

DOCUMENTATION AND NUTRITIVE EVALUATION OF TRADITIONAL FOODS OF KERALA – MALAPPURAM DISTRICT



PROJECT SUBMITTED

**In the Partial Fulfillment of the Requirement for the Award of the Degree of
B.Sc. NUTRITION AND DIETETICS**

BY

SAHANA PARVEEN T

Register No - SB20ND022

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

ST. TERESA'S COLLEGE (AUTONOMOUS)

ERNAKULAM

APRIL 2023

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CERTIFIED AS BONAFIDE RESERCH WORK

Signature of Internal Examiner

Signature of External Examiner

DECLARATION

I hereby declare that the project entitled “ **DOCUMENTATION AND NUTRITIVE EVALUATION OF TRADITIONAL FOODS OF KERALA -MALAPPURAM DISTRICT**” submitted in partial fulfilment of the requirement for the award of the degree of B.Sc Nutrition and Dietetics is a record of original research work done by me under the supervision and guidance of **Ms. Dr. Soumya.P.S**, Assistant Professor, Department of Clinical Nutrition and Dietetics, St. Teresa's College (Autonomous), Ernakulam and has not been submitted in part or full of any other degree/diploma/fellowship or the similar titles to any candidate of any other university.

Place: Ernakulam

Sahana Parveen T

Date:18-04-2023

CERTIFICATE

I here certify that the project entitled “**DOCUMENTATION AND NUTRITIVE EVALUATION OF TRADITIONAL FOODS OF KERALA - MALAPPURAM DISTRICT**” submitted in partial fulfilment of the requirement for the award of the Degree of B.Sc Nutrition and Dietetics is a record of original work done by **Ms. Sahana Parveen T** during the period of the study under my guidance and supervision.

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ACKNOWLEDGEMENT

My Sincere efforts have made me to accomplish the task of completing this thesis. I have taken effort in this thesis. However, it would not have been possible without the kind support and help of many individuals. I would like to extend my sincere thanks to all of them.

First and foremost, I praise the Lord Almighty to the skies, for providing me all the strength and courage to complete my thesis work.

I hereby express my sincere gratitude to Director Rev.Sr.Emeline CSST, Provincial Superior and Manager Rev.Sr.Vinitha CSST and Dr. Alphonsa Vijaya Joseph, Principal, St.Teresa's College (Autonomous) Ernakulam, for granting me the permission to commence this thesis.

I also express my sincere and deep gratitude to the Head of the Department of Clinical Nutrition and Dietetics, Mrs. Surya.M.Kottaram, for her support and encouragement throughout the study. Also I'm deeply thankful to my research guide, Dr. Soumya.P.S, Ph.D for being the source of inspiration behind all my activities and constant support and guidance. Her valuable instructions, inspiring guidance, motivation and consistent inspection helped me to complete my study effectively.

I sincerely acknowledge the courtesy and help to all the teachers in the Department of Clinical Nutrition and Dietetics.

My sincere thank you to all the respondents and families from the district of Malappuram who took time in contributing to my thesis.

I also humbly thank my parents who stood by me and motivated me during my stressful period and cheered me up with their unconditional love.

Lastly I also thank my well wishers who deserve special mention for their never ending love and prayers.

SAHANA PARVEEN T

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1. INTRODUCTION

“Food is not simply organic fuel to keep body and soul together, it is a perishable art that must be savored at the peak of perfection.”

– E.A. Bucchianeri

Food is a culture, emotion, hospitality, prestige and power and is closely knitted with tradition. Traditional knowledge is a community based functional knowledge system, developed, preserved and refined by generations through continuous interaction, observation and experimentation with their surrounding environment. It includes beliefs, values, and practices gathered from the practical experience of older generation, and its whole function is survival and development of culture of people.

Traditional foods, originated from ancestral kitchens are developed through ages, invented, modified, utilized and evolved to improve nutritional and social well-being of the people around the world. Most of them are culture specific, region specific, environment specific, community specific and season specific. These foods are socially, culturally and economically important and provide food security, enhance livelihood and improve nutritional and social well-being of people. Food culture arises out of the place of a people's origin, and so traditional local foods hold the potential to bind and stabilize communities and enable a cultural continuity through conserving their histories. Indian cuisine is represented as a wide spectrum of food cultures with distinctive regional differences and preferences (Achaya, 1998).

Traditional food products are socially, culturally and economically important. These are developed on the basis of the domestic agricultural produce to meet the nutritional needs of the people and have great potential to develop new food industries. Moreover, traditional foods provide food security, enhance livelihood, improve nutritional and social wellbeing of people around the world, particularly the marginalized and vulnerable groups.

Rao and Srivastava (1998) defined traditional foods as those evolved out of necessity to make maximum use of local foods, utilizing available artifacts and expertise and carried down through generations.

Traditional food for a region is usually identified as the dietary system inherent within a culture that grows out of the social and natural resources available and accepted by the culture (Kuhnlein & Recheur, 1996). The definition is somewhat comprehensive since it involves socio-cultural factors such as the sourcing of materials and the preparation activities.

Traditional food is a valuable part of a people's culture. It can be deduced from the literature that the various indigenous peoples in different regions who have assimilated with the local populace have tried all possible means to preserve and promote their traditional food, albeit with some difficulties because of environmental influences.

According to Preetam Sarkar *et.al*(2015), traditional Indian foods have been prepared for many years and preparation varies across the country. Traditional wisdom about processing of food, its preservation techniques, and their therapeutic effects have been established for many generations in India.

The substitution of traditional foods not only led to a loss of production of traditionally and culturally appropriate food, but also in the loss of traditional knowledge related to food production. It created serious health and socio-economic problems among community members (Diaz,2005). Hence, the traditional foods which reflect the rich heritage of regional cultures should be saved from extinction and the skills gained through generations have to be preserved.

Factors such as international migration, the communication revolution and culinary tourism have contributed to globalization of food habits and this has paved the path towards global food culture (Everett, and Aitchison, 2008). According to Hollingsworth (2000), traditional foods are now considered competitive products, with its unique materials and production techniques. Upliftment of these regional food items from local standards to global standards necessitates development of new policies and strategies for quality standardization.

The traditional Indian food culture should not be forgotten by every generation as it shows the identity of the Indian people itself in terms of culture and norms. Each of the instruments has its own tales and sentimental values along with it. Without them, the indian food will not have its own distinctiveness and cannot achieve the accomplishment that can be seen nowadays. Thus, several commendations should be made in supporting the cultures in order to preserve it for longer period.

There is no reliable sources or texts which contain authentic information on traditional recipes that currently exist. Our effort here is to generate a study entitled "Documentation and nutritive evaluation of traditional foods of Kerala –Malappuram district" with the following objectives.

1. To identify and collect information on the various traditional foods of different districts of Kerala
2. To document their methods of preparation of traditional foods.
3. To evaluate the nutritional characteristics of the selected traditional food.

2.REVIEW OF LITERATURE

Literature relevant to the present study entitled “Documentation and quality evaluation of traditional foods of central zone of Kerala” is reviewed under the following heads.

- 2.1. Importance of traditional knowledge
- 2.2. History of traditional foods
 - 2.2.1. Traditional foods of India
 - 2.2.2. Traditional foods of Kerala
 - 2.2.3. Meaning, Concepts and Definition
 - 2.2.4. History and Ethical Background
- 2.3. Traditional foods of adequacy of different group
- 2.4. Health and nutritional aspects of traditional foods
- 2.5. Key challenges of traditional foods
- 2.6. Future scope of traditional foods

2.1. Importance of traditional knowledge

Ranjayet *al.* (2021) reported that the critical role of lesser-known local plant species in the food, nutrition and livelihood security of traditional community in India. Considering women as a major custodian in knowledge and practices on foods, a total of 90 traditional women and 60 key knowledgeable community members (thus a total of 150 participants) were selected from East Siang and Upper Siang.

Ojhaet *al.* (2022) reported that himalayan communities illustrate a rich agriculture-medicine use system that not only provides adequate dietary diversity and nutrition but also delivers therapeutic security. This study explores the food-medicine interface as observed by the marginal hill communities in the central Himalaya with an aim to assess traditional agriculture and food plants with relation to dietary diversity and nutritional and medicinal values based on comprehensive research.

According to Boesi(2014) tibetans have traditionally exploited few wild food plants. These mainly compensate for the lack of vegetables and fruit in traditional Tibetan diet, notably

among pastoralists, and are far more important during famines as substitutes for roasted barley flour. Today few wild food plants are regularly consumed, less in the main towns and villages and moreso in remote areas and among pastoralists. Younger generations from towns have almost lost traditional botanical knowledge. Owing to modernisation and globalisation processes, many local people have specialised in collecting natural products increasingly demanded in China and abroad. Tibetan people strongly benefit from these activities. Tibetan medicine sees diet as a way of curing diseases and medical treatises describe therapeutic properties of several wild food plants that Tibetans nowadays consume.

