

Indian Food -A Natural Medicine

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Abstract

India is the nation of numerous appearances and this peculiarity is reflected in its ethnical food. Indian food includes a wide assortment of territorial cooking local to India. Given the scope of a wide variety in soil type, atmosphere and occupations, these cooking styles differ altogether from one another and utilize locally accessible fixings, for example, herbs, vegetables and organic products. The Indian food routine is noted for its consideration of numerous pulses spice, rice which make this food one of a kind. Being commonly low in fat and high in vegetables, leafy foods, meat, Indian food has numerous medical advantages. From the British period to this day, Indian food plays an important role in the Medical field. This study explores the connection between Indian food and health benefits. The study then looks at the links between the Indian Food, Indian medicine and Indian diet of contemporary India. The study goes on to reflect on the nation's food culture. This review also speaks about some nutritional studies that have been performed to explore different types of food consumed in various Indian regions, among different social samples. The paper ends by arguing that Indian food has high medicinal value and a high respect in the medical field.

Keywords: Indian food; health benefits; spices; popularity; food processing; food preservation.

Introduction

Food is any substance consumed by an organism to provide nutritional support (Davies, 2000). Food is usually of plant or animal origin, i.e., veg or non-veg (Prashaanthi and Brundha, 2018). Preparation varies across the country. Indian cuisine reflects an 8,000 year history of various groups and cultures interacting with the Indian subcontinent, leading to diversity of flavours and regional cuisines found in modern-day India (Harsha and Brundha, 2017). Later, trade with British influence added to the already diverse Indian cuisine (Chaudhary and Yadav, 2020). Aryans classified food materials on the basis of their nature as sukha dhania (Cereals), Samidhanya (Pulses), Phala (fruits), Shakna (vegetables), Payovarga (milk products), Madhyavarga (alcoholic beverages), Mamasavarga (animal products) (Sharma and Parisi, 2017; Shreya and Brundha, 2017). Indian food is excellent medicines with incredible flavors and excellent cuisines (Shenoy and Brundha, 2016; Cukkemane, Kumar and Sathyamoorthy, 2020).

Preetam Sarkar, in his article explains about traditional and ayurvedic foods of Indian origin. (Sarkar *et al.*, 2015). Hannah R Vasanthi emphasises the importance of Indian spices in the medicinal role of Indian food (Vasanthi and Parameswari, 2010). Agilandesar. Devarajan's research provides the medical role knowledge of rasam, a Indian cuisine in Indian medicine (Balaji, Brundha and Path, 2016; Devarajan and Mohanmarugaraja, 2017). Chyawanprash explains the importance of food as medicine for a healthy living (Neme and Mohammed, 2017). A Chopra emphasises the importance of Indian food in Rasayana therapy (Chopra and Doiphode, 2002). S.K. Mukherjee and S. Soni explains the medicinal value of

common / daily Indian foods like Idli and dosa('Role of *Leuconostocmesenteroides* in Leavening the Batter of Idli, a Fermented Food of India', 1965).

Indian food has high medicinal value for the human body . We Indians have an excellent grain based diet(Ravichandran and Brundha, 2016). Indian soup, i.eRasam soup made with different spices has high medicinal value in the world (Kalaiselvi and Brundha, 2016). Indian food plays an important role in Ayurvedic medicines . Many Indian foods are recommended as Ayurvedic food for many health disorders (Tameneet *et al.*, 2019). The big impact in reduction in the medicinal value of Indian food is due to adulteration of food (Hannah *et al.*, 2019). Most common accidental adulterants are pesticides, D.D.T and residues present on plant products that reflect on the food made with it (Pandit *et al.*, 2002).This adulteration plays an important role in Indian street foods (Bhaskar *et al.*, 2004). Most of the traditional Indian food is Carbohydrate rich since Indian farmers need a lot of energy in their daily work .

Our team has rich experience in research and we have collaborated with numerous authors over various topics in the past decade (Arigaet *et al.*, 2018; Basha, Ganapathy and Venugopalan, 2018; Hannah *et al.*, 2018; Hussainyet *et al.*, 2018; Jeevanandan and Govindaraju, 2018; Kannan and Venugopalan, 2018; Kumar and Antony, 2018; Manohar and Sharma, 2018; Menon *et al.*, 2018; Nandakumar and Nasim, 2018; Nandhini, Babu and Mohanraj, 2018; Ravinthar and Jayalakshmi, 2018; Seppanet *et al.*, 2018; Teja, Ramesh and Priya, 2018; Duraisamyet *et al.*, 2019; Gheena and Ezhilarasan, 2019; Hema Shree *et al.*, 2019; P. Sharma *et al.*, 2019; Rajakeerthi and Ms, 2019; Rajendran *et al.*, 2019; Sekaret *et al.*, 2019; Siddique *et al.*, 2019; Janani, Palanivelu and Sandhya, 2020; Johnson *et al.*, 2020; Jose, Ajitha and Subbaiyan, 2020)(Duraisamy et al. 2019; Ariga et al. 2018; Kannan and Venugopalan 2018; Basha et al. 2018; Rajakeerthi and Ms 2019; Teja et al. 2018; Menon et al. 2018; Siddique et al. 2019; Nandakumar and Nasim 2018; Manohar and Sharma 2018; Hema Shree et al. 2019; Rajendran et al. 2019; Gheena and Ezhilarasan 2019; Hussainy et al. 2018; Hannah et al. 2018; Sharma et al. 2019; Ravinthar and Jayalakshmi 2018; Jose et al. 2020; Sekar et al. 2019; Kumar and Antony 2018; Johnson et al. 2020; Janani et al. 2020; Seppan et al. 2018; Jeevanandan and Govindaraju 2018; Nandhini et al. 2018).

