooligosaccharides in fried food products has a potential to be developed into a therapeutic food. Hence, the effect of incorporating fructooligosaccharide on sensory qualities of fried product lilva kachori (Deep fried) was investigated. Fructooligosaccharides was added to the one serving of lilva kachori's stuffing at 5 g, 10 g, and 15 g and were compared with the standard recipes. Three successive trials were conducted for screening the panelist through threshold test A significant reduction ($p < .001$) was found in all sensory attribute scores of lilva kachori. Addition

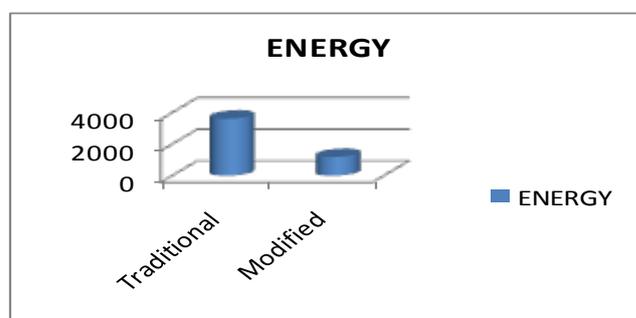
upto 5 g fructooligosaccharide did not altered sensory qualities of lilva kachori. The most affected attribute for lilva kachori it was color and appearance. Thus it can be concluded that fructooligosaccharides can be incorporated upto 5 g in lilva kachori. An addition of fructooligosaccharide in stuffed fried snacks may serve to fulfill consumer demand for health foods.

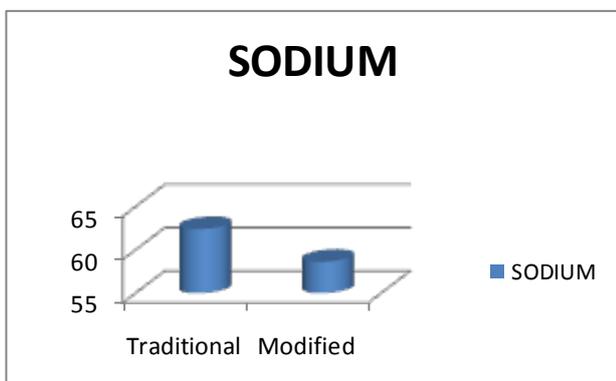
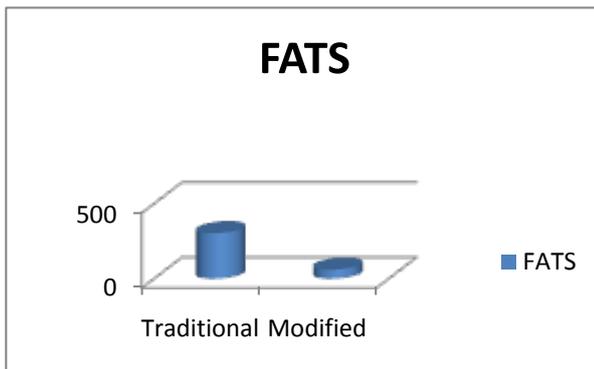
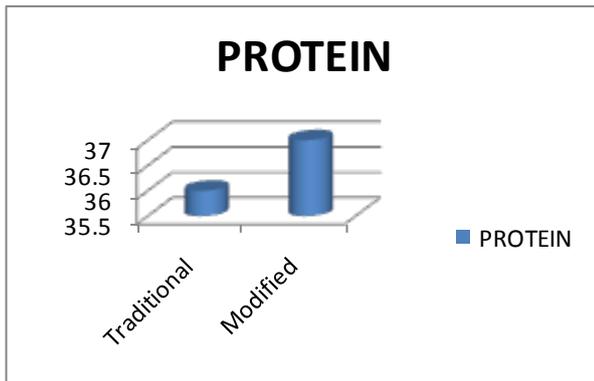
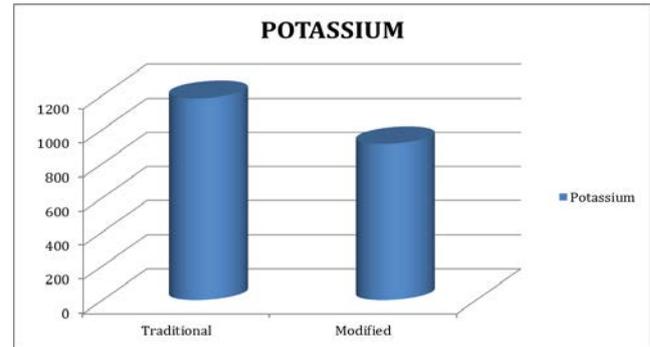
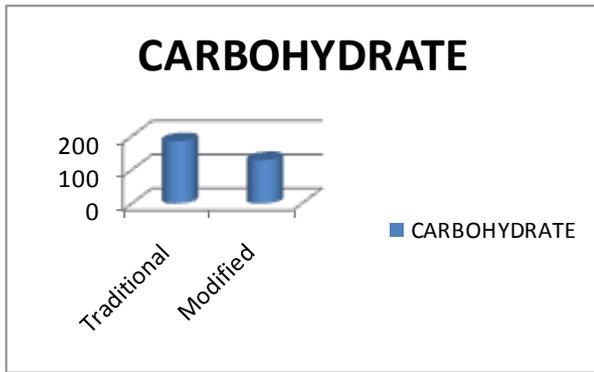
There is increasing evidence that consumption of soy protein in place of animal protein lowers blood cholesterol levels and may provide other cardiovascular benefits. Epidemiologists have long noted that Asian populations who consume soy foods as a dietary staple have a lower incidence of CVD than those who consume a typical Western diet.

The American Heart Association (AHA) Dietary Guidelines for Healthy American Adults stated that although there was some evidence that when soy protein was substituted for animal protein, total and LDL cholesterol could be reduced, the findings were inconclusive.

Jowar is somehow similar to sorghum which contains essential nutrients like Vitamin E and B, magnesium, fiber, and iron along with other valuable antioxidants. Consumption of jowar is beneficial in preventing common cardiovascular disease like atherosclerosis that often leads to stroke. In addition to that, it helps reduce bad cholesterol responsible for blood coagulation and high blood pressure.

Ginger contains dozens of the most potent inflammation fighting substances known, phytonutrients called gingerols. One study compared the medicinal potential of ginger to non-steroidal anti-inflammatory drugs (NSAID's). Ginger contains over four hundred chemically active ingredients and has been used traditionally for digestive complaints. It may protect the stomach from ulcers and has a wide range of parasite-fighting abilities. Studies indicate that ginger may be helpful for nausea, and migraine headaches Hence due to various advantages of the modified food to health, providing satiety, high in dietary fibre, low in calories and fat and along with numerous other benefactors 'BajraPuris' was modified by ingredients and cooking method.





The modified product was well accepted in terms of its nutritional benefits and medicinal impact as well as the palatability. Clinical trials of this product were not done.

CONCLUSION

The modified baked kachori is a much better option than traditional fried kachori in terms of health aspects as it is not fried and the ingredients present in it will help to lower the deranged lipid profile also they have a shelf life of 10 to 12 days.

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