Choudhary *et al* (2015) reported that traditional foods and their dietary guidelines are prescribed in Ayurveda. There is so much similarity in ayurvedic dietetics and traditional foods that many of the traditional health foods in India can be called ayurvedic foods. This review article introduces the concepts of ayurvedic health foods in India and describes several traditional health foods across various regions of India. Recommended dietary guidelines according to age and health condition of the consumer, and seasonal considerations are presented for each of the traditional health foods of India. In the era of globalization of the population and international food trading, health-conscious citizens around the globe will benefit from the wealth of knowledge on traditional Indian and ayurvedic health foods of Indian origin.

Aneena (2009) reported in her study “Documentation and quality evaluation of traditional foods of central zone of Kerala” was taken up with the objectives of identifying and collecting information on the various traditional foods of central zone of Kerala and documenting their mode of processing, and evaluating quality characteristics of the selected less used traditional foods. The study was conducted in four districts namely Ernakulam, Thrissur, Palakkad and Malappuram comprising the central zone of Kerala. Senior citizens who possess the details of traditional food items and preparations in each locality were selected as the respondents. The respondents were categorised based on the communities they represent.

Payyappallimana (2010) described ‘The United Nations’ Decade of Education for Sustainable Development (DESD) aims, among other objectives, to foster and promote the mainstreaming of intercultural approaches within a social learning process through multi-sectoral, collaborative and interdisciplinary methods. Biological as well as cultural diversity are inherently linked and form an important part of the sustainable development education process. Traditional knowledge (TK), a central dimension of bio-cultural diversity, is also receiving increased attention in this context. However, there are several socio-political and methodological challenges of integrating TK in Education for Sustainable Development (ESD)

programs. Using the case of traditional medicine from Kerala state, India, this paper attempts to highlight the importance of and the issues pertinent to such integration in a local context.

According to Ramesh Chandran (2016) one of the visible impacts of globalization in Kerala is the transformation of the food habits of urban population, particularly the youth. The urban dietary pattern visibly shows that there is a conspicuous shift from traditional foods to fast foods. Along with that is the larger consumption of processed foods and packaged fruit juices.

Asha John *et al.* (2019) reported that just like in any art form, trends in the food service industry are constantly shifting to reflect the ever changing interests and needs of people. Keeping up with these trends is highly important to restaurant owners, chefs, are really anyone working in the foodservice industry.

Edward (2017) reported that traditional food and healthy eating habits has been one of the fast-growing areas. All humans, both men and women, require food for their survival. However, both men and women indulge in food as if it were their sole purpose of existence. Hence, eating disorders are common among men and women.

2.2. History of traditional foods

2.2.1. Traditional foods of India

Traditional Indian foods have been prepared for many years and preparation varies across the country. Traditional wisdom about processing of food, its preservation techniques, and their therapeutic effects have been established for many generations in India. Food systems can deliver numerous biological functions through dietary components in the human body. Indian traditional foods are also recognized as functional foods because of the presence of functional components such as body-healing chemicals, antioxidants, dietary fibers, and probiotics.

Subramanyam *et al.*, 2010 reported that, India has a rich and highly diverse food, and its various diets are well closely linked to social identity, religion and other cultural influences as well as local agricultural practices and wide range of food availability Vecchio *et al.*, 2014.

Traditional food processing in India began when man ceased to be a food hunter (Potty, 1986). Each and every community in India have their own and distinct food ethos (Achaya, 1998). According to Pratima (2000), India has been the home for ageless culinary art, and had a rich heritage of a wide variety of traditional foods. According to Pattanayak (1986), traditional foods varied not only around the world but also within a region.

Vegetarianism in countries like India has been adopted mainly due to socio-economic and cultural factors rather than the health benefits of vegetarian diet (Kakade and Agte, 1997).

Egg halva is a traditional Indian sweet dish which is a combination of milk, liquid, whole egg and sugar (Kalra *et al.* 1998). Khoa is an important indigenous heat coagulated and partially dehydrated milk product (Sharma and Lal, 1999).

Documentation of vast range of traditional convenience foods across the different zones of North Karnataka was carried out by Ishwarappagol (2009). The study revealed that 162 traditional convenience foods (106 ready-to-eat and 56 ready-to-use) documented across the regions were preferred more among urbanites (134) compared to rural group (81). Cereal based foods dominated (60) the category (ready-to-eat 32, ready-to-use 28). Family size, type and number of generations living together negatively influenced the preparation of traditional convenience foods.

Khoa- jalebi, a unique traditional product of central India was studied by Pagote and Rao (2012). Devi and Kumar (2012), worked on the traditional, ethnic and fermented foods of different tribes of Manipur. The traditional foods of Manipuri's comprised of iromba, champhu, kangshoi, hawaichar, sibus, ngare, paknam, chagempomba, kungshu, hentak, khazing and heitak. Alcoholic beverages made up of rice, locally called as 'yu' are very common in almost all the festivals of the tribal people of Manipur.

Though a significant portion of Indian food is vegetarian, many traditional Indian dishes also include chicken, goat, lamb, fish, and other meats. Cuisine across India has also been influenced by various cultural groups that entered India throughout history, such as the Persians, Mughals, and European colonists (IAS Charisma, 2013).

Indian traditional foods are also recognized as functional foods because of the presence of functional components such as body-healing chemicals, antioxidants, dietary fibers, and probiotics. These functional molecules help in weight management and blood sugar level balance and support immunity of the body. (Hotz ,2007)

Indian traditional foods can be classified into eight broad categories: (1) processed grain products, (2) fermented foods, (3) dehydrated products, (4) pickles, chutneys, sauces, and relishes, (5) ground spice and spice mixtures, (6) fried food products, (7) dairy products, and (8) confections and sweets. (Srinivasan,2010).

The cooked rice kept overnight in water was consumed as a delicious breakfast item by South Indians after mixing with curd (Subbalakshmi, 2005). Realization of functional properties of Indian traditional food eventually led to development of one of the world's oldest medicinal systems, the Ayurveda (Sarkar *et al.* 2015).

Angchowket *al.* (2009) made an attempt to study the traditional foods and beverages of Ladakh, and to bring forth those dishes and beverages, which are true representative of the region. The traditional foods and beverages included in the study were tagikhambir (browned sour dough bread), tagibushuruk (puffed unleavened bread) tagitsabkheer (ground sprouted wheat bread), sepheag/ (freshly sprouted wheat bread) etc. These recipes have been described in detail including their method of preparation.

2.2.2. Traditional foods of Kerala

Traditional and Indigenous Knowledge have been used for centuries by indigenous and local communities under local laws, customs and traditions. It has been transmitted and evolved from generation to generation. Traditional knowledge has played, and still plays, an important role in vital areas such as food security, the development of agriculture and medical treatment. The importance of traditional and indigenous knowledge for its creators and for the world community at large, and the need to foster, preserve and protect such knowledge, has gained growing recognition at international level (Aneena, 2009).

Foreign influence on the cuisine of Kerala is marked, with each religion from Muslims to Syrian Christians developing their own cuisine and style of preparation. The Moplah cuisine of the Malabar region has a distinct flavour, borrowed from the traders who regularly visited the region. Kerala cuisine has an abundance of coconut, rice, tapioca and spices like black pepper, cloves, cinnamon and ginger. The Portuguese introduced cassava, now widely eaten in Kerala. The region is also famous for its Sadhya, served at the Hindu festival Onam and consisting of boiled rice and a host of vegetarian dishes on a banana leaf. Kerala cuisine also features a lot of sea food like fish, prawns, mussels and crabs because of its long coastline.

2.2.3. Meaning, Concepts and Definition

Kerala cuisine is a culinary style originated in the Kerala, a state on the southwestern Malabar Coast of India. Kerala cuisine offers a multitude of both vegetarian and non-vegetarian dishes prepared using fish, poultry and red meat with rice as a typical

accompaniment. Chillies, curry leaves, coconut, mustard seeds, turmeric, tamarind, asafoetida and other spices are also used in the preparation.

Kerala, in the south-western part of India, is known for its rich heritage and cultural diversity. Situated along the Malabar coast, Kerala has had regular interaction with the West since ancient times. From the coming of the Arab traders to the Portuguese, and later the British, Kerala has witnessed it all. This greatly influenced the socio-cultural fabric of the region, making it one of the most diverse states of India.

Traditional foods are foods based on solid foundation of culture, customs and natural environment of a country or a region of the world and eaten by the people for a long time (Tokuji, 1986). Kuhnlein and Receveur (1996) defined a traditional food as food from a particular culture available from local resources and culturally accepted and includes socio cultural meanings, acquisition/processing techniques, use, composition, and nutritional consequences for people using the food.

Azarand(1996) defined traditional food as a specific food in a region whose raw materials are locally available and which is not used in other regions. Rao and Srivastava (1998) defined traditional foods as those evolved out of necessity to make maximum use of local foods, utilizing available artifacts and expertise and carried down through generations. According to Jordana(2000) a traditional product is a “representation” of a group, which belonged in a defined space, and is part of a culture that implies the cooperation of the individuals operating in that territory. The author also indicated that in order to be traditional, a product must be linked to a territory and it must also be part of a set of traditions, which will necessarily ensure its continuity over time.

