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Review Article

INDIGENOUS FOODS OF TAMIL NADU-A NARRATIVE REVIEW OF ITS NUTRITIVE VALUE AND MINERAL BIOAVAILABILITY

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ABSTRACT

The Siddha system is one of the oldest traditional and holistic systems practiced in the southern part of India. "Food itself is Medicine and Medicine itself is Food" same indicates the Tamil quote *"Unavae Marunthu, Marunthae Unavu"* indigenous food is which is traditionally transferred from one generation to the next generation hence these food products are known as traditional foods. Indigenous food system helps to improve the quality of life. We conducted a literature search in scientific databases: PubMed and Google Scholar, also relevant Siddha literature from Dr. Ambedkar Library, Chennai. To identify studies reporting nutritive values and/or anti-nutrient content of IFs (not included in the Indian food composition database), consumed by peoples of Tamil Nadu. Data were selected and gathered from a total of 10 kinds of literature and 55 research papers. Some indigenous food displayed high levels of nutrients and minerals. Hence, efforts are desirable to encourage the inclusion of these nutritionally superior traditional foods into the usual diets. Indigenous food preparations are rich in nutraceutical compound which aids in better well-being and improve immunity. So, it is important to record indigenous foods in order to safeguard and maintain our traditional knowledge.

INTRODUCTION

According to Siddha system, human being is constituted by basic principles called as 96 Thathuvam (five elements, physical constituent, three vital humors). The 96 *Thathuvas* includes physical, functional and psychological components. The three vital humors are *Vatham, Pitham,* and *Kapham*. This humor maintains the healthy being of the body.[1] Indian cuisine has a long history and has developed over the years. Indian cuisine offers a delicious glimpse into the country's rich cultural past. Every region of India, as well as the entire world, has a different cuisine. Every location has its own recipes, uses various ingredients when cooking, and has its own distinct cuisine. A holistic approach to nutrition serves as the foundation for traditional eating habits across the nation.

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We run the serious risk of losing our extensive traditional food knowledge, which was developed with the wisdom of centuries, as our eating patterns are also changing quickly in response to rising urbanization. A wealth of knowledge about medical sciences can be found in authentic old Tamil cuisine. Traditional, real cuisine that is prepared with nearby ingredients and simple cooking techniques is recognized to provide amazing nutritional benefits.[2] Tamil Nadu's long history, distinctive geography, and being heavily influenced by various rulers, and tourists have helped to shape its food subculture and traditions. [3] Idli, *Dosai, Upma, Pongal, Sevai, Uttapam*, and *Vada* are popular breakfasts in Tamil Nadu cuisine. The ideal accompaniments for idli's and dosas are sambar or any of the chutneys that Tamil Nadu cuisine is known for. Lunch is a more elaborate affair with a good portion of rice served with curries, Sambar, Rasam (a spicy tamarind juice made with pepper and other spices), Poriyal (a dish made of various vegetables), and Morkulambu (curd and spices with coconut) or Puli Kulambu (a spicy sour curry with vegetables and tamarind). Breakfast and dinner are frequently lighter meals of day. [4]

The specific cuisine preparations used on the occasion (E.g Pongal, Diwali) were exclusive to Tamil Nadu. People's well-being and health are significantly maintained by their traditional dietary system. We can see that folk societies paid more attention to preserving easily perishable foods like milk, vegetables, and other such consumables when there was no refrigerator. The spread of knowledge about the traditional food system can help to build a strong society and country. For a specific geographic area, traditional culinary knowledge is thought to be the greatest. The good health of society may be harmed by a change in eating habits. Therefore, it is crucial to understand the value of a balanced diet and excellent eating practices from our own traditions[5]. A process of documenting traditional knowledge, ingredients, and recipes must start in order to save and maintain India's traditional food knowledge and critically comprehend the worth and profound significance of what it can provide to the world in terms of health.

METHODOLOGY

Literature Search

The published research articles and reports that were chosen through two stages served as the data sources for this review.

A literature search was done in the first phase using popular databases including PubMed and Google Scholar.

To find relevant studies, several keyword combinations including "nutritive value," "nutrition," "indigenous foods," "traditional foods," and "Tamil Nadu" were used in the searches.

Duplicate citations were excluded from articles that had been read and evaluated for inclusion after they had been scanned and checked against the inclusion criteria.