This study serves the purpose of revealing the hidden importance of health benefits of Indian food. This study also provides us with enough information to understand the medicinal value of Indian food. The preparation recipe of medicinally valued Indian food is not included in this article. The results obtained are based only on information provided by books in libraries and articles on the Internet. Our institution is passionate about high quality evidence based research and has excelled in various fields ((Pc, Marimuthu and Devadoss, 2018; Ramesh *et al.*, 2018; VijayashreePriyadharsini, SmilineGirija and Paramasivam, 2018; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Ramaduraiet *et al.*, 2019; Sridharan *et al.*, 2019; VijayashreePriyadharsini, 2019; Chandrasekar *et al.*, 2020; Mathew *et al.*, 2020; R *et al.*, 2020; Samuel, 2021)

This study provides knowledge to individuals to deviate from synthetic drugs to herbal food products like chutney made from solanum trilobatum for conditions like fever.

This study deals with the importance of Indian food in Ayurvedic medicine. It also discusses the origin and history of Indian food. This study emphasises on the importance of medicinal role played by spices in Indian food. The study also deals with the processing and Preservation of Indian food for better medicinal value. This study also deals with the popularity of the Indian cuisine over the world. The aim of this study is to uncover the hidden importance of the health benefits of Indian food. To know the unknown medicinal value of Indian food. This study also aims at easy understanding of the importance of Indian food.

Materials and method

A protocol was established and studies were sourced from electronic databases. Screening and quality assessment was conducted by all authors. The databases including Pubmed, Google Scholar, EBSCO and SCOPUS were considered from inception of the database. In addition, we hand searched the World Wide Web, bibliographies of all included studies and Library of the institution for additional information. Around 30 articles were collected using keywords, analysed and reviewed.

Indian food and health benefits

Traditional Indian food provides enough nutrients that support the human body. Many Indian food varieties are grain based which are excellent as low carbohydrate food. Curd, An Indian food is given as a last resort in every meal and has high medicinal value (Singh and Das, 2017). Plant oils included in Indian food have high nutritive and therapeutic effects (Banerjee, Thiagarajan and Thiagarajan, 2017). Medicinal herb extracts like Amla extract have high Vitamin C which is good for health (Rathi, Riddell and Worsley, 2018). South Indian food is mainly based on Idli and dosa enhances probiotic activity. Indian traditional rasam has high antipyretic, hypoglycemic (Preethika and Brundha, 2018), antimicrobial activity (Vijayalakshmi, Swamy and Shantha, 1998) 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, Rani and Brundha, 2020), (Timothy, Samyuktha and Brundha, 2019). Inclusion of clove to food has a beneficiary effect on teeth.

Indian food - A role in Ayurvedic medicine

Herbs rich Indian food plays an important role in Ayurvedic health supplements (Sharma *et al.*, 2019). Indian food plays an important role in application of Ayurvedic concepts. Many Indian foods are recommended as Ayurvedic foods for many health disorders. Indian food based on curcumin, ginger and neem are used as immunomodulators in Rasayana therapy (Sinha *et al.*, 2018). The dominant constituents of the body called *doshas* are classified into *kapha*, *pitta*, and

vatta. Indian food plays a vital role based on the principles of ayurvedic diet i.e, *kedarakulyanyaya*, *khale kapota nyaya*, and *kshiradadhinyaya*. These three principles(*kedarakulyanyaya*, *khale kapota nyaya*, and *kshiradadhinyaya*)describe different aspects of digestion and function of food in the body (Bharathi *et al.*, 2016).

Spice - Medicinal role in Indian food

Indian tradition has a long history for the use of spices in Indian food for its medicinal values to prevent and treat diseases . Curcumin based Indian food is used in ancient traditional medicine like siddha and Ayurveda (Hunter, 2014). Black pepper has anti bacterial and anti cancer properties and can also prevent constipation. Jeera / Cumin helps in the digestion(Akash, Rani and Brundha, 2020).Cardamom increases appetite and has anti inflammatory and antibacterial properties. Chilli improves digestion and helps against migraines, cloves help in tooth problems (Kralis, 2012; Chavan, 2015). Howeverchillies can also cause nocturia (Kumar and Brundha, 2016). The active components of the spices play an important role in their medicinal properties (Jiang, 2019).The active metabolites of the spices and its health benefits have been mentioned in table 1.

Black Pepper

Black pepper was considered as gold, a valuable item in ancient trade.Pepper is an extensively used spice both in Eastern and Western food.It has a noteworthy cancer prevention agent and antibacterial impact and assists with processing and weight reduction since it animates the breakdown of fat cells.Black pepper is considered as the lord of flavors, as it gets the best yield as decided from the volume of worldwide exchange.Black pepper has the ability to increase the production of HCl in the stomach that helps in the digestion. It is also anti-bacterial in nature, reduces blood pressure (Naveenaa, Rani and Brundha, 2020) and contains iron that is beneficial for the body . Black pepper has a high antioxidant property .Black pepper has been reported to influence lipid metabolism predominantly by mobilization of fatty acids .

