



Dal Pitha: Connecting Eastern Indian Flavour's With Global Gastronomic Experience

Dr. Surjeet Kumar ^{1*} , Mr. Ashish Ranjan ² 

¹ Assistant Professor, Department of Tourism & Hotel Management, Kurukshetra University, Kurukshetra, India

² Research Scholar, Department of Tourism & Hotel Management, Kurukshetra University, Kurukshetra, India

*Corresponding author: surjeetkumar.kuk@gmail.com

Abstract. This study examines the nutritional value of Dal Pitha to promote it beyond its local borders. This study seeks to understand the meal's origins and cultural importance. This study also describes the preparation, technique, and nutrition of a lesser-known guilt-free snack. This study aimed to objectively examine three Dal Pitha features. The study aims to analyse the source and process of preparation; to create an approximated Nutrients Information Panel and the goal is to discover potential bioactive compounds to offer a succinct review of health benefits. The study used mixed methodologies. To comprehend the food, several interviews were done to learn the recipe. A rudimentary calorie counter was used for nutritional analysis to determine calorific value. The survey found that people of Eastern India value Dal Pitha culturally and it is part of their traditional inheritance. The combination of components and careful preparation give these steamed dumplings their unique taste, texture, and flavour. Dal Pitha may provide critical nutrients and health benefits as anti-inflammatory, antioxidant, anti-carcinogenic, and cardiovascular health. The calculated total energy was 153 calories, which is more nutritious. Additionally, these calories are clean. Scientific interventions for Dal Pitha production and packaging on a bigger scale are needed to meet expected demand and extend shelf life

Keywords: Gastronomic Experiences, Dal Pitha, Eastern Indian cuisine

1 Introduction

The history of Eastern India is a tapestry woven with the threads of time, encompassing millennia of diverse cultures, empires, and civilizations. Stretching from the rugged terrain of the Eastern Himalayas to the vast expanse of the Bay of Bengal, this region has played a pivotal role in shaping the history of the Indian subcontinent. One of the earliest chapters in the history of Eastern India is associated with the Indus Valley Civilization, which thrived around 2500 BCE. While the core of this ancient civilization lay in present-day Pakistan, its easternmost reaches extended into parts of Eastern India, particularly along the banks of the Ganges River. This period marked the beginnings of agricultural settlements and early urbanization in the region. Around 600 BCE, Eastern India became a significant center for the spread of Buddhism, with the region being home to the famous Magadh empires. The life and teachings of Siddhartha Gautama, who later became the Buddha, are deeply entwined with this region. Bodh Gaya, located in modern-day Bihar, is where the Buddha attained enlightenment under the Bodhi tree, making it one of the most sacred sites for Buddhists worldwide. In the centuries that followed, Eastern India saw the rise and fall of several dynasties and empires. The Mauryan Empire, under the rule of the

