

மூக்கில் மருந்திடுவதால் கபமும் குறையும் என ஒரு கருத்து உண்டு. இது ஒரு ஆங்கில முறை மருத்துவருக்கு ஏற்றுக்கொள்ள கடினமாக இருக்கலாம். சித்தமருத்துவ நூல்களில் மஞ்சள் கரிசலாங்கண்ணி மூலிகையில் தங்கச்சத்து உள்ளதாக கூறப்பட்டு உள்ளது. இது ஒரு தாவரவேதியியல் வல்லுநருக்கு வியப்பளிப்பதாக அமையும். பல்வேறு பின்னணியில் இருந்து வந்த வல்லுனர்களுக்கு இதுபோன்ற காரணிகள், ஒரு பொதுக்கருத்தினை எட்டி மேற்கொண்டு தங்களது ஆய்வினைத் தொடர விடாது ஒரு தடையாக விளங்குகின்றன.

உடல்நலம், சுற்றுச்சூழல் பாதுகாப்பு போன்ற பல துறைகளில், அத்துறை வல்லுனர்களது நிபுணத்துவத்துடன் சார்ந்த பிறதுறை வல்லுனர்களது கருத்துக்களும், அறிவும் கலந்தால் மட்டுமே ஒரு முழுமையான வளர்ச்சி சாத்தியப்படும். இப்படி பல துறைகளில் இருந்து பெறப்பட்ட அறிவு, ஒரு நோக்கத்தினை நிறைவேற்றும் வண்ணம் ஒருமுகப்படுத்தப்படும் பொழுது, அப்பணியின் இலக்கு எளிதில் அடையப்படுகின்றது. நாட்டார் மருந்தியல் ஆய்வு என்பது மேற்கண்டவாறு அறிவியல் துறை அறிவு மட்டுமன்றி, கலைத்துறைகளது அறிவும் சேரவேண்டிய ஒரு ஆய்வாகும். ஒரு சில அரசு நிறுவனங்களில் இது போன்ற துறைகள் ஓரிடத்தில் அமைக்கப்பட்டுள்ளது; இருப்பினும் நமது நாட்டில் இது போன்ற பல துறை அறிஞர்கள் ஒருங்கிணைந்து ஆய்வு செய்யும் நிலை இன்னும் வலுப்பெற வேண்டிய சூழலே உள்ளது.

பூமத்தியரேகைப்பகுதியில் உள்ள பல்வேறு நாடுகளில், மிகுதியான தாவர வளங்கள் காணப்படினும் நமது நாட்டில் அத்தாவரவளத்தினை எங்ஙனம் பயன்படுத்துவது என்ற அறிவும் சிறப்புற அமைந்துள்ளது. இருப்பினும் அவ்வளமும், அறிவும் உலக மக்கள் அனைவருக்கும் பயன்படவும், அதன் மூலம் நமது முன்னோர்களது புகழ் உலகம் முழுவதும் பரவவும், உலகின் மருத்துவத்தேவையில் இந்தியாவின் பங்களிப்பை அதிகரிக்கவும், அதன் மூலம் நமது தேசத்தின் வருவாய் அதிகரிக்கவும் நமது பாரம்பரிய மருத்துவ முறைகள் குறித்த முறையான மருத்துவ ஆய்வுகள் அவசியமானவை. இந்த இலக்கை நாம் அடைய பல்வேறு அறிவியல் புலங்களுக்கு இடையே மட்டுமின்றி அறிவியல் புலங்களுடனும், கலைப்புலங்களும் சேர்ந்து செய்யும் பல்நோக்கு ஆய்வுகள் நமது தேசத்தின் இன்றைய தேவையாக உள்ளது.

A Brief Introduction to Indian Fermented Foods and Its Health Benefits

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Abstract

Fermented foods are popularly consumed around the world especially among Asian people. India is one of the richest and diverse source of fermented foods. The current article briefly introduced about the famous Indian fermented foods and raw materials used to prepare the food. The health benefits of fermented foods of India have also been discussed. The paper describes the in-depth scientific study on traditional fermented foods of India, which aid to explore the potential of bioactive microbes residing in the fermented foods.