Traditional food is at the core of indigenous cultures and economies and practices regarding harvesting, preserving and preparing food reinforce indigenous culture and identity (Damman et al.,2008).

2.2.4. History and Ethical Background

Food is an integral part of any culture-Bhagavad Githa says “from food do all creatures come into being”. Traditional food processing in India began when man ceased to be a food hunter (Potty, 1986). Traditional foods evolved hundreds of years ago are indispensable for majority of people (Tyn, 1986).

According to Achaya (1998) food choices and food habits are an outcome of cultural heritage and economic and social factors. The traditional foods and cuisines in India could be traced as far back as to the Aryan times, some even to the pre-Aryan times, with the Muslim and European influence contributing later to new dishes that enriched the native cuisine of India. The author also pointed out that every community in India had their own and distinct food ethos.

According to Aziziet *al.*(1998) traditional foods have evolved through centuries taking into consideration the prevailing climatic conditions, availability of local materials and socio-economic conditions. Parpia (1999) indicated that traditional Indian foods were developed as part of at least forty indigenous cultures over centuries.

Pratima (2000) reported that India is the home for ageless culinary art, and had a rich heritage of a wide variety of traditional foods. Traditional foods are an expression of culture, history and lifestyle (Slimani et al, 2002).

Traditions, region and culture linked to the food products were considered as important quality features (Holt and Amilien, 2007).

The authors also indicated traditional and regional products as part of the national cultural heritage which hold the potential to bind and stabilize communities. According to Trichopoulou et *al.* (2007) investigation and registration of traditional foods contribute to the preservation of important elements of a nation's culinary heritage and culture and allows future generations, both from the native population and from other countries, to be acquainted with traditional foods.

2.3 Traditional foods of different groups

Traditional Indian meal patterns differ from region to region, but all contain a wide range of foods, normally including foods from each food group. (Kalpana, 2020)

According to Somnath Basaket *al.* (2023) The recipes of traditional foods have been perfected, practiced, and handed over from generation to generation. A typical Indian "vegetarian" diet includes plant-based and dairy-based foods, while a "non-vegetarian" diet includes egg, fish, and meat. While the northern region is majorly dependent on wheat products, the eastern, north-eastern, and southern parts of India majorly depend on rice-based products.

According to Agilandeswari and Mohan(2017), Traditional South Indian foods provide a perfect combination of proteins from legumes and coconut, carbohydrates from rice, fats both visible and invisible from curry and fried savory items, vitamins and minerals from sprouted grams, and vegetables which contain functional components such as β -carotene, Vitamins C and E, thiamine, tocopherol, and antioxidant compounds. *Rasam* is a traditional South Indian food, prepared using tamarind juice as a base, with a variety of spices. *Rasam*, with all its ingredients medicinally claimed for various ailments, is a functional food.

Idli, is a popular steam cooked traditional Indian food prepared from a wet ground fermented batter of rice and black gram dhal (in the ratio of 3:1) by steaming in a mold. It is famous for its soft, spongy texture, desirable sour taste and characteristic aroma. (Nisha*et.al.*, 2005)

Dosa is another fermented dish like *idli* mainly found in the south Indian region. It is a highly seasoned pancake, contains rice and black gram as primary ingredients. *Nannarisharbat* is a traditional herbal beverage prepared using the roots of *Decalepishamiltonii*. In Ayurveda the plant is called *Ananthamula*. Beverage is used in summer time for thirst quenching and it acts as a hepatoprotective agent, which is good for stomach health, (Preetam Sarkar *et.al.*, 2015)

South Indian parotta is wheat flour-based circular, unleavened, multi-layered flat bread. It is one of the staple food items in the southern states of India. Parotta is made from wheat flour, salt, water, and oil for spreading of the dough; however, optional ingredients such as sugar and egg are also used in the preparation of parotta. (Dasappa and GandhamVenkateshwara Rao, 2021)

2.4 Health and nutritional aspects of traditional foods

2.4.1. Health and nutritional advantages of traditional foods

Proximate and mineral composition of 30 traditional and popular Indian foods were evaluated by Prasad *et.al.* (2000) and indicated that traditional foods provided approximately 350-660 Kcal/100g and found that the lead and aluminium content of traditional foods were well below the permissible limits. Pattan*et.al.* (2001) evaluated the nutritional qualities of madeli, a traditional ready to eat sweet product and found that it contained 6.98g protein, 4.4g fat, and 1.19g of crude fibre per 100g and had a shelf life of 21 days. Khakhra Consumed for breakfast, snack or in the main meal was considered as a carrier of

dietary fibre and minerals (Shirsath and Landge, 2006). Sattu, the nutritious popular traditional food of North India is an energy drink with medicinal properties like prevention of gastritis and sunstroke (Prakash and Swamy, 2006).

Modakams prepared during Ganesh Chaturthi and Naivedyam prepared during Gokulashtami complemented amino acids and provided good quality protein (Subbulakshmi, 2005). Halubayi, the traditional processed food product of Karnataka was found to be highly nutritious with good protein, carbohydrate and vitamins (Nagaraja, 2006). Kulkarni *et.al.* (2006) indicated the nutritional advantages of chakli, sev, kharagritters, laddu and hurigalu the traditional snack items of Karnataka.

Traditional supplementary foods consumed by lactating women of Gujarat namely wheat rab, budhgond ka soonthad high energy, protein and fibre respectively Mulimani *et.al.*, (2001). The authors also indicated superior nutritional quality of kotta and battisaladu. Gupta *et.al.*, (2003) observed high calcium, iron, zinc, copper and phosphorus in ajwain followed by gondpanjiri, kangniandhalwathe traditional foods consumed by lactating women of India. The authors also indicated better protein and starch digestibility in traditional supplementary foods.

Lalithambika (2007) indicated the importance given to kanji, the traditional food of Kerala in ayurveda especially in diseased conditions due to its easy digestibility. Sharon *et.al.* (2006) indicated the nutritional significance of puttu, ada, and idiyappam, the traditional breakfast foods of Kerala with high protein, carbohydrate and energy density. Paalkanji, a traditional cereal and milk based Kerala delicacy was reported to be rich in protein, phosphorous, vitamin C, thiamin, riboflavin, iron, calcium, choline, copper, manganese and magnesium with good digestibility (Achuthan and Emmanuel, 2006). Chendamurian, the traditional banana delight of southern Kerala was found to contain highly nutritive milk proteins, milk solids and potassium and had laxative properties (Sudhakaran, 2006). The nutritional advantages of traditional foods namely putu, laddu, ada and coffee prepared using rice bran as the main ingredient were reported by Aneena and Indira (2007) and indicated that the foods had good amount of B complex vitamins, fibre, calcium and iron.

Nutritional advantages and the importance of traditional foods in Human physiological activities were indicated by Shin (2004).

Kuhnlein *et.al.* (2002) evaluated 236 Canadian Arctic foods for macronutrients, minerals and fatty acids and indicated a considerable amount of nutrients in these traditional foods. A study conducted by Evans *et.al.*, (2003) on 36 traditional and imported foods of Tonga

indicated that people preferred traditional foods and perceived traditional foods as more nutritious. Considerable micronutrients were found in traditional foods namely karat banana and pulque prepared from Agave species, and gac fruit (Kuhnlein, 2004). The water extract prepared from the brown algae, the traditional food of Noto area in Japan, had strong antioxidant activity (Kuda, *etal.* 2005).

Rasala, the dahi based milk product with good nutritional and medicinal attributes was found to be effective against bleeding disorders, burning sensation and thirst (Warrier and Sudhakaran, 2006). Karkkidakamarunnukanji, a traditional herbal concoction, was found to be beneficial for the purification of the body and soul, providing nourishment to the whole body and augmenting the immune status Asha *et.al.* (2006). Pulissery, a prominent culinary item prepared from curd in Kerala, had health promoting and therapeutic properties with the nutritional benefits of fermented milk products (Shifa, 2006). Vijayakrishnan (2007) indicated excellent medicinal value of Kerala sadya and reported that the combination of pepper, cumin seeds and curd in Kalan, a side dish of the traditional sadya gave protection against three doshas of ayurveda. Sour curd used in Kalan was reported to be good for digestion and pepper and cumin seeds avoided gastritis and acted as antimicrobial agent.

Uauy *et.al.* (2001) indicated the protective effect of traditional diet in chronic diseases and obesity. Li *et.al.* (2004) observed functional materials in traditional fermented soybean foods namely sufu and douchi. Apparent health benefits of traditional Greek foods were reported by Trichopoulou *et.al.* (2007). The traditional Mediterranean diet of Greece was associated with reduced total mortality as well as reduced mortality from coronary heart disease and cancer (Trichopoulou, *etal.*, 2007).

2.4.2. Impact of dietary transition on health and disease

The nutrition transition had direct implications in the upsurge of non-communicable diseases (Zimmet, 2000). Dietary transition refers to changes in the quantity and composition of the diet due to improved economic development leading to lack of physical activity, weight gain, lifestyle changes, development of diabetes mellitus, high blood pressure and increased risk of heart diseases and some forms of cancer (Seshadri, 2005).