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legendary Emperor Ashoka, extended its influence over a vast territory that included much of Eastern India [1]. Ashoka's inscriptions, known as the Rock Edicts, are scattered across the region and bear testimony to his promotion of Buddhism and religious tolerance. The Gupta Empire, which spanned from the 4th to the 6th century CE, marked another golden era in Eastern India. This period is often referred to as the "Golden Age of India" due to significant advancements in science, art, and literature [2]. Nalanda University, located in modern-day Bihar, emerged as a renowned centre of learning during the Gupta period, attracting scholars from all over the world. As the centuries unfolded, Eastern India continued to be a melting pot of cultures and influences. [2]. The region saw the rise of powerful medieval kingdoms like the Pala and Sena dynasties, which furthered the spread of Buddhism and played a crucial role in shaping the artistic and architectural heritage of the area. The grand temple complexes of Puri, Konark, and Bhubaneswar, with their exquisite carvings and monumental structures, are testament to this rich cultural legacy. During the medieval period, Eastern India became a significant player in the maritime trade routes, connecting the Indian subcontinent with Southeast Asia and beyond [3]. The Kalinga (modern-day Odisha) coast served as a vital hub for trade, and the region's prosperity attracted the attention of various foreign powers. In the colonial era, Eastern India witnessed the arrival of European powers, particularly the British East India Company, which gradually established its dominance over the region. This marked a significant shift in the region's history, with the British laying the foundation for modern infrastructure, administration, and education, but also leaving behind a legacy of exploitation and social upheaval [4]. Today, Eastern India is a dynamic and diverse part of the country, known for its vibrant cultures, languages, and traditions. The region continues to evolve, contributing to India's economic growth and playing a crucial role in the country's democratic and cultural fabric. Its historical legacy, from the ancient civilizations to the colonial era, serves as a constant reminder of its enduring significance in the broader narrative of Indian history. The culinary heritage of the Eastern India region is enriched by the presence of Dal Pitha, a traditional dish that possesses considerable cultural and gastronomic importance. This culinary creation is a sophisticated amalgamation of lentils (dal), a variety of spices, and rice flour, meticulously crafted into dumplings and skilfully steamed to achieve an optimal level of culinary excellence. The origins of this cuisine may be traced back to ancient times, during which it held a significant role as a dietary staple for the inhabitants of Eastern India. Over the course of multiple generations, Dal Pitha has served as a means of satiating hunger while also embodying the cultural essence and diverse flavours of the dynamic Indian state. In this discourse, we shall explore the historical perspective of Dal Pitha and trace its trajectory over the annals of time. The origins of Dal Pitha can be traced back to the agrarian community of Eastern India, which thrived in proximity to the fertile banks of the Ganges River throughout ancient times. The area possesses a significant agricultural background and a longstanding tradition of cultivating lentils, resulting in their incorporation as a fundamental component of the regional gastronomy. The culinary creation was mainly conceived to effectively utilise the copious quantities of lentils and wheat that were readily accessible within the geographical area. Over the course of several centuries, the craft of producing Dal Pitha has through a process of evolution and refinement. It has evolved into an indispensable component of Eastern India's gastronomic heritage, intricately interwoven within time-honoured culinary practises transmitted over successive generations. The recipe underwent nuanced modifications as each family included their unique blend of spices and culinary methods, leading to a diverse array of flavours and textures observed across various parts of Eastern India. The consumption of Dal Pitha not only provided gustatory pleasure but also served as a significant component of communal meetings and the present section provides a comprehensive review of the existing literature on the subject matter at hand. The inclusion of an expert perspective is crucial, as is the expert evaluation of the existing literature. When perusing specific scholarly articles, it is possible

for readers to inadvertently disregard certain aspects that would be discerned by a proficient clinical researcher. This article discusses the concept of literature review as a form of secondary literature, wherein previously published original experimental research is compared based on their alignment with specific criteria. In contrast, literature reviews provide a concise overview of the authors' perception of the most significant and pertinent previous scholarly works. The provided content exhibits a high level of authenticity, as it showcases the abundant cultural heritage of Eastern India, encompassing its art forms and traditional culinary practises. The author cites several significant publications to facilitate a comprehensive understanding of the present paper.

2 Literature Review

These scholarly articles jointly emphasise the significance of regional and local food in fostering community development. In the study conducted [4] the author examines the strategic planning process of a Food Estate project in North Sumatera, Indonesia. The primary focus of this initiative is to promote sustainable agricultural practises while simultaneously fostering community development and enhancing the overall welfare of the local population. The [5] initiative places a strong emphasis on recognising the importance of local cuisine and gastronomy in the context of tourist development. This recognition stems from the understanding that local food not only supports to the growth of the local economy but also offers visitors distinctive and memorable experiences. The primary focus of [3] centres around Brazilian Community Restaurants and their availability to regional cuisine, with an emphasis on the disparities in food supply across different regions and the significance of advocating for the utilisation of local ingredients. The study [7] investigates the influence exerted by local food products on the promotion of sustainable regional development. The study places particular emphasis on the cultural and historical connections of local food producers, as well as the significance attributed by consumers to food items produced within their immediate vicinity. In general, the publications [8] illustrate the capacity of regional and local food systems to make a meaningful contribution towards community development and the promotion of sustainable economic growth. The study conducted by [11] has yielded significant findings about the impact of local cuisine on tourists' consumption behaviour, as analysed via the lenses of acculturation theory, need hierarchy theory, and self-determination theory. The researcher obtained data from a sample of 305 individuals who were outbound tourists in China, and subsequently constructed a structural equation model (SEM) based on this data. The results indicate that the consumption of regional cuisine, characterised by its distinctiveness, authenticity, sensory appeal, and social aspects, significantly impacts cultural competency. This experience also leads to feelings of well-being and prompts individuals to engage in behaviours related to local gastronomy. While reviewing domestic literatures, it was found that the study of [10] investigated how local food impacts community health and dietary habits. They discovered that the presence of diverse food options across regions significantly influences what people eat. These findings challenged the conventional notion that hunger solely drives food choices and highlighted the historical shift from hunter-gatherer societies to agricultural ones as a pivotal moment in human dietary evolution. Now it was crucial to study previous researches on Pitha and in the flow it was discovered that [9] focused on the connection between a traditional delicacy known as Pitha and cultural festivals in eastern India. Pitha, a culinary phenomenon with a wide range of flavours, sweet, savory, and spicy, has been intertwined with festivals like Rath Yatra and Durga Puja for centuries. Their study shed light on the enduring presence of Pitha in the region's culinary landscape. Building on this, [6] conducted a comprehensive study on Pitha, revealing its resemblance to pancakes, dumplings, or fritters. Originating in the Indian subcontinent, Pitha has gained popularity in Bangladesh and India. They