Keywords: Indian fermented foods, Health benefits, Probiotics, Fermented rice.

Introduction

Fermented foods (FFs) are food recipes prepared based on the fermentation process. The traditional FFs are, in general, prepared by the spontaneous fermentation process. Our ancestors explored the use of fermentation for preparing and preserving the food stuff and other traditional medicines without scientific knowledge on the process. The microbes involved in the fermentation process are the key player and are responsible for the eminence of the final recipe. Several FFs have been used around the world, but Asian countries are heaven for a diverse selection of FFs. Kimchi, sausages, yogurt, and wine are the commonly known FFs. Every country has region specific indigenous FFs prepared using vegetables, legumes, meats, and milk (Sivamaruthi et al., 2018a). The current manuscript summarizes the common FFs of the Indiansubcontinent and general aspects of health benefits of FFs.

Fermented foods of India

FFs are the major part of Indian tradition. The nature of the foods varies based on the geographical region and the availability of the raw materials. Use of rice-based famous FFs, called *idli*, and *dosa*, have been recorded from 700 BC. FFs also describes the lifestyle and agricultural status of a particular region of the country. For example, rice cultivating regions most commonly use the rice-based food and FFs compared to other types of foods (Satish Kumar et al., 2013).

Types of FFs in India

The detailed FFs and beverages of India, and raw materials used for the preparation has been reported previously (Satish Kumar et al., 2013; Sarkar et al., 2015; Tamang, 2015; Ray et al., 2016; Narzary et al., 2016; Rawat et al., 2018).

FFs are broadly classified as cereal and pulses-based FFs, milk-based Ffs, vegetables-based FFs, and meat-based FFs. Rice, wheat, barley, and finger millet are the common cereals used for the preparation of FFs. *Idli*, *dosa*, *Appam*, and fermented rice (*pazhaiya soru*) are the representative cereal-based FFs of south-India (Sekar and Mariappan 2007). *Manna*, *Kurdi*, and *Sang* are wheat-based FFs of North-India especially Himachal Pradesh (Savitri and Bhalla, 2007). *Dahi* (like yogurt), *Kurut*, *Philuk*, *Chhu*, *Chukham*, *Shyow*, and *Khadi* are the milk-based FFs of India. Yak, cow, and goat milk have been used for the preparation of milk-based FFs. The people in Darjeeling hills, Sikkim, Arunachal Pradesh Ladakh, and Gujarat are frequently using several unique milk-based FFs while south Indians use only yogurt, and butter milk extensively than other milk-based FFs (Yadav et al. 2007b; Dewan and Tamang, 2007a).

Anishi, *Sinki*, *Hikhu*, *Ekung*, *Eup*, *Mesu*, *Lungseij*, and *Hiring* are vegetable based FFs, and *Ngari*, *Tungtap*, *Lona ilish*, *Utonggari*, *Arjia*, *Chartayshya*, *Suka Ko Masu*, *Geema*, *Lang satchu*, *Lang kargyong*, *Chilu*, and *Faak kargyong* are meat and fish based FFs of north-east India (Tamang and Tamang, 2009; Singh et al., 2007b; Thapa et al., 2004; Majumdar and Basu, 2010; Oki et al., 2011; Rai et al., 2010) (Table: 1).

Table: 1 Some of the representative Indian Fermented foods (Satish Kumar et al., 2013).

S. No.	Name of the food	Raw material	Origin or popular region	Ref.
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Cereals and pulses -based FFs

1	<i>Idli</i> <i>Dosa</i> <i>Appam</i> Fermented rice (<i>pazhaiya soru</i>)	Rice	The southern part of India, especially Tamil Nadu	Sekar and Mariappan 2007.
2	<i>Manna</i> <i>Kurdi</i> <i>Sang</i>	Wheat	North-India Himachal Pradesh	Savitri and Bhalla, 2007

Milk-based FFs

3	<i>Dahi</i> (like yogurt) <i>Kurut</i> <i>Philuk</i> <i>Chhu</i> <i>Chukham</i> <i>Shyow</i> <i>Khadi</i>	Milk	Darjeeling hills Sikkim Arunachal Pradesh Ladakh Gujarat	Yadav et al. 2007b Dewan and Tamang, 2007a
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Vegetable-based FFs