In the second phase relevant Siddha literature from the Ambedkar Library, Chennai was searched for the ingredients and preparation of traditional foods.

Selection Criteria

Foods that are native to the region or that were introduced there long ago and can be obtained from the natural food environment are referred to in the present review as "Indigenous foods, or Traditional food". We chose articles and literature based on this definition and their eligibility. Criteria: 1. original full-text English articles and literature evidence of the nutritive values of indigenous food consumed and known by peoples of Tamil Nadu. We defined nutrient composition data as inclusive of macronutrients (energy, protein, fat) and/or micronutrients (vitamins A, B1, B2, B3, B6, B9, C, iron, calcium, and zinc) respectively.

Data Extraction and Preparation

Using the selection criteria as a guide, several scientific sources were examined, and a final inventory of 55 articles and 10 kinds of literature was created. For all macronutrients, and micronutrients data were taken from each study, analyzed, and organized systematically according to the dietary groups.

In order to document additional nutrient composition data (where available) on indigenous food that were mentioned in the included research publication was also consulted. We researched and compiled all available information on indigenous food, including their scientific names and common names.

RESULTS AND DISCUSSION

Koozhu

Koozhu is a very traditional and ancient food made by Tamilians, and it is specifically organized for the Tamil month *Aadi Masam* which is held every year from July to August. In Tamil Nadu, *Koozhu* is organized and given to Mari Amman (another form of goddess Durga and Kali known as *Amman* in Tamil). *Koozhu*, which is prepared using millets. Mainly Finger millet (Ragi) and pearl Millet (*Kambu*) were used for the preparation of *Koozhu*. *Koozhu* is simple to prepare it requires *Ragi* or *Keppai*, broken rice, and required amount of water cooked thoroughly, and chopped onions, curd to taste. These ingredients are readily available and inexpensive for everyone. On the streets of Chennai, Tamil Nadu, many people choose *Koozhu* over soda because it is far healthier than soda or any other type of refreshing drink.[2] The *Koozhu* is rich in nutrients. It includes high fiber, vitamin E, vitamin B complex, niacin, thiamine, and riboflavin. It also contains important minerals including iron, calcium, and potassium, as well as amino acids like methionine, arginine, and phenylalanine. The amino acid content of fermented *Ragi koozh* is arginine 4.3g/100mg, histidine 5.5g/100mg lysine 1.9g/100mg, phenylalanine 4.8g/100mg, tyrosine 1.0g/100mg, methionine 1.2g/100mg, threonine 5.8g/100mg, cystine 2.3g/100mg, leucine 1.0g/100mg, isoleucine 1.5g/100mg, and Valine 3.0g/100mg respectively [6]

Benefits

Throughout the summer, a lot of individuals get sunburned. If a *Koozhu* is the ideal beverage for lubricating this body, it must be. The body's temperature is kept constant if you eat a *Koozhu* every day. The body receives instant energy from it as well.

Kazzhi (Kali)

Kazzhi is a classic Tamil dish made with rice or ragi or urad dal. For all types of kali, people use a specific wooden ladle known as a "*Thudppu*."

A. *Ulundu kazzhi*

A native pudding called kali is created by finely powdering urad dal and mixing it with jaggery syrup.

Benefits

For growing children, *Kali*, also known as *Ulundhangali* in Tamil, helps to strengthen bones and regulate metabolism. When a girl child reaches puberty, *Ulundhu Kali* is typically administered to her because of its strengthened hip bones and uterus. It's advisable to start providing from the age of 9 or 10 and not just throughout puberty. All women should consume this at least once a month as it is excellent for bone health. [2,7]

B. *Arisikali*

On the auspicious occasion of *Thiruvathirai, Arisi Kali* is typically prepared. A dessert called kali is prepared using broken rice, jaggery, moong dal, ghee, cardamom, and cashew nuts. Figure 4 shows *Arisikali*.

Benefits

It gives strength for growing children.

C. *Ragi Kali*

Ragi kali is made up of only *Ragi* and water. In this *Kali* there is no addition of jaggery. *Ragi kali* is eaten along with *Keerai Kulambu.* Figure 5 shows *Ragi kali*.

Benefits

Ragi kali is rich source of calcium. It strengthen the bones.[8]

Black gram porridge *(Ulluntham kanji)*

This meal is typical of Tamil Nadu. It's commonly served as a hot breakfast. *Ullunthu* kanji Ingredients are urad dal (*Vigno mungo*) and jaggery porridge.