explained that Pitha is prepared using dough or batter and undergoes various cooking methods like steaming, frying, or griddling. Additionally, the study identified a trend among young individuals commercializing traditional meals, opening doors for the broader availability of Pitha recipes in the future. Furthermore explored the role of regional food in the development of tourism. Their research highlighted how regional cuisine plays a multifaceted role in the tourism sector [11]. It not only allows travellers to connect with a destination's culture but also contributes to the local economy and enhances the overall tourism experience. In essence, these studies collectively emphasize the intricate links between food, culture, and society, showcasing how culinary traditions are not just a source of sustenance but also integral to our well-being, cultural identity, and economic prosperity [13]. Upon an exhaustive examination of the literature, it becomes abundantly clear that Dal Pitha exerts a notably optimistic influence on both socio-cultural, physiological and economic facets within the context of community building [14]. While prior research has delved into the cultural dimensions of this dish, a conspicuous lacuna exists when it comes to the nutritional inquiry required for global recognition. Consequently, the primary objective of the present study is to meticulously delineate the nutritional composition and dietary implications of Dal Pitha, thereby fostering its enhanced integration into the realm of global gastronomy. This exploratory endeavour seeks to unearth hitherto undiscovered facets of this culinary tradition and illuminate its potential as a globally appealing culinary delight.

3 Research Objectives

The main objectives of the study are:

- To identify procedure and create a standard recipe for dal pitha.
- To create an informational panel that focuses on the nutritional aspects of the food.
- To identify bio-active compounds in dal pitha.

4 Research Methodology

A structured technique was employed to effectively address and achieve the intended objectives of the present study, allowing for a comprehensive exploration of multiple dimensions. The primary objective of the study was to investigate the origins of the food and obtain an original local recipe. To do this, interviews were conducted with residents of Eastern India, and the researcher himself is a native of the region where the cuisine originated. This material was obtained to obtain a historical overview and understanding of the process of manufacturing Dal Pitha.

The other objective was to create an informational panel that focuses on the nutritional aspects of the food. To consolidate the nutritional information, each ingredient was separately assessed, considering the nutritional data provided in the Report of Nutritive Value of Foods. The publication being referred to is Home and Garden Bulletin 72, which is authored by the U.S. Department of Agriculture, specifically the Agricultural Research Service. The analysis involved assessing each element and its corresponding quantity, followed by calculating the average based on the amounts provided in Figure 1. Finally, the results were aggregated to fulfil objective 2.

Each ingredient was thoroughly examined to evaluate the bioactive substances in question, considering their potential for inclusion and inclusivity. The bioactive chemicals present in each ingredient have been extensively studied and documented in various scientific research and literature. Festivities, the food in question acquired symbolic significance as it fostered a sense of unity, prompting families and communities to convene for its preparation and communal consumption. Festivals such as Chhath Puja, Makar Sankranti, and Holi are characterised by the presence of a delightful fragrance emanating from the newly cooked Dal Pithas, which entices

individuals to partake in their delectable flavours. The cultural value of Dal Pitha extends beyond its gustatory appeal. The cultural attributes of simplicity, friendliness, and hospitality are emblematic of the Eastern Indian culture. As the state began to accept variety, Dal Pitha emerged as a unifying element, fostering social cohesion by attracting individuals from many origins who gathered to appreciate its various flavours. The incorporation of this element into wedding feasts, religious rites, and other celebratory events played a pivotal role in enhancing the cultural tapestry of Eastern India. Here's a list of various types of Pitha from different states in Eastern India, along with brief descriptions, presented in table 1:

<i>Type of Pitha</i>	<i>State</i>	<i>Description</i>
Chakuli Pitha	Odisha	Circular, crispy, and deep-fried rice cakes
Manda Pitha	Odisha	Steamed rice dumplings filled with sweet stuffing
Kakara Pitha	Odisha	Fried dumplings made with rice flour
Enduri Pitha	Odisha	Rice flour pancakes filled with sweet coconut
Arisa	Assam	Deep fried rice cakes often served during bihu
Pitha Guri	Assam	Rice Flour dough filled with coconut and jaggery
Tekeli Pitha	Assam	Rice cakes cooked in special utensils called “Tekeli”
Ghila Pitha	Tripura	Steamed rice balls both sweet and savory
Puli Pitha	West Bengal	Rice dumplings, sweet or savory, steamed or fried
Gajja Pitha	Bihar	Steamed crescent shaped rice cakes
Moth Pitha	Bihar	Steamed rice balls served with sattu (gram flour)

Table 1: Various Pitha in different regions of India

Source: Author Creation

The names and variations of Pitha given in above Table 1, can vary within each state and even among different communities within the same state. These delightful treats are often prepared during In Eastern India; several regions have independently crafted their own iterations of Dal Pitha, using distinct local ingredients and flavours. In the Mithila region, it is common to see Pithas that are generously seasoned with a combination of piquant spices and accompanied by a condiment known as chutney. In various regions, the stuffing may encompass seasonal vegetables, meat, or a medley of lentils, so yielding a wide array of flavours. In recent years, Dal Pitha has experienced a surge in popularity that extends beyond the geographical boundaries of Eastern India. It has successfully made its way into restaurant menus and has become a beloved street food option. The dish has been subject to more experimentation, incorporating inventive fillings and presentations, to respond to the changing preferences of culinary connoisseurs. Dal Pitha serves as a tribute to the abundant culinary tradition of Eastern India, effectively embodying the historical, cultural, and social aspects of the province. The historical trajectory of this culinary

tradition highlights the resourcefulness and creativity of individuals who skilfully converted basic ingredients into a gastronomic masterpiece. Dal Pitha, whether savoured in its traditional form or appreciated in modern variations, remains a culinary delight that can tantalise the palate and safeguard the authentic flavours of Eastern India for future generations. below figure 1 shows the regions, where Dal Pitha is consumed.



Figure 1: Location of Eastern India, Jharkhand, West Bengal and Eastern Uttar Pradesh

Source: Google maps (<https://maps.google.com/>)

Objective 1: To identify procedure and create a standard recipe for dal pitha

The procedure for preparing the sample was implemented in accordance with established scientific protocols. For this purpose, residents were taken into confidence and various interviews were conducted to know that evidential process of Dal Pitha. After series of interviews and survey a common and traditional method was implicated to make a standard process which is scientifically justified in the process below. In the various conversations with locals, it was recorded that the constituents of dal Pitha encompass rice flour, split chickpeas (channa dal), assorted vegetables, a blend of spices and herbs, water, oil, and salt. The process of preparing dal Pitha may be categorised into four distinct stages, namely: (a) the preparation of the wrapper, (b) the selection and arrangement of the stuffing ingredients, (c) the filling and sealing of the wrapper, and (d) the steaming process.

(a) Preparation of Wrapper: The production of the wrapper involves the utilisation of freshly prepared rice flour. The choice of flour is of considerable importance as it directly influences the texture of the dal Pitha. It is recommended to thoroughly integrate the flour, salt, and water, and thereafter engage in the process of kneading the dough until a desirable level of smoothness is achieved. Baking soda is currently employed in the process of dough production to enhance the properties and taste of the dough. It is necessary to ensure that the dough is adequately shielded with a damp muslin cloth and allowed to rest at ambient temperature for a duration of 30 to 60 minutes prior to being flattened into a thin layer. The dough sheet is moulded into the desired form using a circular cutter, such as the rim of a cup.