South Indian food is mainly based on Idli and dosa enhances probiotic activity. Indian traditional rasam has high antipyretic, hypoglycemic (Preethikaa and Brundha, 2018) and reduces hypertension (Alleyne *et.al.*, 2005). Some Indian foods are proven to cure cancer also (Brundha and Pathmashri, 2019). Food especially made from beet root is proven to have a

significant effect on haemoglobin value. Doctor check ups also suggest eating healthy food improves the health of the patient in many ways (Varshini and Brundha, 2020), (Timothy, Samyuktha and Brundha, 2019). Inclusion of clove to food has a beneficiary effect on teeth.

In developing countries, the rate of obesity, diabetes, cardiovascular disease and cancer increased as a consequence of urbanisation and socioeconomic changes (Albala *et al.*, 2001 and Popkin *et al.*, 2001). Jimaima *et al.*, (2001) reported an increased consumption of introduced foods and an increased prevalence of diabetes among the indigenous population. The authors also indicated increased incidence and prevalence of non-communicable diseases due to deviation from the traditional food consumption pattern and traditional lifestyle. Lako (2001) also observed increased incidence and prevalence of non-communicable diseases among Fijians due to drastic changes in the dietary pattern and deviation from the traditional food consumption pattern and traditional lifestyle.

Direct relationship between decreased consumption of traditional foods and decreased physical activity with obesity and related chronic diseases was observed by Uauy *et al.*, (2001) and Kuhnlein *et al.* (2004). Yusuf *et al.* (2001), Kuhnlein *et al.* (2002) and Kumanyika *et al.* (2002) also documented the relationship between the dietary changes associated with urbanisation and globalisation and increased prevalence of numerous obesity-related chronic diseases around the developing world, including diabetes and cardiovascular diseases.

Consumption of market food and decreased consumption of traditional food, coupled with decreased physical activity, resulted in increased incidence of obesity and its correlated diseases like diabetes, heart disease and dental caries. Kuhnlein (2003) indicated that in addition to obesity and other associated diseases, increased consumption of industrially processed foods lead to poor intake of micronutrients.

Urbanisation and westernisation forced people to give up their traditional food habits and inclusion of high saturated fat containing processed foods leading to various health hazards (Roy, 2001). As an impact of westernisation, Blazose (2002) indicated that traditional plant-based cuisines became energy dense due to increased proportion of animal food and fat and decreased proportion of plant foods.

Mendez *et al.* (2004) compared the diets in urban areas with traditional diet and indicated increased consumption of fat and more prevalence of obesity among low and middle income groups residing in urban areas. Damman *et al.* (2008) also indicated

increased prevalence of chronic disease among indigenous communities due to nutrition transition characterized by a rapid westernisation of diet and lifestyles.

Transition in the dietary pattern characterized by shift towards high intake of calorie, saturated fat and cholesterol was observed by Schmidhuber (2004). Substantial decline in the intake of potassium was observed due to consumption of westernised diet by Demigne *et.al.*(2004) when compared to traditional diet. Seshadri (2005) also indicated the presence of high sodium content in processed foods compared to their natural counterparts and its health impact. Nutrition related problems due to consumption of processed, ready to cook and ready to serve foods among career women was pointed out by Subbulakshmi (2005) due to their increased purchasing power and lack of time for cooking traditional foods.

2.5 Key Challenge in the production and use of Traditional foods

Oniang'o(1999) indicated that the faster the people adapt to the new globalized food patterns, the less likely traditional knowledge will be transferred to the next generation. Traditional foods and food habits were progressively replaced by the globalized food culture of the multinational corporations leading to disastrous impact over the past several decades stated by(Zimmet, 2000).

Indigenous and traditional foods and food systems were found to disappear, leading to significant loss and threat to personal health and security at the regional and international level (Kuhnlein, 2003). Diaz (2005) stated that substitution of traditional foods not only led to a loss of production of traditional and culturally appropriate food, but also led to loss of traditional knowledge related to food production.

Evans *et al.*(2003) indicated one of the important effects of globalisation as the increased reliance on imported foods, rather than traditional foods. The impact of globalisation of food industry on the food habits and dietary patterns of people of Tanzania, Asia, Latin America and some African nations and Korea were reported by Kinabo (2004): Erdos(2004): Roe (2004): and Shin (2004)

Urbanisation and globalisation enhance access to non traditional foods due to changing prices and production practices, as well as trade and marketing practices (Lang, 1999; Evans *et al.*, 2003 and Chopra, *et al.*, 2002).

Foreign investment had contributed to the rise of fast food restaurants and western-style supermarkets, which also influenced consumer food choices by offering greater variety,

quality, convenience and competitive prices in high-value added foods (Regmi and Gehlar 2001; Reardon, *et al.*,2003).

Increased purchasing power, change in socio-economic status and life styles were considered as the factors which contributed to enhanced consumption of processed and convenience products (Kumar and Anjaneyalu, 1998). Ranjini*etal.*(2000) also indicated the availability of processed foods as the main reason for the tremendous change in the modern day consumption pattern of convenience and fast foods.

The diversity of India is reflected in diverse nature of traditional foods and this restricts the market potential of traditional foods (Chaudhry, 2006). Kulkarni and Unnikrishnan (2006) observed limited shelf life as the key challenge in the marketing of traditional products.

Bedekar (2006) indicated that majority of traditional Indian processed foods were made most unhygienically in unorganized sector with an adoption of low level of mechanization. The main challenge in the traditional food industry according to Ramesh (2006) was the design of machineries because of lack of adequate data on engineering properties of traditional foods. stability was reported as the prime challenges in traditional food industry (Chaudhry, 2006).

2.6 Future scope of Traditional foods

Traditional foods, used more as seasonal and banquet food or for religious ceremonies rather than as staple food, had become popular as a delicacy food (Shin,1999). According to Hollingsworth (2000) one of every sevenfold dollar over the next decade would be spent on ethnic food. The author also predicted that food manufacturers would compete for market share in the faster growing ethnic cuisines like Thai, Caribbean, Mediterranean and Indian. According to Parpia (2004) the value of traditional processed foods accounts for nearly 75 per cent of the processed foods in the market in India. Since, traditional food has been considered as a competitive product, with unique materials and production techniques, efforts to export them are expanding nowadays (Shin, 2004). Traditional food market in India had witnessed a rapid growth over last five to eight years and large scale production and preservation of traditional foods had become the need of the hour due to the scope of these products for indigenous consumption, export purposes and the interest showed by multinational companies (Dipali and Rodrigues, 2006). With rapid urbanisation and advancement of heritage food

production technologies, traditional convenience and ready to serve foods were pouring in the market from time to time (Manjula *et al.*, 2006).

Ohiokpehai (2003) indicated that women's indigenous knowledge on traditional foods could be harnessed to improve nutrition security. Though, the traditional food system of indigenous people contained a wealth of micro nutrients, in public – health promotion programmes and health training programmes, this information was not used due to lack of scientific coverage (Kuhnlein, 2003)

Everett and Aitchison (2008) indicated correlation between increased levels of food tourism interest and the retention and development of regional identity. The authors also stressed the conservation of traditional heritage, skills and ways of life, the social and cultural benefits and the benefits of the production of local food.

Jacob (2007) examined the role of NGOs in the economic and community development of Kerala. A case study of Peermade Development Society (PDS), one of the prominent and major NGOs in Kerala in the Peermade Taluk of Idukki district, was undertaken. NGOs are somewhat stable groups with defined activities and programmes and have, barring some exceptions, an urge and also an exposure to the horizontal and sometimes vertical linkages within and across their chosen sectors of activity.

Tourists are gradually moving towards niche travel like adventure, luxury, ethnic, indigenous, heritage, health and many other such new tourism products. They look forward to experience and to be part of the culture and heritage of the destinations they seek to explore (Divecha, 2012).

Nanotechnology is the emerging revolution having great potential in every sector from mechanics to medicine including food industry. It is the study of manipulation and control of matter on atomic and molecular scale having at least one characteristic dimension in nanometer mostly ranging from 1 to 100 nm (Chellaram *et al.*, 2014). It can even be used to detect food pathogens acting as food quality and safety indicators (Bott, Stormer and Franz, 2014). In food processing, nanoencapsulation of food (nano-sized) ingredients, nutritional supplements.

Nowadays, high technologies are widely adopted into agricultural production, biological diversity conservation and crop improvement. (Thao, 2016). The Indian food service

market is projected to grow at a rate of 10.3% during the forecast period (2018–2023). Food industry of Kerala is also booming at a high rate so importance of this highly immense as it will help us in understanding the various changes under going in this industry.(Sujith and John, 2019)

Under present circumstances, conventional breeding techniques are not sufficient. Innovation in plant breeding is critical in managing agricultural challenges and achieving sustainable crop production. Novel plant breeding techniques, involving a series of developments from genome editing techniques to speed breeding and the integration of omics technology, offer relevant, versatile, cost-effective, and less time-consuming ways of achieving precision in plant breeding. Opportunities to edit agriculturally significant genes now exist as a result of new genome editing techniques. (Fiazet *al.* (2021).