Turmeric

The spice of every south indianhousehold.In the south it is called “manjal,” a word that is frequently used in ancient Tamil literature .Turmeric is a spice that comes from the turmeric plant. The rhizome or underground stem of the plant is used as spice. Turmeric is used for rheumatoid arthritis, chronic anterior uveitis, conjunctivitis, skin cancer. It is also used for digestive disorders. It provides relief from abdominal pain and distension(Ingle, 2020).The fundamental clinical focuses of turmeric are the organs in the digestive system for treatment of severe conditions like familial adenomatous polyposis, in the bowels, for treatment of inflammatory gut sickness (Hosseini and Hosseinzadeh, 2018).

Cardamom

Cardamom is obtained from several plants in the genera *Elettaria* and *Amomum* in the family Zingiberaceae. Cardamoms are indigenous to Indian subcontinent. Cardamom is also known as *elaichi*. It has a rich source of vitamin A (John and Brundha, 2016) and Vitamin C. Vitamin C is a powerful antioxidant (Ionescu, 2016). This spice promotes heart health, helps in digestion, enhances oral health, helps in diabetes (Preethikaa and Brundha, 2018; Sowbaraniya, Preejitha and Brundha, 2020), fights asthma (Lakshmi, Rani and Brundha, 2020), prevents blood clots and treats skin infection. It also combats nausea, gas, increases appetite and reduces heartburn (Rexlin, Preejitha and Brundha, 2020). Cardamom is rich in cineole, an active component of cardamom. The inhibitory impacts of cineole on the arrangement of prostaglandins and cytokines by activated monocytes *in vitro*, might be liable for its expected advantageous use in treatment as an anti-inflammatory and pain-relieving specialist.

Food processing and preservation

Food preservation helps in prevention of microorganisms (Amit *et al.*, 2017). It includes curing, cooling, sugaring, freezing and boiling (Goresline, no date). The history of food processing reveals its merits and demerits (Grumezescu and Holban, 2018). Food Processing involves the transformation of agricultural products into food. Food additives are added to preserve the flavour or to enhance it (Lueck and Edwards, 1980; Brundha, 2015). Food processing is a major driver of economic growth (Saravanan *et al.*, 2011). Food preservation and food processing steps improve the food quality and increase the nutritional value.

Advantages of food preparing and safeguarding incorporate poison expulsion, protection, facilitating advertising and circulation assignments, and expanding food consistency. Food handling and safeguarding helps from multiple points of view like, it builds yearly accessibility of numerous nourishments, empowers transportation of fragile short-lived food sources across significant distances and makes numerous sorts of nourishments safe to eat by deactivating decay and pathogenic microorganisms. Present day general stores would not exist without current food preparing procedures, and long journeys would not be conceivable (Brundha and Nallaswamy, 2019; Brundha and Pathmashri, 2019).

The chance of spoilage is less in processed foods than fresh foods and are better suited for long-distance transportation from the source to the consumer. At the point when processed food were first presented in many nations, they assisted with mitigating food deficiencies and improved the general nourishment of population as it made numerous new nourishments accessible to the majority. Now a days paraffin waxes are used in processing the food since it gives a shiny appearance, but use of paraffin wax is not good for health (Hannah *et al.*, 2019).

Popularity

Indian food has high import and export value. Indian cuisine is ninth in world ranking with an average popularity score of about 62% among 24 countries (Khan, 2015), 77% of Singaporeans, 70%. Malaysians, 49% Indonesians, 44 %. Vietnamese like Indian cuisine . Indian cuisine is praised by European countries (Trost and Kravetsky, 2014) .The active components of the spices play an important role in their medicinal properties(Ferdioz and Brundha, 2016).

Future scope :

This review proves that indian food has health benefits similar to allopathic medicines.With the world returning to organic ways to sustain life,replacing chemical medicines with naturally cooked indian food can cause a great green revolution in the future .This review also educates the future generation about the health benefits of indian food that is long forgotten.

Conclusion

There is such a great amount of assorted variety in customary/ traditional Indian food in light of the fact that the regional food sources are developed by the atmosphere, culture and trimming practices of a specific area.Besides, certain nourishments have gotten increasingly mainstream in specific location as indicated by the wellbeing state of the population.This study stands as a pillar representing the health benefits of Indian food. These knowledge are required for the newer generations to lead a chemical free and healthy lifestyle. "EAT WELL LIVE WELL BE WELL.

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Author Contribution

R. Theivachandran executed the work by data collection and drafting of manuscript .S.Leslie Rani devised the concept and design of the study and validated the data collection .S.Leslie Rani and M.P.Brundha carried out the work of revision and proof -reading of the review.K.Anjaneyulu validated the data collection.

Conflict of interest

None to declare

References:

- [1]. Akash, N., Rani, S. L. and Brundha, M. P. (2020) ‘Awareness on benefits of chia seeds among college students’, *Drug Invention Today*, 14(2).
- [2]. Alleyne, T. *et al.* (2005) ‘The control of hypertension by use of coconut water and mauby: two tropical food drinks’, *West Indian Medical Journal*. doi: 10.1590/s0043-31442005000100002.