(b) Preparation of stuffing: The soaked split chickpeas (channa dal) should be drained and rinsed thoroughly. To initiate the cooking process, it is recommended to amalgamate the thoroughly rinsed dal, precisely 1 cup of water, and a minute quantity of salt within a pressure cooker. The dal should be cooked in a pressure cooker for duration of 2-3 whistles, or until it reaches a state of tenderness and can be easily mashed. After the lentils have finished cooking, remove any remaining water and set them aside. Begin by heating a quantity of oil in a skillet, followed by the addition of cumin seeds, garlic, and chilies. Incorporate diced onions and ginger paste inside a culinary vessel. Continue cooking the onions until they achieve a translucent appearance. After the addition of turmeric powder, it is recommended to cook for duration of one minute. Next, include the cooked dal, salt, and coriander leaves into the mixture. Cook the mixture for a little duration, with continuous stirring, until the flavours are fully incorporated. Remove the mixture from its current location and allow it to cool. This was recorded while various interviews conducted with local people that the percentage of ingredients in the dish gives that evidential and traditional flavour. So, for in-depth understanding Figure 2 has pie charted and represented percentage wise content of raw ingredients to be used.



Figure 2: Profusion of ingredients in percentage
Source: Author Creation

(c) The Filling and Sealing of the wrapper: The process of filling and sealing the wrapper involves placing an appropriate amount of stuffing materials onto the middle piece of the wrapper and shaping it into a circular or half-moon shape. The wrapper is then sealed, ensuring that there is sufficient room left for the collection of broth during the steaming process.

(d) The Steaming Process: The process of steaming dal Pitha is conducted using a specialised equipment known as a tasla, which bears resemblance to a moktu or momo steamer. The lower section of the steamer apparatus is filled with water, while the perforated racks are either coated with grease or lined with banana leaves to prevent food from adhering to them. After the steaming process commences, the racks are subsequently loaded with Dal Pithas and subjected to a steaming duration ranging from 15 to 25 minutes. Dal Pitha is additionally subjected to deep frying in oil. The dish of freshly cooked Dal Pitha is traditionally accompanied by a variety of chutneys or sauces. For easiness of the readers and visualisation of process Table 2 is made for pictorial representation of each step of the whole process.





STEPS	PROCEDURE	TIME (Total time for preparation = 40 minutes)	DIAGRAM
1	Preparation of Wrapper	8 MIN	
2	Preparation of Stuffing	20 MIN	
3	The filling and sealing of the wrapper	10 MIN	
4	The steaming process	10 MIN	

Table 2: Pictorial representation of process in standard recipe

Source: Author Creation

from the table 2, the total time for recipe preparation is 40 minutes & the breakage of various preparations time as also mentioned. The time considered is approximate as distinct factors, such as, atmospheric pressure, quality of raw materials, fuel considerations and many others will affect the process. To sum up, we can disclose, the process of preparing dal Pitha has four stages that is the preparation of the wrapper; the selection and arrangement of the stuffing ingredients; the filling and sealing of the wrapper and the steaming process. further the standardize process of preparation Dal Pitha is 35- 40 minutes.

Objective 2: Creation of nutrients information panel for dal pitha

As discussed above Dal Pitha is a dish of various ingredients so to create a nutrient information panel each item must be analyzed and its constituted nutrient must be further bifurcated to conclude overall nutrient abundance. To identify the subtle distribution of macro and micronutrients, it is crucial to identify nutritional package of each ingredient. Table 3 shows the basic nutritional information of each ingredient used in making of Dal Pitha. The nutritional information was taken into consideration from Report of Nutritive Value of Foods. U.S.D.A.R.S, Home & Garden (Bulletin 72). The Table 3 will lead to estimation of total nutrients available in Dal Pitha by the help of Report of U.S agricultural Department.

Ingredients	Carbohydrate	Proteins	Fats	Dietary Fibers	Calcium	Iron	Potassium	Magnesium	Vitamins			
									B1	B2	B3	C
Rice Flour	29g	12g	2g	9g	1g	2mg	2mg	1mg	0	0	0	0
Lentil	22.62g	4.95g	1.14g	4.4g	0	0	172mg	0.9mg	0.1mg	0.1mg	0.1mg	1mg
Onion	10.11g	0.92g	0.08g	1.4g	0	0	144mg	0	0	0	0	0
Carrot	9.58g	0.93g	0.24g	2.8g	0	0	0	0	0	0	0	1mg
Mustard Oil		0	100g	0	0	0	0	0	0	0	0	
Water	0	0	0	0	0	0	0	0	0	0	0	0

Table 3: Composition of Nutrients (per100gm of ingredients as report)

Source: Gebhardt, Susan E., and Robin G. Thomas. 2002. Nutritive Value of Foods. U.S. Department of Agriculture, Agricultural Research Service, (Home & Garden Bulletin 72).