The food industry seeks development of new products that follow modern trends and traditional method and are able to conquer today's consumers, while at the same time maintaining the identity of specific products, valued as traditional. (Raquel *et al.*,2021)

3.MATERIALS AND METHODS

This chapter deals with the methods and tools followed in the various phases of the study and the details are presented under the following headings:

3.1 Locality of the study

3.2 Selection of sample

3.3 Plan of study

3.3.1 Collection of information regarding traditional food habits in Malappuram

3.3.2 Documentation of traditional foods in Malappuram

3.3.3 Preparation of selected traditional foods in Malappuram

3.3.4 To develop a nutritive value of selected traditional foods in Malappuram district

3.1 Locality of the Study

Locality of my study is Malappuram district purposively selected for the study as there exist wide diversity in food habits, religion, and culture and socio economic conditions. From Malappuram 10 study location traditionally known for regional and religious preparations. Thus, 10 study locations were selected for the study and the list of identified study locations are given in Table 1.

Table 1.Details of locations selected for the study

Sl.No.	Malappuram
1	Angadipuram
2	Manjeri
3	Kondotty
4	Parappanangadi
5	Pattikkad
6	Ponnani
7	Tirur
8	Vengara
9	Vazhakkad
10	Edappal

3.2 Selection of the Sample

Elderly persons above the age of 60 years with expertise in traditional food preparations were also selected randomly from each study locality. As traditional food habits differ with respect to region, religion, and caste, the selected experts were categorized based on the communities they represent. Thus, three communities namely Hindu community, muslim community(MU), Christian community(CH) with distinct regional and religious diversified culinary culture were selected purposely. As Muslims of the Malappuram district had unique food habits, Hindus of Malappuram were also included in the study. A total of 10 elderly persons were selected as the sample for the study and the number of respondents belonging to each community in each district is given in Table 2.

Table 2. Distribution of respondents selected for the study

Sl.No.	Communities	Malappuram
1	Hindu community	3
2	Muslim community	5
3	Christian community	2
	Total	10

3.3 Plan of study

Based on the objective of the study, the plan of the study was designed. The study comprised:

3.3.1 Collection of information regarding traditional food habits in Malappuram

3.3.2 Documentation of traditional foods

3.3.3 Preparation of selected traditional foods in Malappuram

3.3.1 Collection of information regarding traditional food habits in Malappuram

From the identified study locations, information regarding the traditional foods and food habits of each community associated with religious customs, festivals, special occasions, rituals, physiological conditions and their method of preparation, were collected orally through questionnaire. We prepared a questionnaire and it was distributed at different houses and then

collected back from them. This questionnaire helped us to know more about the traditional food habits of each house, and its nutritional benefits. From this we conclude the older traditional practices and the method of preparation improve the quality of life.

3.3.2 Documentation of traditional foods

From the questionnaire that we have used to collect information regarding the traditional foods, the details of different traditional foods of different communities were identified. In Depth interviews were also conducted with experts to collect information regarding the method of preparation of selected traditional foods. The documentation of the process through photographic and written methods was done. The information regarding the shelf life of diet traditional foods and also the occasions in which they are prepared were also collected using the questionnaire.

Table 3. Collected traditional food recipes

Sl. No.	Name
1	Kai pola
2	Avil milk
3	Muringathaallichath
4	Malappuram dum biriyani
5	Coconut rice
6	Uluva kanji
7	Kalthappam
8	Eenthumpidi
9	Poovada
10	Kuvavaragiyadhu
11	Chakkaramathan
12	Thari kanji
13	Puzhungalpathiri
14	Ullichoru
15	Ottada
16	Avalosepodi

17	Ellunda
18	Jeeraka kanji
19	Malappurammittayi
20	Chakkarapayasam

Out of these 20 recipes 10 recipes were selected:

- i. Avil milk
- ii. Muringathaallichath
- iii. Coconut rice
- iv. Kalthappam
- v. Poovada
- vi. Kuvavaragiyath
- vii. Thari kanji
- viii. Ullichoru
- ix. Avalosepodi
- x. Jeeraka kanji

3.3.3 Preparation of selected traditional foods in Malappuram

A) Avil milk

Ingredients (1 servings):

- Rice flakes - 9.5g
- Coconut milk -170ml
- Sugar - 10g
- Banana – 101g
- Cardamom powder-1g

Method of preparation:

- Firstly cut the bananas into small pieces
- Take a cup, add coconut milk, rice flakes, sugar, cardamom powder and mix well.
- Add banana into it.



Plate 1. Avil milk

B) Muringa thaallichath

Ingredients(2 servings):

- Oil – 10ml
- Shallot-5g
- Green chilli-3g
- Drumstick leaves-100g
- Starch water- 100ml

Method of preparation:

- Heat the pan and add oil.
- Add shallot and green chilli and sauté it well
- Add rice water and salt.
- Add drumstick leaves and again sauté for 3 mins
- Mix it well.
- Boil for 5 mins.



Plate 2. Muringa thaallichath

C) Coconut rice

Ingredients(3 servings):

- Rice- 195g
- Coconut- 100g
- Fenugreek-4g
- Turmeric powder-3g
- Salt-3g
- Shallot-90g
- Water- 375ml

Method of preparation:

- Take a bowl and add rice, coconut, shallot, fenugreek, turmeric powder and salt.
- Mix it well.
- To boiling water, add this mixture.
- Close the lid and cook the rice.



Plate 3. Coconut rice

D) Kalthappam

Ingredients(4 servings):

- Raw Rice/Pachari :250g
- Parboiled Rice /Puzhungalari : 62g (both rice soaked in water for 2 hours)
- Cooked Rice : 62g
- Jaggery :100g or according to your taste
- Shallots /Red Onion : 13g(finely sliced)
- Coconut Bites /Thengakothu : 19 g
- Baking Soda : a pinch (optional)
- Salt to taste
- Coconut Oil :10ml
- Water as needed

Method of preparation:

- Wash and soak rice for couple of hours.Drain the soaked rice and grind it along with cooked rice and $\frac{1}{4}$ cup of water.
- Melt the 25ressur with $\frac{1}{4}$ cup of water; remove the impurities and add the 25ressur syrup and salt to rice batter; mix well. Optional – Add pinch of baking powder to the batter.
- In a pressure cooker, add coconut oil and 25ress the coconut slices till it become golden brown and transfer to plate and 25ress the shallot to golden brown; do the same and set it aside.

- Now there will be enough oil left in the pressure cooker, so swirl the pressure cooker in such way that oil is coated on its all sides.
- Add half of fried shallot and coconut slices to the batter and mix well.
- Heat the pressure on high heat and pour the batter and add the remaining fried shallot and coconut slices on top of it and cook for 2 minutes on a high flame. Next lower the flame; close the pressure cooker tightly without the weight/whistle and cook for 15 minutes.



Plate 4. Kalthappam

E) Poovada

Ingredients(3 servings):

- Riceflour (Aripodi) – 250g
- Grated coconut – 72g
- Sugar - 1/4 cup Sugar -24g
- Coconut oil – 5ml
- Salt to taste
- Plantain leaf (Vazhayila) - 4 nos
- Water – 250ml

Method of preparation:

- Heat a pan and boil 1 cup of water, 1 tsp of coconut oil, with salt. When it boils add the rice flour with constant stirring. Keep it on simmer for 1 minute and turn off the flame. Close the lid and keep for 5- 10 minutes.
- Knead the dough thoroughly with your hands. Make big lemon sized balls for making ada using this dough
- Clean the vazhayila with water. Spread the dough on the vazhayila pieces.

- Mix together the grated coconut and sugar well.
- Fill this mixture above the dough and press softly the whole sides of the ada and fold the vazhayilas.
- Heat a chappathi tawa or a non stick pan and place the adas and cook both sides of the ada's. Cook for 20 minutes.



Plate 5. Poovada

F) Kuva varagiyadhu

Ingredients(2 servings):

- Arrow root powder-250g
- Jaggery-150g
- water-750ml
- cardamom powder-a pinch
- dried ginger powder-a pinch
- grated coconut-60g

Method of preparation:

- Melt the jaggery by boiling it in 1 cup of water. In a thick bottomed vessel, mix arrowroot powder, jaggery syrup, cardamom powder, dried ginger powder, ghee and 2 cups water. Stir continuously on medium flame.
- Add grated coconut when the arrowroot mixture thickens up. Stir until everything mixes well and has a thicker consistency.



Plate 6. Kuva varagiyadhu

G) Thari Kanji

Ingredients(3 servings):

- Semolina or Rava - 34g
- Vermicelli, broken- 23 g (you could use roasted vermicelli)
- Water- 240 g
- Milk-354 ml
- Whole Cardamom, smashed- 1
- Sugar- 110g (based on your sweet level)
- Coconut milk- 118 ml
- Salt- 3 g
- Ghee- 27 g
- Shallots or small onions, chopped- 30g
- Raisins- 14 g
- cashew nuts- 7 g

Method of preparation:

- Place a saucepan over medium heat, add semolina, vermicelli, water and smashed cardamom to the pan.
- Cook the semolina in water for a few minutes, keep stirring as the mixture will thicken.
- Add the milk, salt and sugar, combine well and let the milk come to a slight boil, keep stirring.