4	<i>Anishi</i>	Yam	Nagaland	Tamang and
5	<i>Sinki</i>	Radish	North east India	Tamang, 2009
6	<i>Hikhu</i> <i>Ekung</i> <i>Eup</i> <i>Mesu</i> <i>Lungseij</i> <i>Hiring</i>	Bamboo shoot	North east India	Singh et al., 2007b Tamang and Tamang, 2009

Meat-based FFs

7	<i>Ngari</i> <i>Tungtap</i> <i>Lona ilish</i> <i>Utonggari</i>	Fish	Manipur, Assam, North-east India	Thapa et al., 2004 Majumdar and Basu, 2010
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8	<i>Arjia</i> <i>Chartayshya</i> <i>Suka Ko Masu</i> <i>Geema</i>	Goat meat	Himalaya region Sikkim	Oki et al., 2011 Rai et al., 2010
9	<i>Lang satchu</i> <i>Lang kargyong</i> <i>Chilu</i>	Beef	Sikkim	Rai et al., 2010
10	<i>Faak kargyong</i>	Pork	Eastern Himalaya region	Rai et al., 2010

Health benefits

FFs have been reported for several health benefits that includes anti-diabetic activity, anti-obese activity, and also improved the health status of the gastrointestinal tract, high blood pressure, and cognitive function, etc. (Sivamaruthi et al., 2018b; Sivamaruthi et al., 2018c). The fermented plant extracts have also been used in cosmetic industries (Sivamaruthi et al., 2018d). The health benefits of the FFs were attributed to the presence of active micro organisms and bioactive phytochemicals. During the fermentation process, microbes activate or change the phytochemicals. Some of the bacteria present in the FFs improved the health status of the consumers; those beneficial microbes are called as probiotics. FFs are the rich source of bioactive microbes (such as probiotics, antagonistic, enzyme producers, neurotransmitter producers, etc.) (Sivamaruthi et al., 2018a). Some of the reported health benefits of FFs of India has been listed in table 2.

Table: 2 Health benefits of Fermented foods of India

S. No.	Name of the food	Health benefits	References
1	<i>Idli</i>	Suitable for infant, and ill people	Steinkraus 1996
2	<i>Koozhu</i> (Fermented finger millet flour)	Rich in riboflavin, thiamine, niacin Nourished healthy food	Rajyalakshmi and Geervani, 1990
3	<i>Dahi</i> (Fermented milk)	Anti-diarrheal, Anti-cholesteremic, anti-diabetic, anti-carcinogenic, anti-atopic dermatitis activities.	Agarwal and Bhasin, 2002, Sinha and Sinha 2000, Arvind et al.

			2010, Yadav et al. 2007a, Watanabe et al. 2009.
4	<i>Sinki</i> (Fermented radish root), fermented <i>Rai</i>	Anti-diarrheal activity. Anti-stomach pain Improves digestion.	Singh et al. 2007b
5	<i>Kanji</i> (Fermented rice)	Good for people with chronic diseases	Reddy et al., 2007
6	<i>Kardi</i>	Cures digestive problems	Singh et al. 2007b
7	<i>Soibum</i> (Fermented bamboo shoot)	Cures plague disease	Singh et al. 2007b

Conclusion and future perspectives

India has several cultural communities, and their food habits also diverse. The present manuscript is not a comprehensive review on FFs of India, but some of the representative FFs of Indian societies have been documented here with general health benefits. Though thousands of traditional Indian fermented foods and beverages are in-use in the deep countryside, the composition and its health benefits have not yet scientifically documented clearly. The documentation of our traditional foods and its benefits help to retain our royalty in it. The most documented, in terms of preparation methods, and health benefits, fermented food is *Kimchi*, a Korean traditional fermented cabbage. The way of making *Kimchi* is closely related to the making of traditional Indian pickles. Whereas the scientific documentation is limited on the Indian traditional pickles. So detailed studies are required to explore the resources of Indian FFs.

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