Now from Table 3 nutrients per 100 g are taken into consideration and then for 100 g of Dal Pitha it must be calculated as in table 4 below. Total energy in calories (c) is also considered by basic formulae, i.e., 1g of carbohydrate gives 4 c, 1 g of protein gives 4 c and 1 g of fat gives 9 c. To get macro and micronutrients quantity it’s crucial to investigate ingredients from Table 1 and their percentage from figure 1. The composition of ingredients from figure 1 is 33% rice flour, 36% lentils, 12% vegetables, 15% water and 2% salt and oil each.

Serving Size-100g per serve			
Macro Nutrient	Quantity per 100 g	Micronutrient	Quantity per 100 g
Carbohydrates	30	Dietary Fiber	5-7g
Protein	8g	Sugars	1-2g
Fat	1g	Calcium	20-30mg
		Iron	1-2mg
		Potassium	250-300mg
		Magnesium	20-30g
		Vitamin C	1-2mg
		Thiamine (Vitamin B1)	0.1-0.2mg
		Riboflavin (Vitamin B2)	0.1-0.2mg
		Niacin (Vitamin B3)	1-2mg

Table: 4 Nutrients Information Panel for Dal Pitha
Source: Author Creation

From table 4, energy would be mainly provided by carbohydrates, proteins and fats. Energy (kcal) calculation will be $(30*4) + (8*4) + (1*9) = 153$ calories. So, a 100 g of Dal Pitha will be giving approximately 153 calories. So, from above data the instance is very clear that Dal Pitha, a traditional dish of Eastern India, can indeed be considered a healthy snacking option due to several factors. Lentils, the primary ingredient in Dal Pitha, are an excellent source of plant-based protein. They contain essential amino acids that contribute to muscle growth, repair, and overall body function. Protein helps keep you satiated, promotes energy balance, and supports healthy weight management. Lentils are rich in dietary fiber, which aids in digestion, prevents constipation, and promotes a healthy gut. Fibre regulates blood sugar and lowers cholesterol, supporting heart health. Dal Pitha is generally low in fat content, making it suitable for individuals aiming to maintain a balanced diet or manage their weight. It can be a healthier alternative to fried snacks that are often high in unhealthy fat. The rice flour used in Dal Pitha provides complex carbohydrates, which are a more sustainable source of energy compared to simple carbohydrates. These complex carbohydrates release glucose slowly into the bloodstream, providing sustained energy levels and preventing blood sugar spikes. Lentils used in Dal Pitha are packed with essential vitamins and minerals such as iron, potassium, magnesium, and B-vitamins. These nutrients play crucial roles in maintaining overall health, including supporting red blood cell production, regulating blood pressure, promoting nerve function, and boosting energy levels. For individuals with gluten sensitivities or celiac disease, Dal Pitha is prepared using gluten-free flours like rice flour or millet flour, making it a suitable snacking option for those following a gluten-free diet. Dal Pitha is traditionally steamed, which helps retain the nutritional value of the ingredients while minimizing the use of oil or fats. Steaming also preserves the natural flavours and textures of the dish without compromising its nutritional benefits. Dal Pitha can be filled with a variety of ingredients, including vegetables, herbs, and spices. These fillings contribute additional nutrients, vitamins, and antioxidants, enhancing the overall nutritional value of the dish. Dal Pitha provides a combination of proteins, complex carbohydrates, and fiber, making it a balanced snack that can help satisfy hunger and provide sustained energy. It can be an ideal choice for those seeking a healthy, wholesome, and filling snack. It is important to note that the overall nutritional value of Dal Pitha can vary depending on the specific recipe, ingredients, and cooking methods used. To maximize its health benefits, it is advisable to prepare Dal Pitha with minimal oil, incorporate whole grains, and use a variety of lentils for added nutritional diversity. As with any food, portion control and moderation are key. Incorporating Dal Pitha as part of a well-rounded diet, along with a variety of fruits, vegetables, and other nutrient-dense foods, can contribute to a healthy snacking routine. Therefore, from the above we can conclude, that Dal Pitha is a healthy food & is full of good essential nutrients. From the Nutrients Information Panel (NIP), we can derive that essential amount of macro & micro-nutrients are available in Dal Pitha to promote it as a global guilt free snack.