- [3]. Amit, S. K. *et al.* (2017) 'A review on mechanisms and commercial aspects of food preservation and processing', *Agriculture & Food Security*. doi: 10.1186/s40066-017-0130-8.
- [4]. Ariga, P. *et al.* (2018) 'Determination of correlation of width of Maxillary Anterior Teeth using Extraoral and Intraoral Factors in Indian Population: A systematic review', *World journal of dentistry*, 9(1), pp. 68–75. doi: 10.5005/jp-journals-10015-1509.
- [5]. Balaji, S., Brundha, M. P. and Path, D. N. B. (2016) 'Awareness of About Breast Cancer among Dental Surgeons', *Research journal of pharmaceutical, biological and chemical sciences*, 8(8), p. 797. Available at: <https://pdfs.semanticscholar.org/63f4/4173d90b35bffa33eed0aeb52ac547ef1567.pdf>.
- [6]. Banerjee, K., Thiagarajan, N. and Thiagarajan, P. (2017) 'A flaxseed oil emulgel formulation for prospective food applications synthesis and characterization', *Research Journal of Pharmacy and Technology*, p. 1802. doi: 10.5958/0974-360x.2017.00318.3.
- [7]. Basha, F. Y. S., Ganapathy, D. and Venugopalan, S. (2018) 'Oral hygiene status among pregnant women', *Journal of advanced pharmaceutical technology & research*, 11(7), p. 3099. doi: 10.5958/0974-360x.2018.00569.3.
- [8]. Bharathi, K. *et al.* (2016) 'Nutritional and Socio-Demographic Profile among Gond Tribe of Binouri Village, Bilaspur Chhattisgarh (India)', *Indian Journal of Research in Anthropology*, pp. 115–120. doi: 10.21088/ijra.2454.9118.2216.6.
- [9]. Bhaskar, J. *et al.* (2004) 'Bacteriological profile of street foods in Mangalore', *Indian journal of medical microbiology*, 22(3), p. 197. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/17642735>.
- [10]. Brundha, M. P. (2015) 'A Comparative Study-The Role of Skin and Nerve Biopsy in Hansen's Disease', *Research journal of pharmaceutical, biological and chemical sciences*, 7(10), p. 837. Available at: https://www.researchgate.net/profile/Brundha_Mp/publication/283561218_A_comparative_study-the_role_of_skin_and_nerve_biopsy_in_hansen's_disease/links/5892ba5d458515aeac946451/A-comparative-study-the-role-of-skin-and-nerve-biopsy-in-hansens-disease.pdf.
- [11]. Brundha, M. P. and Nallaswamy, D. (2019) 'Hide and seek in pathology- A research on game-based histopathology learning', *International Journal of Research in Pharmaceutical Sciences*, 10(2), pp. 1410–1414. doi: 10.26452/ijrps.v10i2.606.
- [12]. Brundha, M. P. and Pathmashri, V. P. (2019) 'Quantitative Changes of Red Blood cells in Cancer Patients under Palliative Radiotherapy-A Retrospective Study', *Research Journal of*. Available at: <http://www.indianjournals.com/ijor.aspx?target=ijor:rjpt&volume=12&issue=2&article=041>.
- [13]. Chandrasekar, R. *et al.* (2020) 'Development and validation of a formula for objective assessment of cervical vertebral bone age', *Progress in orthodontics*, 21(1), p. 38. doi: 10.1186/s40510-020-00338-0.
- [14]. Chaudhary, R. and Yadav, A. (2020) 'Experimental investigation of a solar cooking system inhibiting closed airtight cooking pot and evacuated tube collector for the preparation of Indian

- cuisine items', *Environment, Development and Sustainability*. doi: 10.1007/s10668-020-00711-3.
- [15]. Chavan, U. D. (2015) *Nutritional Value and Health Benefits from Fruits, Vegetables, Nuts and Spices*. Available at: https://books.google.com/books/about/Nutritional_Value_and_Health_Benefits_fr.html?hl=&id=hmp7jwEACAAJ.
- [16]. Chopra, A. and Doiphode, V. V. (2002) 'Ayurvedic medicine. Core concept, therapeutic principles, and current relevance', *The Medical clinics of North America*, 86(1), pp. 75–89, vii. doi: 10.1016/s0025-7125(03)00073-7.
- [17]. Cukkemane, A., Kumar, P. and Sathyamoorthy, B. (2020) 'A metabolomics footprint approach to understanding the benefits of synbiotics in functional foods and dietary therapeutics for health, communicable and non-communicable diseases', *Food research international*, 128, p. 108679. doi: 10.1016/j.foodres.2019.108679.
- [18]. Davies, E. (2000) *A basic encyclopaedia of food*. neate publishing. Available at: https://books.google.com/books/about/A_basic_encyclopaedia_of_food.html?hl=&id=YuBV3CDPP0C.
- [19]. Devarajan, A. and Mohanmarugaraja, M. K. (2017) 'A comprehensive review on Rasam: A South Indian traditional functional food', *Pharmacognosy Reviews*, p. 73. doi: 10.4103/phrev.phrev_13_17.
- [20]. Duraisamy, R. et al. (2019) 'Compatibility of Nonoriginal Abutments With Implants: Evaluation of Microgap at the Implant-Abutment Interface, With Original and Nonoriginal Abutments', *Implant dentistry*, 28(3), pp. 289–295. doi: 10.1097/ID.0000000000000885.
- [21]. Ezhilarasan, D., Apoorva, V. S. and Ashok Vardhan, N. (2019) 'Syzygiumcumini extract induced reactive oxygen species-mediated apoptosis in human oral squamous carcinoma cells', *Journal of oral pathology & medicine: official publication of the International Association of Oral Pathologists and the American Academy of Oral Pathology*, 48(2), pp. 115–121. doi: 10.1111/jop.12806.
- [22]. Ferdioz, J. and Brundha, M. P. (2016) 'Awareness of sty', *International Journal of Pharmaceutical Sciences Review and Research*, 40(1), pp. 30–32. Available at: <http://dx.doi.org/> (Accessed: 6 June 2020).
- [23]. Gheena, S. and Ezhilarasan, D. (2019) 'Syringic acid triggers reactive oxygen species-mediated cytotoxicity in HepG2 cells', *Human & experimental toxicology*, 38(6), pp. 694–702. doi: 10.1177/0960327119839173.
- [24]. Goresline, H. E. (no date) 'Historical Aspects of the Radiation Preservation of Food', *Preservation of Food by Ionizing Radiation*, pp. 1–46. doi: 10.1201/9781351076005-1.
- [25]. Grumezescu, A. M. and Holban, A. M. (2018) *Food Processing for Increased Quality and Consumption*. Academic Press. Available at: <https://play.google.com/store/books/details?id=6wIxDwAAQBAJ>.
- [26]. Hannah, R. et al. (2018) 'Awareness about the use, ethics and scope of dental photography among undergraduate dental students dentist behind the lens', *Journal of advanced pharmaceutical technology & research*, 11(3), p. 1012. doi: 10.5958/0974-360x.2018.00189.0.