Benefits

This dish is excellent for women of all ages in terms of health.

It strengthens bones, especially the lower back bones.[7]

Table 1: Carbohydrate, protein and fat content of traditional foods

Food name	Carbohydrate (g/100mg)	Protein (g/100mg)	Fat (g/100mg)
Koozhu	35	10.10	-
Ulundu kazzhi	32	6.2	5.4
Arisikali	56	5	4
Ragi Kali	72.47	8.69	1.09
Black gram porridge	32	6.2	5.4
Puttu	49.8	5.1	9.5
Fermented Foods	7.2	1	0.1
Idli			
Dosa	18.8	2.7	5.2
Appam	23.2	2.1	3.7
Palaya choru	0.461	0.374	-

Table 2: Mineral content of Traditional foods

Food name	Iron (mg/ 100mg)	Calcium (mg/100mg)	Potassium (mg/100mg)	Magnesium (mg/100mg)	Sodium (mg/100mg)	Zinc (mg/ 100mg)	Phosphurus (mg/100mg)
Koozhu	0.0046	0.35	0.270	-	-	-	-
Ulundu kazzhi	1.4	53.4	202.7	-	10.1	0.8	-
Arisikali	2	14	-	-	-	-	-
Ragi Kali	0.0046	0.35	0.270	-	-	-	-
Black gram porridge	1.4	53.4	202.7	-	10.1	0.8	-
Puttu	0.8	8.2	-	61	8.6	-	148.8
Fermented Foods	0.2	4	30.8	7.5	1.1	0.2	19.2
Idli							
Dosa	0.5	10.9	73.2	22.4	3.3	0.4	73.2
Appam	-	-	13.5	-	31.7	-	-
Palan choru	-	9.23	3.28	3.01	17.18	-	-

Table 3: Vitamin content of Traditional foods

Food name	Vit A (µg/100mg)	Vit B1 (mg/100mg)	B2 (mg/100g)	B3 (mg/100mg)	B6 (mg/100mg)	B9 (µg/100mg)	Vit C (mg/100mg)
Koozhu	-	-	-	-	-	-	-
Ulundu kazzhi	54.6	0.1	0.1	0.5	-	33.4	-
Arisikali	11	0.8	-	-	-	-	-
Ragi Kali	-	-	-	-	-	-	-
Black gram porridge	54.6	0.1	0.1	0.5	-	33.4	-
Puttu	-	-	0.1	1.3	-	7.6	0.7
Fermented Foods	0.8	-	-	0.3	-	3.6	-
Idli							
Dosa	47.2	0.1	-	0.7	-	9.5	-
Appam	1.1			0.4	-	1.8	-
Palan choru	-	-	-	-	-	-	-

Puttu

Both Kerala and the Tamil Nadu region are known for it. Various types of flour, such as rice flour, wheat flour, millet or ragi powder were used for the preparation of *Putu*. But notably rice flour (*Arisi mavu),* may be used to make unique variations of *Puttu*. Most of them are used to consume *Puttu* by using rice flour. *Puttu* is eaten along with Jaggerry and grated coconut.

Benefits

Traditionally, *Puttu* has given in menorrhagia conditions for women to stop their menses.

Little amount of eating this has a lot of advantages. For instance, if you consume it with little millet (Samai rice), the blood flow is proper; stomach issues, and constipation.

The number of living cells will increase. Rice manufactured from millet is beneficial for people with diabetes and high blood pressure. [7]

Fermented Foods

Fermentation may be defined as any process for the formation of a product by the mass culturing of microorganisms.[9] Fermentation of rice can be either acidic or alcoholic, or even both simultaneously. Beginning with the processing of the rice grains- such as soaking, grinding, or boiling- the process usually results in the relaxation of the starch's tight structure while also diluting the presence of anti-nutrient components. Certain food preparations' prolonged soaking starts the germination process by activating hydrolytic enzymes that loosen the starch's grip through exo- and endo-cleaving pathways. Rice batter (combined with pulses) is made by microbial fermentation, which produces carbondioxide and other gases inside the batter and gives the meal its spongy texture. Food taste, texture, appearance, smell, and so forth are all influenced by the degree of fermentation, which is dependent on time [10-12]

A. Idli

Idli is a low-calorie, healthy, starchy food that is typically eaten during breakfast.