Objective 3: To identify bio-active compounds in dal pitha

The Dal Pitha is a rich source of bioactive compound due to integration of ingredients such as rice flour, vegetables, spices and herbs. The term bioactive compounds (BCs) denote food components that deliver positive physiological functions to humans, while anti-nutritional compounds (ANCs) refer to those food substances that negatively interfere with the digestion and absorption of nutrients. This classification, however, is debatable since currently some of these compounds could offer both beneficial and adverse effects. These compounds could also interact with each other which may affect their physiological effects. The status of bioactive compounds in it depends on its ingredients and processing methods followed. The most probable bioactive compound of Dal Pitha and their bioactivities is given in Table 3. The steamed cooked Dal Pitha can lower the risk of cardiovascular disease and cancer and improve public health.

Bioactive compound	Ingredient	Health Benefits
Quercetin	Onion	<ul style="list-style-type: none"> • Have anti-inflammatory, antioxidant, anti-carcinogenic property. • Improve cardiovascular health
Poly Phenols Raffinose Saponins	Lentils	<ul style="list-style-type: none"> • Promotes muscle growth while reducing body fat, the most potent cancer-fighting substances in it, • Improve the cholesterol/HDL ratio. • Helps normalize impaired glucose tolerance in diabetics, • Decreases abdominal fat, • Reduces food-induced allergic reactions
Capsaicinoids	Red chili, Pepper	<ul style="list-style-type: none"> • Have anti-inflammatory property. • Relief from osteoarthritis pain, lower rate of heart attack, stroke and pulmonary embolism. • Relieves and prevents cluster headaches, migraine headaches, prevent chronic sinus infections, • Increases metabolic activity. • Prevent stomach ulcers
Beta carotene	Carrots	<ul style="list-style-type: none"> • Preventing Vitamin, A Deficiency. • Antioxidant & Immune-Enhancing Activity • Promoting Proper Cell Communication. • Supporting Reproductive Health,
Curcumin	Turmeric	<ul style="list-style-type: none"> • Have antitumor, antioxidant, anti-arthritis, anti-amyloid and anti-inflammatory properties
Inulin, Allicin	Garlic	<ul style="list-style-type: none"> • Prevention of cardiovascular attacks • Broad spectrum of antimicrobial activities • Preventing the common cold • Prevention and treatment of can
Anthocyanin Proanthocyanidin	Rice Flour	<ul style="list-style-type: none"> • Possess ant diabetic, anticancer, anti-inflammatory, antimicrobial, and anti-obesity effects, as well as prevention of cardiovascular diseases (CVDs)

Table: 5 Bio-active compounds in Dal Pitha
Source: Author Creation

The table 5 crisp out the bio-active compounds in each ingredient used in making of Dal Pitha. from the above table, it is concluded that every Bioactive Compound (BC) in ingredients will have its traces in final product, summarizing Dal Pitha as a guilt free street food for public. To sum up, that Dal Pitha is not only a guilt free snack but all the ingredients present in its Bio active compound has positive health benefits.

5 Discussion

The research paper undertakes a meticulous exploration of Dal Pitha, a traditional dish from Eastern India. Beginning with the establishment of a standardized recipe, the procedure encompasses four distinct stages. Residents' input was crucial, and interviews revealed the key constituents as rice flour, split chickpeas, assorted vegetables, spices, herbs, water, oil, and salt. The preparation involves the production of a wrapper, requiring the integration of rice flour, salt, and water. The dough, enhanced with baking soda, rests before being flattened into thin layers and shaped using a circular cutter. The stuffing involves cooking soaked split chickpeas, followed by a blend of spices, herbs, and vegetables, cooked until flavors meld. Filling and sealing the

wrapper completes the preparation, leading to the steaming process using a specialized *tasla* apparatus. The nutrient information panel (NIP) for Dal Pitha is meticulously crafted, detailing the composition of carbohydrates, proteins, fats, dietary fibers, and various vitamins and minerals per 100g of ingredients. The energy content is also calculated, showcasing Dal Pitha as a balanced snack with approximately 153 calories per 100g. The NIP emphasizes the dish's health benefits, noting its suitability for those seeking plant-based protein, fiber, and essential vitamins and minerals. The detailed breakdown of macro and micronutrients offers a comprehensive understanding of the dish's nutritional profile. The exploration of bioactive compounds in Dal Pitha sheds light on its potential positive physiological effects. Ingredients like onion, lentils, red chili, pepper, carrots, turmeric, and garlic contribute compounds with anti-inflammatory, antioxidant, anticarcinogenic, and cardiovascular health benefits. The inclusion of these bioactive compounds reinforces the paper's conclusion that Dal Pitha is not only a guilt-free snack but also a source of positive health benefits.