- [27]. Hannah, R. *et al.* (2019) 'Liquid Paraffin as a Rehydrant for Air Dried Buccal Smear', *Research Journal of Pharmacy and Technology*, 12(3), pp. 1197–1200. Available at: <http://www.indianjournals.com/ijor.aspx?target=ijor:rjpt&volume=12&issue=3&article=038>.
- [28]. Harsha, L. and Brundha, M. P. (2017) 'Prevalence of dental developmental anomalies among men and women and its psychological effect in a given population', *Research journal of pharmaceutical, biological and chemical sciences*, 9(6), p. 869. Available at: <http://search.proquest.com/openview/1f488cc6e377096f44a87e509aceab79/1?pq-origsite=gscholar&cbl=54977>.
- [29]. Hema Shree, K. *et al.* (2019) 'Saliva as a Diagnostic Tool in Oral Squamous Cell Carcinoma - a Systematic Review with Meta Analysis', *Pathology oncology research: POR*, 25(2), pp. 447–453. doi: 10.1007/s12253-019-00588-2.
- [30]. Hosseini, A. and Hosseinzadeh, H. (2018) 'Antidotal or protective effects of Curcuma longa (turmeric) and its active ingredient, curcumin, against natural and chemical toxicities: A review', *Biomedicine & pharmacotherapy = Biomedecine&pharmacotherapie*, 99, pp. 411–421. doi: 10.1016/j.biopha.2018.01.072.
- [31]. Hunter, J. P., III (2014) *Health Benefits: From Foods and Spices*. John P. Hunter III. Available at: <https://play.google.com/store/books/details?id=TrMWBAQAQBAJ>.
- [32]. Hussainy, S. N. *et al.* (2018) 'Clinical performance of resin-modified glass ionomer cement, flowable composite, and polyacid-modified resin composite in noncarious cervical lesions: One-year follow-up', *Journal of conservative dentistry: JCD*, 21(5), pp. 510–515. doi: 10.4103/JCD.JCD_51_18.
- [33]. Ingle, E. (2020) 'Turmeric in the management of oral submucous fibrosis - A systematic review and meta-analysis', *International journal of health sciences*, 14(3), pp. 41–46. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/32536848>.
- [34]. Ionescu, G. (2016) *Sustainable Food and Beverage Industries: Assessments and Methodologies*. CRC Press. Available at: <https://play.google.com/store/books/details?id=nB9jDAAAQBAJ>.
- [35]. Janani, K., Palanivelu, A. and Sandhya, R. (2020) 'Diagnostic accuracy of dental pulse oximeter with customized sensor holder, thermal test and electric pulp test for the evaluation of pulp vitality: an in vivo study', *Brazilian dental science*, 23(1). doi: 10.14295/bds.2020.v23i1.1805.
- [36]. Jeevanandan, G. and Govindaraju, L. (2018) 'Clinical comparison of Kedo-S paediatric rotary files vs manual instrumentation for root canal preparation in primary molars: a double blinded randomised clinical trial', *European archives of paediatric dentistry: official journal of the European Academy of Paediatric Dentistry*, 19(4), pp. 273–278. doi: 10.1007/s40368-018-0356-6.
- [37]. Jiang, T. A. (2019) 'Health Benefits of Culinary Herbs and Spices', *Journal of AOAC International*, 102(2), pp. 395–411. doi: 10.5740/jaoacint.18-0418.
- [38]. John, D. A. and Brundha, M. P. (2016) 'Awareness of Vitamin A Deficiency among Middle Aged Men-Research', *Vitamins & Minerals*. Available at: <https://pdfs.semanticscholar.org/6450/b7a951ea17ed64c0f699315fe1e3e5d5f1bc.pdf>.
- [39]. Johnson, J. *et al.* (2020) 'Computational identification of MiRNA-7110 from pulmonary arterial