- Add coconut milk, keep stirring and let cook for a couple of minutes.
- Remove the pan from the heat, keep covered.
- For the seasoning, Heat a frying pan over medium heat, add ghee.
- Add shallots, raisins and cashew nuts to it, saute till shallots turn light golden in color.
- Pour this seasoning into the prepared semolina milk mixture.
- Keep covered for a few minutes.
- Serve warm or you could chill it and serve.



Plate 7. Thari kanji

H) Ulli Choru

Ingredients(2 servings):

- Cooked rice(Kerala rice/sonamasoori rice) – 300 g
- Ghee – 14 g
- Shallots – 52 g
- Garlic – 5 g
- Turmeric powder – 2.3g
- Curry leaves – few
- Mustard seeds – 1.5 g
- Salt to taste

Method of preparation:

- Heat a pan or wok and add ghee. Splutter mustard seeds
- Add finely chopped shallots.
- Add salt to taste. Stir well until onion becomes translucent

- Add crushed garlic cloves. Saute until pungent smell goes away.
- Add turmeric powder and curry leaves.
- Add cooked rice. Stir well. Adjust salt.
- Remove the heat
- Serve hot



Plate 8. Ulli choru

I) Avalose Podi

Ingredients(4 servings):

- Rice Flour : 400 g
- Fresh Grated Coconut : 95 g
- Turmeric powder - 2 g
- Cumin Seeds (Jeerakam) /Cumin Powder : 2g
- Salt a pinch

Method of Preparation :

- Combine the rice flour, grated coconut, half of the cumin seeds, Turmeric powder and salt using your hands and set it aside; let it rest for about 1 hour.(Note : The mixture should be dry)
- Heat a heavy bottomed pan kadai (Preferably uruli or cheenachatti – Kerala style shallow kadai) and add the rest of the cumin seeds and lightly roast it.
- Add the rice coconut mixture and dry roast the mixture stirring continuously on a medium low flame for about 1/2 hour or till the mixture turns light brown in color.

- Remove from fire and keep the mixture stirring for some more time after switching the flame off.
- Cool completely and store in airtight containers.



Plate 9. Avalose podi

J) Jeeraka kanji

Ingredients(2 servings):

- Raw rice- 201 g
- Scraped coconut- 95 g
- Shallots- 60 g
- Jeerakam- 1.02 g
- Turmeric powder- 0.8 g
- Salt as required as required

Method of preparation:

- Wash and cook rice to a thick consistency
- Grind coconut (mildly)
- Mix ground coconut with cup of water and add to the cooked rice
- Keep stirring until .it comes to a boil
- Serve hot...



Plate 10. Jeeraka kanji

3.3.4 To develop a nutritive value of selected traditional foods in Malappuram district

For all the selected 10 traditional recipes, nutritive value of all the macronutrients such as carbohydrate, protein, energy and fat and three micronutrients that are majorly present in that particular food item are calculated. It shows you some key nutrients that impact your health.

Carbohydrate

Carbohydrates, or carbs, are sugar molecules. Along with proteins and fats, carbohydrates are one of three main nutrients found in foods and drinks. Your body breaks down carbohydrates into glucose. Glucose, or blood sugar, is the main source of energy for your body's cells, tissues, and organs.

Energy

Energy is defined as the capacity to do work. Through the process of digestion, we convert the food we eat to energy. This food energy is calculated as Calories (C) or kilocalories (kcal) or Joules (J). Food gives us the energy to do various activities such as walking, sitting, speaking, playing, etc. Some foods give us a lot of energy and help in the growth and repair of the body. Foods also give us the energy to protect the body from diseases. This energy comes from substances present in the food.

Protein

Proteins are the building blocks of life. Every cell in the human body contains protein. The basic structure of protein is a chain of amino acids. You need protein in your diet to help your body repair cells and make new ones. Protein is also important for growth and development in children, teens, and pregnant women.

Fat

Fats are a type of nutrient that you get from your diet. It is essential to eat some fats, though it is also harmful to eat too much. The fats you eat give your body energy that it needs to work properly. During exercise, your body uses calories from carbohydrates you have eaten.

Calcium

Calcium is a mineral most often associated with healthy bones and teeth, although it also plays an important role in blood clotting, helping muscles to contract, and regulating normal heart rhythms and nerve functions. About 99% of the body's calcium is stored in bones, and the remaining 1% is found in blood, muscle, and other tissues. The Recommended Dietary Allowance (RDA) for calcium for women 19-50 years of age is 1,000 mg daily; for women 51+, 1,200 mg. For pregnant and lactating women, the RDA is 1,000 mg. For men 19-70 years of age, the RDA is 1,000 mg; for men 71+ years, 1,200 mg.

Potassium

Potassium is a mineral found in the foods you eat. It's also an electrolyte. Electrolytes conduct electrical impulses throughout the body. Potassium plays a role in the function of the kidneys, the heart, the muscles, and the transmission of messages through the nervous system. The U.S. Dietary Reference Intakes state that there is not enough evidence to establish a Recommended Dietary Allowance (RDA) for potassium. For women 14-18 years of age, the AI is 2,300 mg daily; for women 19+, 2,600 mg. For pregnant and lactating women, the AI ranges from 2,500-2,900 depending on age. For men 14-18 years of age, the AI is 3,000 mg; for men 19+, 3,400 mg. It is estimated that the average daily intake of potassium in adults is about 2,320 mg for women and 3,016 mg for men.

Magnesium

Magnesium, an abundant mineral in the body, is naturally present in many foods, added to other food products, available as a dietary supplement, and present in some medicines (such as antacids and laxatives). Magnesium is required for energy production, oxidative phosphorylation, and glycolysis. It contributes to the structural development of bone and is required for the synthesis of DNA, RNA, and the antioxidant glutathione. The Recommended Dietary Allowance (RDA) for adults 19-51+ years is 400-420 mg daily for men and 310-320 mg for women. Pregnancy requires about 350-360 mg daily and lactation, 310-320 mg.

Sodium

Salt, also known as sodium chloride, is about 40% sodium and 60% chloride. It flavors food and is used as a binder and stabilizer. It is also a food preservative, as bacteria can't thrive in the presence of a high amount of salt. The human body requires a small amount of sodium to conduct nerve impulses, contract and relax muscles, and maintain the proper balance of water and minerals. It is estimated that we need about 500 mg of sodium daily for these vital functions. Guidelines for Adequate Intakes (AI) of sodium were established based on the lowest levels of sodium intake used in randomized controlled trials that did not show a deficiency but that also allowed for an adequate intake of nutritious foods naturally containing sodium. For men and women 14 years of age and older and pregnant women, the AI is 1,500 milligrams a day.

Zinc

Zinc is a trace mineral, meaning that the body only needs small amounts, and yet it is necessary for almost 100 enzymes to carry out vital chemical reactions. It is a major player in the creation of DNA, growth of cells, building proteins, healing damaged tissue, and supporting a healthy immune system. The Recommended Dietary Allowance (RDA) for adults 19+ years is 11 mg a day for men and 8 mg for women. Pregnancy and lactation require slightly more at 11 mg and 12 mg, respectively. UL: The Tolerable Upper Intake Level is the maximum daily intake unlikely to cause harmful effects on health. The UL for zinc is 40 mg daily for all males and females ages 19+ years.

Iron

Iron is a mineral that is naturally present in many foods, added to some food products, and available as a dietary supplement. Iron is an essential component of hemoglobin, an erythrocyte (red blood cell) protein that transfers oxygen from the lungs to the tissues. Dietary iron has two main forms: heme and nonheme. Plants and iron-fortified foods contain nonheme iron only, whereas meat, seafood, and poultry contain both heme and nonheme iron. Heme iron, which is formed when iron combines with protoporphyrin IX, contributes about 10% to 15% of total iron intakes in western populations. The amount of iron you need is: 8.7mg a day for men over 18. 14.8mg a day for women aged 19 to 50. 8.7mg a day for women over 50.

Phosphorus

Phosphorus is a mineral that makes up 1% of a person's total body weight. It is the second most abundant mineral in the body. It is present in every cell of the body. Most of the phosphorus in the body is found in the bones and teeth. It plays an important role in how the body uses carbohydrates and fats. It is also needed for the body to make protein for the growth, maintenance, and repair of cells and tissues. Phosphorus also helps the body make ATP, a molecule the body uses to store energy. The UL for phosphorus for adult men and women ages 19-70 years old is 4,000 mg daily, and for older adults 71+ years, 3,000 mg daily. The UL for pregnant and lactating women ages 14-50 years is 3,500 and 4,000 mg, respectively.