6 Limitation of the Study

The study provides a detailed examination of Dal Pitha, a traditional Eastern Indian dish. The recipe was standardized through interviews and surveys, resulting in a four-stage preparation process: wrapper production, stuffing preparation, filling and sealing of the wrapper, and the steaming process. The nutrient information panel indicates that Dal Pitha is a healthy snack, rich in essential macro and micronutrients. However, the study has limitations, such as regional variations, potential differences in ingredient quality, and the reliance on a specific nutrient database. Additionally, the bio-active compounds in Dal Pitha, sourced from ingredients like onions, lentils, red chilies, carrots, and turmeric, highlight potential health benefits. Despite these insights, the study lacks information on portion sizes, individual health conditions, and variations in recipes. Addressing these limitations through broader sampling and more extensive analyses could enhance the overall understanding of Dal Pitha's nutritional and bio-active composition.

7 Conclusion

Dal Pitha dumplings, a staple of Eastern Indian cuisine, are made using rice flour and filled with a delicious lentil mixture and spices. Traditional accompaniments include chutney, ghee, or yoghurt, depending on regional preferences. This dish has captured foodies and tourists interested in India's diverse culinary traditions. Dal Pitha is important to Eastern India's cuisine tourism business, allowing travellers to immerse themselves in the authentic gastronomic essence. The dish is available at local restaurants and street vendors, serving indigenous people and tourists. Nutrient information for each ingredient is provided by the Report of Nutritive Value of Foods and Home and Garden Bulletin 72. The ingredients include 33% rice flour, 36% lentils, 12% veggies, 15% water, and 2% salt and oil. Dal Pitha may improve cardiovascular health, provide anti-inflammatory, antioxidant, and anti-carcinogenic properties, and meet the body's nutritional needs. Scientific intervention in manufacturing and packaging is needed to increase shelf life and fulfill future demand. Traditional Indian meals like Dal Pitha are considered part of a balanced diet, providing various health benefits.

8 Results

The methodology employed to achieve the objectives yielded comprehensive results for the preparation, nutritional composition, and bio-active compounds of Dal Pitha. The standardized recipe outlined four distinct stages: wrapper preparation, stuffing, filling and sealing, and the steaming process. The ingredients included rice flour, channa dal, vegetables, spices, water, oil, and salt. The total preparation time was approximately 35-40 minutes. The nutrient information

panel derived from USDA data indicated that Dal Pitha, per 100g serving, offers a balanced combination of carbohydrates (30g), protein (8g), and fat (1g), contributing to an estimated 153 calories. Furthermore, the dish proved to be a rich source of bio-active compounds, with ingredients such as onions, lentils, red chili, pepper, carrots, turmeric, garlic, and rice flour providing various health benefits, including anti-inflammatory, antioxidant, and anti-carcinogenic properties. Dal Pitha emerged not only as a guilt-free snack but also as a culturally significant and healthful dish, integrating traditional methods with nutritional richness and bio-active compounds that contribute positively to overall well-being.

9 Future Scope of the study

Looking ahead, potential areas for future research are identified. These include sensory analysis for taste and texture evaluation, investigating regional variations in Dal Pitha preparation, longitudinal studies to assess long-term health impacts, and adapting the recipe to align with modern dietary trends. Such future studies would contribute to a more nuanced understanding of Dal Pitha's cultural significance, nutritional value, and potential for adaptation in contemporary culinary practices.

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Disclosure of Interest: The authors would like to disclose potential conflicts of interest related to the above study on Dal Pitha. One of the authors has a personal and cultural connection to Eastern Indian cuisine, and their affinity for the traditional dish might influence the interpretation of the findings. Additionally, the study relies on nutrient information sourced from the Report of Nutritive Value of Foods (U.S.D.A.R.S, Home & Garden Bulletin 72), and it is important to note that the authors do not have any direct association or financial interest with the mentioned report. The research was conducted independently, and the authors strive to maintain objectivity and transparency in presenting the study's results. It is crucial for readers to be aware of these potential biases and affiliations while interpreting the findings presented in the study on Dal Pitha.

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