- hypertension (PAH) ESTs: a new microRNA that links diabetes and PAH', *Hypertension research: official journal of the Japanese Society of Hypertension*, 43(4), pp. 360–362. doi: 10.1038/s41440-019-0369-5.
- [40]. Jose, J., Ajitha and Subbaiyan, H. (2020) 'Different treatment modalities followed by dental practitioners for Ellis class 2 fracture – A questionnaire-based survey', *The open dentistry journal*, 14(1), pp. 59–65. doi: 10.2174/1874210602014010059.
- [41]. Kalaiselvi, R. and Brundha, M. P. (2016) 'Prevalence of hysterectomy in South Indian population', *Research Journal of Pharmacy and Technology*, 9(11), pp. 1941–1944. Available at: <http://www.indianjournals.com/ijor.aspx?target=ijor:rjpt&volume=9&issue=11&article=027>.
- [42]. Kannan, A. and Venugopalan, S. (2018) 'A systematic review on the effect of use of impregnated retraction cords on gingiva', *Journal of advanced pharmaceutical technology & research*, 11(5), p. 2121. doi: 10.5958/0974-360x.2018.00393.1.
- [43]. Khan, S. (2015) *101 Indian Food Recipes: Best Indian authentic Food Recipes Ever*. Osmora Incorporated. Available at: <https://play.google.com/store/books/details?id=C8Y-CgAAQBAJ>.
- [44]. Kralis, J. F. (2012) *Spices: Types, Uses, and Health Benefits*. Nova Science Pub Incorporated. Available at: <https://books.google.com/books/about/Spices.html?hl=&id=pPaPZwEACAAJ>.
- [45]. Kumar, D. and Antony, S. D. P. (2018) 'Calcified canal and negotiation-A review', *Journal of advanced pharmaceutical technology & research*, 11(8), p. 3727. doi: 10.5958/0974-360x.2018.00683.2.
- [46]. Kumar, M. D. and Brundha, M. P. (2016) 'Awareness about nocturia-A questionnaire survey', *Research Journal of Pharmacy and Technology*, 9(10), pp. 1707–1709. Available at: <http://www.indianjournals.com/ijor.aspx?target=ijor:rjpt&volume=9&issue=10&article=043>.
- [47]. Lakshmi, S., Rani, S. L. and Brundha, M. P. (2020) 'Blow the balloon for the ease--A cross-sectional study on wheezing patients', *Drug Invention Today*, 14(2).
- [48]. Lueck, E. and Edwards, G. F. (1980) 'Aim and Development of Food Preservation', *Antimicrobial Food Additives*, pp. 2–8. doi: 10.1007/978-3-642-96570-8_1.
- [49]. Manohar, M. P. and Sharma, S. (2018) 'A survey of the knowledge, attitude, and awareness about the principal choice of intracanal medicaments among the general dental practitioners and nonendodontic specialists', *Indian journal of dental research: official publication of Indian Society for Dental Research*, 29(6), pp. 716–720. doi: 10.4103/ijdr.IJDR_716_16.
- [50]. Mathew, M. G. *et al.* (2020) 'Evaluation of adhesion of Streptococcus mutans, plaque accumulation on zirconia and stainless steel crowns, and surrounding gingival inflammation in primary molars: Randomized controlled trial', *Clinical oral investigations*, pp. 1–6. Available at: <https://link.springer.com/article/10.1007/s00784-020-03204-9>.
- [51]. Menon, S. *et al.* (2018) 'Selenium nanoparticles: A potent chemotherapeutic agent and an elucidation of its mechanism', *Colloids and surfaces. B, Biointerfaces*, 170, pp. 280–292. doi: 10.1016/j.colsurfb.2018.06.006.
- [52]. Nandakumar, M. and Nasim, I. (2018) 'Comparative evaluation of grape seed and cranberry extracts in preventing enamel erosion: An optical emission spectrometric analysis', *Journal of conservative dentistry: JCD*, 21(5), pp. 516–520. doi: 10.4103/JCD.JCD_110_18.