4. RESULT AND DISCUSSION

Result and discussion of the present study on ‘Documentation and nutritive evaluation of traditional foods of Kerala- Malappuram district’ are presented in this chapter under the following headings

4.1 Traditional food habits of different communities

4.1.1 Preference of traditional foods

4.1.2 Reasons for preference of traditional foods

4.1.3 Frequency of preparation of traditional foods (breakfast, lunch, dinner)

4.1.4 Frequency of preparation of traditional health foods

4.1.5 Traditional food items prepared on special occasions

4.1.6 List of traditional kitchen utensils and equipments

4.2 Nutritive value calculation of traditional foods

4.1 Traditional food habits of different communities

Traditional foods evolved through hundreds of years is still an inevitable segment of our culture. In every part of the society, people had diverse food habits which are strongly bound to the region, religion, economic status and cultural beliefs. Kerala, the Emerald of south, besides its natural wealth is proud of its exquisite cuisines. In this section, traditional food pattern prevailing in the Malappuram district of Kerala with particular reference to traditional foods and traditional food pattern of various communities are discussed.

4.1.1 Preference of traditional foods

The details regarding the preference for traditional foods among different communities are given in table 4.

Table 4. Preference of traditional foods

Communities (n)	Preferred (%)	Not preferred (%)
Hindu (6)	6 (100)	-
Muslim (11)	9 (81.81)	2 (18.19)
Christian (3)	2 (66.67)	1 (33.33)
Total (20)	17 (85)	3 (15)

Numbers in parenthesis are percentage

It was found that all respondents of Hindu community(100%) preferred traditional foods and majority of respondents from Muslim(81.81%) and Christian(66.67%) community prefer traditional foods.

It was reported that overwhelming majority of Indian consumers preferred to take traditional Indian meals rather than western foods (Indian Food Industry, 2001). Invasion of tin food culture which caused many hazardous health implications have brought up a preference towards traditional eating habits (Leena 2007). Chaudhry(2006) also indicated the popularity and preference of traditional Indian foods especially among those who took food from outside. In contradiction to this, Rajashekhar (2005) reported that the traditional dishes take lot of time to prepare and the modern foods like bread, butter/jam and eggs, porridges, cornflakes, sandwiches, noodles etc are replacing them.

4.1.2 Reasons for preference of traditional foods

The reasons indicated by the respondents for the preference given for traditional foods are presented in table 5.

Table 5. Reasons for preference of traditional foods

Reasons	Hindu (n=6)	Muslim (n=9)	Christian (n=2)	Total (n=17)
Healthy	6 (100)	7 (77.78)	2 (100)	15 (88.23)
Tasty	5 (83.33)	5 (55.55)	2 (100)	12 (70.59)
No adulteration	5 (83.33)	6 (66.67)	2 (100)	13 (76.47)
Less expensive	-	3 (33.33)	1 (50)	4 (23.53)
Ingredients are locally produced	3 (50)	2 (22.22)	-	5 (29.41)

Numbers in parenthesis are percentage

Most of the respondents belonging to Hindu, Muslim and Christian community who gave preference traditional foods since they are very healthy, tasty and no adulterants were used. Among 17 respondents who preferred traditional foods, 88.23% and 70.59% of respondents considered that they are healthy and tasty. 76.47% and 23.53% preferred traditional foods due to their purity without any adulteration and low cost. 29.41% preferred traditional foods because the ingredients are locally produced.

Aneena, ER in 2009 reported that all respondents of Kerala Brahmin, Tamil Brahmin, Hindus of Palakkad and Christians and majority of Ezhava, Scheduled Caste and Muslim respondents preferred traditional foods mainly due to their health benefits, low cost and palatability. This is a strong evidence of the solid acquaintance towards the nostalgic tastes of their homeland. In a study conducted by Shyna (2001), it was seen that more than 70 per cent of respondents preferred traditional foods due to their variety, purity and palatability.

4.1.3 Frequency of preparation of traditional foods (breakfast, lunch, dinner)

The frequency of preparation of different traditional foods by the different communities for breakfast, lunch and dinner are given in table 6.

Table 6. Frequency of preparation of traditional foods for breakfast, lunch and dinner.

Frequency	Hindu (n=6)	Muslim (n=11)	Christian (n=3)	Total (n=20)
Daily	6 (100)	9 (81.82)	2 (66.67)	17 (85)
Weekly thrice	-	2 (18.18)	1 (33.33)	3 (15)
Weekly twice	-	-	-	-

Numbers in parenthesis are percentage

It was found that 85% of respondents prepared traditional foods daily. Majority of respondents from all the community prepared traditional foods daily. Remaining 15% of respondents prepared traditional recipes weekly thrice. None of them preferred preparing traditional foods weekly twice.

Traditional food items which have been time tested and regularly prepared for centuries were still prepared and consumed by all respondents. Aneena, ER in 2009 reported that more than 80 per cent of respondents of different communities except Ezhavas and Muslims prepared traditional foods frequently for breakfast. Shyna (2001) also indicated that traditional breakfast items were prepared upto four times in a week by majority of respondents in different communities of Thrissur district. All the respondents prepared traditional food items daily for lunch which indicated that the respondents insisted upon an indigenous lunch.

4.1.4 Frequency of preparation of traditional health foods

The reasons indicated by the respondents for the preference given for traditional foods are presented in table 7.

Table 7. Frequency of preparation of traditional health foods.

Frequency	Hindu (n=6)	Muslim (n=11)	Christian (n=3)	Total (n=20)
Occasionally	4 (66.66)	6 (54.54)	1 (33.33)	11 (55)
Never	2 (33.33)	5 (45.45)	2 (66.66)	9 (45)

Numbers in parenthesis are percentage

Details of frequency of preparation of different health foods by different communities (Table 6) indicated that about 66.66 per cent of Hindu, 54.54 per cent of muslim, 33.33 per cent of christian respondents indicated that they prepared traditional health food at home occasionally. About 33.33 percent of Hindu respondents, 45.45 per cent of muslims and 66.66 per cent of christian community never prepare traditional health food at home.

Aneena, ER in 2009 reported that it was seen that hindu respondents prepared traditional snack items frequently when compared to other communities. This Nearly 82 per cent of the respondents prepared traditional beverages like chukkuvellam, jeerakavellam, karingalyvellam, pathimughamvellam and narangavellam regularly. Among the different communities also it was seen that majority of the respondents prepared traditional beverages daily. Traditional health foods were prepared only by 41 per cent of respondents occasionally and the rest did not prepare any health foods at home. Commercialisation of health foods and their availability in the open market might be the reasons for not preparing health foods at home.

4.1.5 Traditional food items prepared on special occasions

The details regarding the traditional food items prepared on special occasions presented in table 8.

Table.8 Traditional foods prepared by different communities on special occasions

Occasion	Items
Marriage	Biriyani, sadhya, vellappam, poovada, Halwa, kootukalan, cherupayarpayasam, sambaram
Puthiyaplasalkaram	kozhikanji, elanchi, kozhinirachathu, balayappam. mutta marichathu, musara, kalathappam, muchilappam, muttasurukka, pancharapatta, seerappam, irachipathiri, neyyappam, palooda and muttamala.
Non-vegetarian feast	Appam, vattayapam, non vegetarian curries
Valaikappu	Pokavada, bhoondhiladdu, beetroot pulav, thayirvadai
Vishu	Unniyappam, vishukatta, vishukani, Ela ada, chakka ada
Bakrid	Kheer, shahi thukda, mutton kuruma, biriyani, thengachoru
Christmas	Duck mappas, coconut pudding, munthiri wine, Kerala black halwa
Easter	Erachivaruthadh, pork stir fry, paalappam, kozhiperalan roast, Beef liver paalu curry
Ramdan	Tharikani, jeeragakanji, erachipathiri, pazhamnirachadh, unnakkaya
Onam	Koottucurry, oolan, injipuli, cherupayarpayasam, rasam, chakkayada, koottucurry, sambaram
Death	Adiyantharasadhya
Annaprasam	Ada, appam, aval, malar in jagerry syrup, sadya

Marriage celebrations of muslims lasted for four days and during all these days traditional food items like murukku, laddu, thenkozhal, appam, payasam, therattipal were prepared. A traditional sadya was served to the invited guests. After marriage, the bride brought varieties of sweets and savouries, known as cheeru to the bride'sgroom's house. Puliyoonu, valakaapu were the important functions conducted during pregnancy. Valakaappu was performed on the fourth month and seemantham during the sixth month of pregnancy. For both different sweets and savouries were prepared. Poruvelangai made up of roasted and powdered rice, wheat and green gram was the focal food item for seemantham and valakappu.

Aneena, ER in 2009 reported that Kerala Brahmins observed uppu pula after the death of close relatives in which they avoided salt in all preparations. Namboothiripad (1963) and Andarjanam (2003) also indicated about uppu pula observed by Hindus for 12 days after the death of close relatives. Shyna (2001) also noticed the same trend in the adiyanthirasadya of Kerala . Andarjanam (2003) reported about the nalucurry prepared for adiyanthiram which consisted erissery, pulissery, olan. Shyna (2001) also reported that Muslims prepared ceremony of puthiyaplasalkaram is most renowned for numerous dishes prepared by the bride's family for the bridegroom day by day. Ahamed (2003) listed various items like kozhikanji, musara, kalathappam, muchilappam, muttasurukka, pancharapatta, seerappam, irachipathiri, neyyappam, palooda and muttamala as the special items prepared for puthiyaplasalkaram by Muslims of Malabar.