Rice (*Oryza Sativa*) and black gram dhal (*Vigno Mungo*) are the ingredients. Black gram dhal and polished rice are each soaked in water for one night before being pulverized. Black gram dhal and rice are combined to create a thick batter. For fermentation, the batter is left out at room temperature overnight. After steaming the fermented batter in a concave idli pan, the savory sponge cake idli is eventually produced. [13]

Benefits

Idli is commonly used in weight loss diets and is said to be anti-obesity. It helps to lower the risk of stroke, high blood pressure, and cardiovascular disease. Moreover, it is utilized as a dietary supplement to treat kwashiorkor and protein-calorie malnutrition in children. Micronutrients including iron, zinc, folate, and calcium, help to nourish bone and muscle and avoid anemia. They also help to oxygenate the blood. The presence of dietary fiber and carbohydrates encourages the production of bulky stools and proper digestion.[14,15]

Idli has a protein content of 3.4% and a carbohydrate content of 20.3%. Amylase, proteinase, total acids, batter volume, soluble solids, non-protein nitrogen, and soluble vitamins (folate, vitamin A, vitamin B1, vitamin B2, and vitamin B12) content all rise during fermentation.[16-18]

B. Dosa

Similar to Idli, Dosa is a fermented food that is particularly popular in the south (Tamil Nadu, Andhra, Karnataka) of India. The most well-known pancake in Tamil Nadu is the Dosa, which is crispy, flat, and thin. It can be eaten for breakfast or dinner. Finger millet and horse gram are two primary ingredients that can be

added to enhance the nutritional quality of Dosa. On a flat hot plate that has been greased with a little edible oil, the colloid fermented batter is applied in the form of a thin layer. A circular semi-soft to crisp dosa appears within a minute.

Benefits: *Dosa* decreases *Pitham, Vatham* and *Kapham* diseases. [4]

C. *Appam*

Appam is a very old and conventional recipe of South India, especially in Tamil Nadu and Kerala. It is a little special recipe that is cooked at the appam pan simplest which is particularly made to cook dinner appams on it. Appam is made with a batter similar to idli batter. Appam is eaten along with coconut milk. In the olden days, Toddy or kallu the neighborhood palm wine was used in the fermentation of Appam [11].

Benefits

Appam has low calories in it so it helps in preserving weight problems away and maintains suitable health and reduces the chances of heart stroke because it lowers cholesterol and fat deposits from the body. Vitamin A, B-complex, calcium, folate, iron, niacin, riboflavin, and thiamine were found in appam. This cuisine is nutritious. [19]

D. Fermented rice (*Palan Choru* (*Pazhya Choru*))

Palan choru is easy to prepare because leftover rice is the main ingredient. In a container with a few cups of water, soak the rice for one day.[20]

It encourages the growth of beneficial bacteria. With the addition of spices like chilies, small onions, curd or buttermilk, etc., it is ready to eat in the morning. *Palan choru* is the name given to the dish that combines soaked rice with certain ingredients. You can still consume the exhausted water one sip at a time or with the rice. This classic dish is a good source of the vitamins B6 and B12.[21,22]

It keeps the majority of common ailments at bay and encourages the growth of beneficial bacteria in the gut. *Palan choru* was widely consumed by people who perform a lot of manual labor. This diet provides a lot of energy and keeps the body fresh throughout the day. The bacteria produced during a certain stage of rice fermentation enhance the digestive system with clean digestion and provide relief from constipation. Negligence is to blame for the fact that such healthy meals were overlooked. This does not need elements that generate revenue, hence it is not as often advertised as corporate goods. Similar to those, *Palan choru* came to be known as a terrible worker's diet, and as a result, the developed world ignored it. [15]

Palan choru reduces body heat and cures peptic ulcer, abdominal pain, and constipation.[4]

CONCLUSION

Indigenous food preparations are rich in nutraceutical compound which aids in better well-being and improve immunity. This review also emphasizes the need for greater investigation into the nutritional and anti-nutrient properties of traditional food and their potential to reduce malnutrition. A diverse food base contextualized to regional, cultural, and traditional food habits will be necessary to shift our focus from a small subset of foods to a diverse food base, which may potentially improve the dietary quality of the population. These policies include the POSHAN Atlas and Horticulture Mission, which are aimed at identifying and producing region-specific foods. So, it is important to record indigenous foods in order to safeguard and maintain our traditional knowledge.

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