- [53]. Nandhini, J. S. T., Babu, K. Y. and Mohanraj, K. G. (2018) 'Size, shape, prominence and localization of gerdy's tubercle in dry human tibial bones', *Journal of advanced pharmaceutical technology & research*, 11(8), p. 3604. doi: 10.5958/0974-360x.2018.00663.7.
- [54]. Naveenaa, N., Rani, S. L. and Brundha, M. P. (2020) 'Knowledge, attitude, and perception on the importance of hematological report among general population', *Drug Invention Today*, 14(2).
- [55]. Neme, K. and Mohammed, A. (2017) 'Mycotoxin occurrence in grains and the role of postharvest management as a mitigation strategies. A review', *Food Control*, pp. 412–425. doi: 10.1016/j.foodcont.2017.03.012.
- [56]. Pandit, G. G. *et al.* (2002) 'Persistent organochlorine pesticide residues in milk and dairy products in India', *Food additives and contaminants*, 19(2), pp. 153–157. doi: 10.1080/02652030110081155.
- [57]. Pc, J., Marimuthu, T. and Devadoss, P. (2018) 'Prevalence and measurement of anterior loop of the mandibular canal using CBCT: A cross sectional study', *Clinical implant dentistry and related research*. Available at: <https://europepmc.org/article/med/29624863>.
- [58]. Prashaanthi, N. and Brundha, M. P. (2018) 'A Comparative Study between Popplet Notes and Conventional Notes for Learning Pathology', *Research Journal of Pharmacy and Technology*, 11(1), pp. 175–178. Available at: <http://www.indianjournals.com/ijor.aspx?target=ijor:rjpt&volume=11&issue=1&article=032>.
- [59]. Preethikaa, S. and Brundha, M. P. (2018) 'Awareness of diabetes mellitus among general population', *Journal of pharmacy research*. Available at: <http://www.indianjournals.com/ijor.aspx?target=ijor:rjpt&volume=11&issue=5&article=024>.
- [60]. Rajakeerthi and Ms, N. (2019) 'Natural Product as the Storage medium for an avulsed tooth – A Systematic Review', *Cumhuriyet Üniversitesi Diş Hekimliği Fakültesi Dergisi*, 22(2), pp. 249–256. doi: 10.7126/cumudj.525182.
- [61]. Rajendran, R. *et al.* (2019) 'Comparative evaluation of remineralizing potential of a paste containing bioactive glass and a topical cream containing casein phosphopeptide-amorphous calcium phosphate: An in vitro study', *Pesquisabrasileira em odontopediatria e clínica integrada*, 19(1), pp. 1–10. doi: 10.4034/pboci.2019.191.61.
- [62]. Ramadurai, N. *et al.* (2019) 'Effectiveness of 2% Articaine as an anesthetic agent in children: randomized controlled trial', *Clinical oral investigations*, 23(9), pp. 3543–3550. doi: 10.1007/s00784-018-2775-5.
- [63]. Ramesh, A. *et al.* (2018) 'Comparative estimation of sulfiredoxin levels between chronic periodontitis and healthy patients - A case-control study', *Journal of periodontology*, 89(10), pp. 1241–1248. doi: 10.1002/JPER.17-0445.
- [64]. Rathi, N., Riddell, L. and Worsley, A. (2018) 'Indian adolescents' perceptions of the home food environment', *BMC Public Health*. doi: 10.1186/s12889-018-5083-8.
- [65]. Ravichandran, H. and Brundha, M. P. (2016) 'Awareness about personal protective equipments in hospital workers (sweepers and cleaners)', *International journal of pharmacy and pharmaceutical sciences*.
- [66]. Ravinthar, K. and Jayalakshmi (2018) 'Recent advancements in laminates and veneers in

- dentistry', *Journal of advanced pharmaceutical technology & research*, 11(2), p. 785. doi: 10.5958/0974-360x.2018.00148.8.
- [67]. Rexlin, P. E., Preejitha, V. B. and Brundha, M. P. (2020) 'Age-related differences of heart rate and respiratory rate in the age group of 45-55 years--A regression analysis', *Drug Invention Today*, 14(2).
- [68]. R, H. *et al.* (2020) 'CYP2 C9 polymorphism among patients with oral squamous cell carcinoma and its role in altering the metabolism of benzo[a]pyrene', *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology*, pp. 306–312. doi: 10.1016/j.oooo.2020.06.021.
- [69]. 'Role of Leuconostocmesenteroides in Leavening the Batter of Idli, a Fermented Food of India' (1965) *Applied Microbiology*, pp. 634–634. doi: 10.1128/aem.13.4.634-634.1965.
- [70]. Samuel, S. R. (2021) 'Can 5-year-olds sensibly self-report the impact of developmental enamel defects on their quality of life?', *International journal of paediatric dentistry / the British Paedodontic Society [and] the International Association of Dentistry for Children*, 31(2), pp. 285–286. doi: 10.1111/ipd.12662.
- [71]. Saravanan, S. S. *et al.* (2011) 'An Analysis of FDI in Indian Food Processing Industry', *Indian Journal of Applied Research*, pp. 80–81. doi: 10.15373/2249555x/mar2013/28.
- [72]. Sarkar, P. *et al.* (2015) 'Traditional and ayurvedic foods of Indian origin', *Journal of Ethnic Foods*, pp. 97–109. doi: 10.1016/j.jef.2015.08.003.
- [73]. Sekar, D. *et al.* (2019) 'Methylation-dependent circulating microRNA 510 in preeclampsia patients', *Hypertension research: official journal of the Japanese Society of Hypertension*, 42(10), pp. 1647–1648. doi: 10.1038/s41440-019-0269-8.
- [74]. Seppan, P. *et al.* (2018) 'Therapeutic potential of Mucuna pruriens (Linn.) on ageing induced damage in dorsal nerve of the penis and its implication on erectile function: an experimental study using albino rats', *The aging male: the official journal of the International Society for the Study of the Aging Male*, pp. 1–14. doi: 10.1080/13685538.2018.1439005.
- [75]. Sharma *et al.* (2019) 'Chyawanprash: A Traditional Indian Bioactive Health Supplement', *Biomolecules*, p. 161. doi: 10.3390/biom9050161.
- [76]. Sharma, P. *et al.* (2019) 'Emerging trends in the novel drug delivery approaches for the treatment of lung cancer', *Chemico-biological interactions*, 309, p. 108720. doi: 10.1016/j.cbi.2019.06.033.
- [77]. Sharma, R. K. and Parisi, S. (2017) 'Aflatoxins in Indian Food Products', *Toxins and Contaminants in Indian Food Products*, pp. 13–24. doi: 10.1007/978-3-319-48049-7_2.
- [78]. Shenoy, P. B. and Brundha, M. P. (2016) 'Awareness of polycystic ovarian disease among females of age group 18-30 years', *Research journal of pharmaceutical, biological and chemical sciences*, 8(8), p. 813. Available at: <http://search.proquest.com/openview/a8a09e7b2e9d2f967bf3fee479c7018a/1?pq-origsite=gscholar&cbl=54977>.
- [79]. Shreya, S. and Brundha, M. P. (2017) 'Alteration of Haemoglobin Value in Relation to Age, Sex and Dental Diseases-A Retrospective Correlation Study', *Journal of pharmacy research*. Available at:

- <http://www.indianjournals.com/ijor.aspx?target=ijor:rjpt&volume=10&issue=5&article=016>.
- [80]. Siddique, R. *et al.* (2019) 'Qualitative and quantitative analysis of precipitate formation following interaction of chlorhexidine with sodium hypochlorite, neem, and tulsi', *Journal of conservative dentistry: JCD*, 22(1), pp. 40–47. doi: 10.4103/JCD.JCD_284_18.
- [81]. Singh, S. and Das, S. (2017) 'Evaluation of Market Curd for Sanitary Quality and Bacteriocin-Producing Lactic acid Bacteria for Potential Application as a Natural, Healthy Food Preservative', *Research Journal of Pharmacy and Technology*, p. 1029. doi: 10.5958/0974-360x.2017.00186.x.
- [82]. Sinha, T. *et al.* (2018) 'A Study about the Health Status of Tribal Women in Bastar Region, Chhattisgarh, India', *International Journal of Preventive, Curative & Community Medicine*, pp. 5–8. doi: 10.24321/2454.325x.201828.
- [83]. Sowbaraniya, S. M., Preejitha, V. B. and Brundha, M. P. (2020) 'Knowledge, awareness, and attitude on dental post-operative complications in diabetes among general population', *Drug Invention Today*, 13(2).
- [84]. Sridharan, G. *et al.* (2019) 'Evaluation of salivary metabolomics in oral leukoplakia and oral squamous cell carcinoma', *Journal of oral pathology & medicine: official publication of the International Association of Oral Pathologists and the American Academy of Oral Pathology*, 48(4), pp. 299–306. doi: 10.1111/jop.12835.
- [85]. Tamene, A. *et al.* (2019) 'Quantification of folate in the main steps of traditional processing of tef injera, a cereal based fermented staple food', *Journal of Cereal Science*, pp. 225–230. doi: 10.1016/j.jcs.2019.04.005.
- [86]. Thelma Ebele, Rita Ifeoma Odo, Uwakwe Simon Onoja, ChikaodiliAdaobiNwagu, John Ikechukwu Ihedioha, and. "Hepatoprotective properties of methanol leaf extract of *Pterocarpus mildbraedii* Harms on carbon tetrachloride-induced hepatotoxicity in albino rats (*Rattus norvegicus*) (2019) *Journal of Complementary Medicine Research*, 10.
- [87]. Timothy, C. N., Samyuktha, P. S. and Brundha, M. P. (2019) 'Dental pulp Stem Cells in Regenerative Medicine--A Literature Review', *Research Journal of Pharmacy and Technology*, 12(8), pp. 4052–4056. Available at: <http://www.indianjournals.com/ijor.aspx?target=ijor:rjpt&volume=12&issue=8&article=088>.
- [88]. Trost, A. and Kravetsky, V. (2014) Greatest Indian Food Everyone Needs to Try: Top 100. A&V. Available at: <https://play.google.com/store/books/details?id=tRPNAwAAQBAJ>.
- [89]. Varshini, A., Rani, S. L. and Brundha, M. P. (2020) 'Awareness of annual doctor checkups among general population', *Drug Invention Today*, 14(2).
- [90]. Vasanthi, H. R. and Parameswari, R. P. (2010) 'Indian spices for healthy heart - an overview', *Current cardiology reviews*, 6(4), pp. 274–279. doi: 10.2174/157340310793566172.
- [91]. Vijayalakshmi, B., Swamy, B. V. and Shantha, T. R. (1998) 'Ayurvedic rationale of the southern Indian vegetable soup saaru or rasam', *Ancient science of life*, 17(3), pp. 207–213. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/22556843>.
- [92]. VijayashreePriyadharsini, J. (2019) 'In silico validation of the non-antibiotic drugs acetaminophen and ibuprofen as antibacterial agents against red complex pathogens', *Journal of*

periodontology, 90(12), pp. 1441–1448. doi: 10.1002/JPER.18-0673.

- [93]. VijayashreePriyadharsini, J., SmilineGirija, A. S. and Paramasivam, A. (2018) ‘In silico analysis of virulence genes in an emerging dental pathogen *A. baumannii* and related species’, *Archives of oral biology*, 94, pp. 93–98. doi: 10.1016/j.archoralbio.2018.07.001.

Table :

SPICES	ACTIVE INGREDIENTS	HEALTH BENEFITS
Turmeric	Curcumin	Anti bacterial, anti oxidant
Cinnamon	Cinnamaldehyde	Against piles ,reduces blood sugar level
Cloves	Eugenol	Tooth problem
Black pepper	piperine	Anti bacterial, prevents constipation, anti cancer
Cardamom	Cineole	Increases appetite, anti inflammatory, anti bacterial
Jeera/cumin	Cuminaldehyde	Helps in digestion
Chilli	Capsaicin	Improves digestion. against migraines

Table 1 -Spices and their active ingredients and health benefits.