4.1.6 List of traditional kitchen utensils and equipments

The details regarding the traditional kitchen utensils and equipments presented in table. 9.

Table.9 Information on traditional household utensils and equipment's used

SI no.	Utensils and Equipments	Purpose of Use
1	Achappamachu	Moulding achappam
2	Appa chatty	Making vellayappam
3	Cheenachatty	Cooking and frying
4	Kalchatti	Preparing curries
5	Cake paathram	For making cake
6	Kannanchiratta	For making puttu
7	Wooden sevanazhi	For making noolappam
8	Ottukalam	Cooking rice
9	Kalchatti	Preparing curries
10	KuzhalapThirikallupamachu	Moulding kuzhalappam
11	Manchatti	Cooking
12	Nazhi	Measuring food items
13	Pattanicheppu	Making appam
Equipments		
1	Aattukallu	Wet grinding
2	Ammi	Mashing and grinding
3	Chirava	For scrapping coconut
4	Muram	Grading, sorting and cleaning
5	Uralandulakka	Pounding and
6	Koondani	Dehuskingand crushing of grains
7	Earthen hearth	Cooking
8	Thirikkallu	Dry grinding

Traditional utensils used by different communities showed that only very few traditional utensils were presently used in households. Aneene ER reported that kuzhiuruli for

making kuzhiyappam, manchatti for preparing curries, nazhi for house hold measuring purposes were used by about 60 per cent of respondents. Shyna (2001) also reported that the use of marika for keeping salt and marapathi for keeping prepared curries. Various vessels like cheenachatti, neyyuruli, pichalachembu, kuzhiuruli were traditionally used by all the communities. Pattanicheppu and cake pathram were the traditional vessels used by Christians for preparing appam and cake respectively. Kannanchiratta and mulamkutti were used for making puttu. Nazhi, edangazhi, para and kazhinkul were traditionally used for measuring purposes. Noojum (2007) indicated that the fast growing home appliance industry played a major role in the fast adoption of newer technologies and refusal of conventional practices.

Table 10. Images of traditional kitchen utensils and equipments





4.2 Nutritive value calculation of traditional foods

Table 11. Nutritive value calculation of traditional foods

Sl No	Name of foods	Energy	Total carbohydrates	Protein	Fat	Calcium	Iron	Phosphorus	Vitamin C
			(g)	(g)	(g)	(mg)	(mg)	(mg)	(mg)
1	AvalosePodi	596.65	83.45	22.5	20.93	86.31	9.53	104.65	1.74
2	Thari kanji	559.48	65.5	7.9	30.53	156.37	1.03	106.8	4.45
3	Jeeraka kanji	380.5	43.62	6.41	19.79	29.85	-	-	-
4	UlliChoru	302.04	52.97	5.95	6.99	30.9	-	-	-
5	Koovavaragi yadhu	338.95	56.57	5.96	10.74	173.01	0.62	-	2.98
6	Poovada	933.08	145.8	30.04	27.63	153.86	9.61	-	0.26
7	Kalthappam	221.8	29.27	2	10.53	24.07	1.11	-	0.54
8	Coconut rice	247.6	9.31	4.13	14.47	-	-	163	-
9	Muringathaal lichath	111.6	9.31	3.95	6.23	-	2.31	-	54.2
10	Avil milk	915.72	62.6	7.17	70.11	-	3.85	289.84	-

The macronutrients found in traditional foods are carbohydrates, proteins, and fats. The traditional foods which are rich in energy are poovada, avil milk, avalosepodu and thari kanji. Traditional foods which are rich in carbohydrates are poovada, ullichoru, avil milk and thari kanji. At the same time traditional foods which are rich in proteins are poovada and avalosepodu. The traditional food items rich in fats are poovada, thari kanji and avalosepodu.

The most common micronutrients found in most of the traditional foods were iron, calcium, phosphorus and vitamin C. Avalosepodu was found to be rich in iron.

Koovavaragiyadhu, thari kanji and poovada were found to be rich source of calcium. Avil milk was the richest source of phosphorus. While muringathalichetu had maximum quantity of vitamin C.

Macro nutrients and micro nutrients of 10 different traditional foods are mentioned here.

Among these food items poovada has highest calorie (933.08 kcal) and the lowest one is muringathalichatu (111.6 kcal). Almost all food items have sufficient amount of carbohydrates but the highest of these are poovada (145.8 g) and the lowest one is coconut rice and muringathalichatu (9.31g)

Highest protein content is noticed in poovada (30.04g) and the lowest of these are in kalthappam (2 g). Other traditional foods have a protein content between 2 to 30.04 g.

Even though there are more of vegetable based food we selected, there is adequate level of fats in each. Among these traditional foods the lowest fat content present in muringathalichatu (6.23 g); and the highest is in avil milk (70.11 g).

Most the traditional foods contain high amount of calcium. Koovavaragiyadhu contained highest amount of it. i.e. (173.01 mg). Kalthappam contained the lowest amount (24.07 mg). Phosphorus content is assessed only in food items that contain more of phosphorus. Highest amount of phosphorus present in avil milk (289.84 mg). Lowest amount among this is present in avalosepodi (104.65mg).

Most of the traditional items contain adequate levels of iron. The highest iron content is in poovada (9.61 mg) and the lowest is in koovavaragiyadhu (0.62 mg). While, Jeeraka kanji, ullichoru and coconut rice have no iron in it.

In a study by Aneena (2009), it was reported that the sodium content of other traditional foods varied from 0.016 to 9.49 mg per 100 g. The potassium content of traditional foods varied from 0 to 566.71 mg 100g-1.

5. SUMMARY AND CONCLUSION

The study entitled "Documentation and nutritive evaluation of traditional foods of Kerala- Malappuram district" was taken up with the objectives of identifying and collecting information on the various traditional foods of Kerala, Malappuram district and documenting their mode of processing, and evaluating nutritive characteristics of the selected traditional foods. The study was conducted in Malappuram. Senior citizens who possess the details of traditional food items and preparation in each locality were selected as the respondents. The respondents were categorised based on the communities they represent.

Details of traditional food habits with respect to preference for traditional foods, the reasons for the preference, frequency of preparation of traditional foods, traditional foods prepared during special occasions, festivals/rituals and during physiological conditions and traditional foods included for breakfast, lunch, dinner, and snacks were collected from the selected respondent. Transition that occurred in the traditional food pattern and in the preparation of traditional foods was also collected. Nutrition evaluation of selected traditional foods was conducted at home level with respect to acceptability and taste.

Majority of the respondents preferred traditional foods due to their health benefits and palatability. Most of the respondents prepared traditional foods for breakfast and lunch and also prepared different traditional snack items. Most of the respondents did not prepare traditional health foods at home due to the laborious procedure involved in the preparation and the commercial availability of these products.

Respondents belonging to different communities prepared various traditional foods during special occasions, festival rituals and consumed traditional foods during different physiological conditions. Most of the respondents included traditional items for breakfast and lunch.

Changes were observed in traditional food patterns and traditional foods over different years with respect to ingredients method of preparation and vessel utensil used for preparation. The recent trend of food consumerism was portrayed by the increased frequency of eating out habits, purchases of instant mixes and bakery items.

From the traditional foods items collected 10 traditional foods namely Avil milk, jeeraka kanji, thari kanji, ullichoru, avalosepodi, muringathalichatu, coconut rice, Poovadaand

Koovavaragiyadh, which were least used, nutritionally viable and organoleptically acceptable were selected and replicated under home kitchen level.

Evaluation of nutrition composition of the traditional foods show that most of the traditional foods are rich in certain macro and micronutrients. Organoleptic evaluation of replicated foods indicated that most of the traditional foods were accepted to the younger generation.

From the present study it was found that the selected food items could be replicated under prevailing conditions without change in their quality aspects. Hence these technologies should be popularised as an attempt to conserve the traditional cuisine of Kerala.

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APPENDIX

Questionnaire for Traditional Recipe

- 1. Name :
.....
- 2. Age :
.....
- 3. Sex : Male Female
- 4. Mostly used traditional food item for breakfast?
.....
- 5. Mostly used traditional food item for lunch/ dinner?
.....
- 6. What are the snack that were used during your childhood?
.....
- 7. What is the traditional recipe that you know or followed till now?
Snack/ Beverage/Others
- 8. How to prepare it?
.....
.....
.....
.....
.....
- 9. Traditional food item used for occasions?
.....
- 10. Do you use any traditional food items for health care?
Yes No

11. If yes, what is it?

12. Do you had any traditional kitchen utensils/equipment's now?

.....

13. Are you using it now? If no, give reason.

.....

14. How often do you prepare traditional healthy food ?

(Occasionally/Never)

15. Which type of food do you prefer mostly ?

(Traditional/Non traditional)

16. How often do you prepare the traditional food ?

(Daily/Weekly thrice/Weekly twice)

17. How to keep seasonal food intact for a long time?

18. What were the different dry products used for lunch/dinner?

[papads/vattals/vadakams/kondattams/others]

19. Do you make it from home?

Yes/ No

20. Major reasons for preferring traditional food?

(Healthy/Tasty/No adulteration/Less expensive/Ingredients are locally produced)