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Review Article

Mulibenificial Uses of Spices: A Brief Review

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Abstract

Spices are groups of food adjunct that have been in use for thousands of years to enhance the sensory quality of food. Apart from flavouring, spices are also used in botanicals, beverages, preservatives, pharmaceutical and other industries. Since, each of the spices possesses more than one health beneficial property and there is also a possibility of synergy among them in their action, using spice in diet can make life not only more spicy but also more healthy.

Keywords: Spices; Botanica; Preservatives; Nutraceuticals; Pharmaceuticals; Cosmetics

Introduction

Spices have been virtually indispensable in the culinary art of flavouring foods since antiquity. Spices are aromatic vegetable substanc-es, in the whole, broken or ground form, whose significant function in food is seasoning rather than nutrition. These spice ingredients impart characteristic flavour, aroma and pungency to foods. Volatile oil spices responsible for aroma and flavour and oleoresin contribute the pungency.

India is the land of spices grown variety of spices due to different agro-climatic conditions. India is the largest producer, consumer and exporter of spices in the world. India holds monopoly in export of spice oils and oleoresins. Spices account for 6 per cent contribution to the agriculture GDP [1]. Among the spices, chilli shares first place in production with the 22.71%, followed by garlic (21.93 %) and turmeric (16.92 %) and the lowest share was observed in clove with 0.02% in the country. The area under major spice was 2.13 and 30.75 million ha with the production of 3.69 and 57.43 million tonnes and productivity was 1.7 and 1.9 t/ha in Karnataka and India respectively. Among the spice producing states in India, Andra pradesh stands first with the production of 11.88 million tonnes and Karnataka stands fifth position with the production of 3.7 million tonnes. The trend in spice production in India increases every year with some slight fluc-tuation during the year 1991 to 1992. Presently, Indian spice production is of 5.74 million tonnes [2].

India's spice production and export is being increasing over the years and this increase is primarily due to higher domestic consumption as well as export. This trend is expected to continue, as more and more spices are put to diversified use.

Multi uses of spices

Apart from flavouring and seasoning, spices are widely used in indigenous medicines, pharmaceuticals, Nutraceuticals, aroma therapy, preservatives, beverages, natural colours, perfumes, dental preparations, cosmetics and botanicals as pesticide and thus, play a significant role in the economy of the producing country. These properties are due to diverse array of chemicals synthesized by these spices.

In general, these phytochemicals function to attract beneficial and repel harmful organisms, serves as photoprotectant and respond to environmental changes. Terpenes and terpene derivatives are probably the most important class of aroma compounds, especially Monoterpenes which helps in contributing fragrance almost for about 90 per cent of spices [3].

Class of phytochemicals	Source
Terpenes	
Monoterpenes	Cumin, fennel and caraway
Tetraterpenes (carotenoids)	Paprika and saffron
Sesquiterpenes	Cinnamon, ginger and turmeric
Terpene derivatives	Coriander

Phenylproponoids	
Cinnamic acid	Cinnamon
Eugenol	Clove
Vanillin	Vanilla bean
Diarylheptanoids	
Curcumin	Turmeric
Sulfur compounds	
Thiols, sulfides, di and poly-sulfides	Garlic and asafetida

Table 1: Major classes of phytochemicals that contribute to the properties of spices.

In the past two to three decades, many more beneficial physiological effects of spices have been experimentally documented, which suggest that the use of these food adjuncts extended beyond taste and flavour. Among the health problems that affect human kind, dia-betes, cardiovascular diseases and inflammatory disorders including arthritis and cancer have received considerable attention. In the recent years, spices and their active principles have been studied as possible ameliorative or preventive agents [4].

Spice as botanical

Spice extracts can be used as natural botanical due to the presence of active principles, which helps in controlling insects and storage pests. Senegal pepper, Industrial pepper and black pepper spice extracts at 10% sprayed during cropping period helped n controlling aphids, thrips and whitefly infestation in green bean [5]. Black pepper at 0.5% and red pepper powder (5%) were effective in reducing major storage pest viz. granary weevil (*Sitophilus granarius*) and Grain borer (*Rhizoper thadominica*) in wheat [6]. This action might be due production of strong odoriferous active principles.

Spices as natural preservative

Chemical constituents like flavonoids, phenolic compounds etc. extracted from natural sources that offer intrinsic ability to protect the products by inhibition of microbial growth, oxidation and certain enzymatic reactions occurring in the foodstuffs [7]. Currently pharmaceutical, food and meat industries are emphasizing more on spice derived preservatives. Clove, garlic, ginger, cinnamon, thyme, oregano and rosemary are mainly used as preservative agents [8]. Dill and coriander oil at 300 ppm has increased the vase life of carna-tion flower, which is due to less microbial proliferation and reducing the blockage of xylem vessels [9].

Spices used as beverages

Beverages made out of spices are of natural products valued highly due to natural antioxidant and antimicrobial properties. It helps to store for the long period and also act as a natural health drink. Cardamom, black pepper, ginger, mint, cumin, cinnamon, ginger, ko-kum and curry leaf are found their applications in beverage industry. Food safety and standards Act, 2006 allows making nutraceuticals drinks of spices like masal chai, jaljeera, Kalam khatta and kokum sharbat. Ginger extract at 0.5% can be used in beverage preparations, helpful in increasing anti oxidants, anti-nutritional factors and also sensory attributes and by this it is useful for curing deadly diseases [10].

Spice as Nutraceutical

Growing demand from the emerging segment of nutraceuticals is driving the global consumption of Indian spices further to meet the needs of traditional food sector. Non-traditional use of spices including nutraceuticals now accounts for nearly 15 per cent of spice production in the country. Chawanprash is one, the highest marketing nutraceutical product in India. It contains spice ingredients such as cinnamon, clove, curcuma spp., saffron and long pepper. As these are good source of vitamin C and rich in antioxidants, helps in in-creasing the immunity, increases digestion and prevents cough, asthma, fever, heart disease, impotency and coarseness speech.

Neurodegenerative diseases are a group of progressive neurological disorders (*viz*., Alzheimer's disease, Parkinson's disease, mul-tiple sclerosis, brain tumour and meningitis) that damage or destroy the function of neurons. Every year in global level, more than 10 million people suffer from neurodegenerative diseases. Spices like turmeric, red pepper, black pepper, clove, ginger, garlic, coriander, rosemary, saffron and cinnamon has been shown to exert its activity against neurodegenerative diseases [11].

Beauty care and cosmetics

The concept of beauty and cosmetics is as ancient as mankind and civilization. Herbs and spices have been used in maintaining and enhancing human beauty since time immemorial. For example - turmeric is used for skin care. The anti-ageing and cosmeceuticals is gaining importance in the beauty, health and wellness sector. Spices like turmeric, cardamom, clove, aniseed, coriander, basil, saffron, garlic and sage are used mainly in beauty and cosmetic industry [12].

Application of turmeric extract cream (0.5%) regulates sebum in human skin, person with excessive oilskin or suffering from acne will

have great benefit from this property [13]. Saffron (*Crocus sativus*) as complexion promoter in skin care and reported that 0.3% of saffron used in cream and lotion will be giving brighter and shiny skin, this effect is mainly due the crocin and cicrocrocin content of saf-fron, this regulates the melanin biosynthesis in skin [14].

Spices in pharmaceutical industry

Spices play an important role in pharmaceutical industry. The active principle present in the spices will acts against human diseases and cure many of them like hypocholesterolemic, antidiabetic, anti-inflammatory, anti-arthritic, anticarcinogenic and also act as natural antioxidants.

Beneficial health effect	Spices	Reference
Hypocholesterolemic	Red pepper, turmeric, garlic, fenugreek, ginger	Srinivasan., *et al*. 2004 [15] Kleijnen., *et al*. 1999 [16] Alder and Holub, 2003 [17] Soumya and Rajalaksmi,1999 [18]
Antidiabetic	Fenugreek, garlic, turmeric, cumin, Cinnamon	Srinivasan, 2005 [19] Sharma., *et al*.1996 [20] Madar and Arad, 2002 [21]
Antioxidant effect	Turmeric, ginger	Srinivasan., *et al*. 2004 [15] Shobana and Naidu, 2000 [22]
Anti-inflammatory and anti-arthritic	Turmeric	Garg., *et al*. 2008 [23] Kwon., *et al*. 2009 [24]
Anticarcinogenic	Turmeric, garlic, ginger, mustard	Fleischauer and Arab, 2001 [25] Kuttan., *et al*. 1997 [26]
Digestive stimulant action	Curcumin, red chilli, black pepper, ginger, cumin, ajowan, fennel, coriander, mint	Patil and Shrinivasan, 2004 [27]
Antimicrobial	Turmeric, garlic, asafoetida	Srinivasan., *et al*. 2004 [15]

Table 2: Beneficial health effects of spices.

Other uses of spices

Spices like turmeric, red chilli, saffron also used as natural colourant in textile industry [28] and also used as defensive spray (Piperine and capsaicin) ingredient of aroma chemical, some spice oils can be easily converted into aroma chemicals. Capsaicin present in chilli and myristicin present in nutmeg and mace can be used as pain reliever creams. (Ex. Eugenol present in clove can be used as natural starter for vanillin, which is present in vanilla).

Adverse effects of spices

Apart from many beneficial effects, it also causes some possible adverse effects when there is over consumption of spices. Gas-trointestinal cancer risk was higher with consumption of spicy foods and chilli. Spices may increase intestinal epithelial permeability through loosening cell contacts for example when paprika and chilli are used or decrease permeability possibly by cell swelling for example when black pepper and nutmeg are used. Higher consumption of cardamom causes the impotency and nutmeg causes the hallucinogenic effect.

Conclusion

Spices natural and necessary components of our daily nutrition, beyond their role in imparting flavour to our food, it also influence the many beneficial physiological effects.The optimum consumption of spices is not only proved to be safe, also leads to be offer various benefical effects. Spices possess more than one health beneficial property and there is also a possibility of synergy among them in their action, a spiced diet is likely to make healthy life.

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