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Functional and Nutraceutical Properties of Herbals and Its Applications in Food

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Abstract: ***The lifestyles of people worldwide have changed in the last century due to a rise in income, reduced physical activity and preferring junk foods. Lack of time to show interests on preparation of nutri dense food products and improper selection, planning, consumption of foods in the regular diet are also the reason to face different health problems. Consequently, there is a global rise in the incidence of diseases such as obesity, cardiovascular diseases, diabetes mellitus, and rheumatoid arthritis. As a parallel development, there is a worldwide increase in health awareness and interest in herbal alternatives. Herbal foods have therefore emerged as an effective means for the prevention of diseases.This change in consumer outlook has encouraged the food industry to apply modern manufacturing technology in the preparation of food products. Herbs are an ancient source of flavorings, aromatic compounds and medicines, although only those that have culinary applications will be concealed in the study. The literature review focused primarily upon the compounds that give culinary herbs their health and functional properties.***

Keywords: Herbal foods, Junk foods,Nutri dense foods, Health, Herbs

1. Introduction

Herbs have been used as food and medicine for centuries. From 1960, an interest in “natural health” and the use of herbs and its products has been increasing. It plays a significant role in the maintenance of the quality of human life through offering an abundant source of antioxidants and medicinal constituents. Herbal bio actives, an important category of nutraceuticals, which have plenty of health promoting medicinal properties in addition to vitamins, minerals and other active components. The active components include: alkaloids,anthraquinones, bitters, flavonoids, saponins, tannins and essential oils. The utility of these incredible valuable food sources appears in the history of many parts of the world.

Herbal bioactives, an important category of nutraceuticals, are commonly used by people who seek conventional health care. Herbs harbor a wide variety of active phytochemicals including the flavonoids, terpenoids, lignans, sulfides, polyphenols, carotenoids, coumarins, saponins, plant sterols, uramins and phthalates (Craig, 1999).

Herbs have been used for medicinal purposes throughout history. Their health properties are linked to a number of chemical constituents, includingvitamins, flavonoids, terpenoids, carotenoids, hytoestrogens and minerals (Calucci et al. 2003; Suhaj 2006).

Herbs such as basil, lemon balm, marjoram, mint, oregano, rosemary, sage, savoryand thyme, appear to be particularly rich in flavonoids, phenolic acids and terpenoids with high levels of bioactivity. Some other herbs such as chervil, coriander, dill, fennel, lovageand parsley, the second most important herb family, have been shown to have high levels of flavonoids.

Nutraceuticals can be grouped into the following three broad categories (Dureja et al., 2003) (a) Nutrients - Substances with established nutritional functions, such as vitamins, minerals, amino acids and fatty acids; (b) Herbals - Herbs or botanical products as concentrates and extracts; (c) Dietary supplements - Reagents derived from other sources (e.g. pyruvate, chondroitin sulphate, steroid hormone precursors) serving specific functions, such as sports nutrition, weight-loss supplements and meal replacements. Nutraceuticals are found in a mosaic of products emerging from (a) the food industry, (b) the herbal and dietary supplement market, (c) pharmaceutical industry, and (d) the newly merged pharmaceutical/ agribusiness/ nutrition conglomerates (Dureja, et al., 2003).

Phytochemical is a natural bioactive compound found in plants, such as vegetables, fruits, medicinal plants, flowers, leaves and roots that work with nutrients and fibers to act as an defense system against disease or more accurately, to protect against disease. (Sudhanshu et al., 2012) Herbal medicines are often prepared from a combination of different plant species. The effects of such mixtures could be due to synergistic action of various phytochemical(Williamson, 2001) The use of synergistic combinations in antimicrobial chemotherapy is often used commercially for the treatment of various infections.

Constituents and the health benefits of some herbals are presented in the below table.

Table 1: Functional and Neutraceutical Components in Common Herbals

Common name	Biological name	Constituent	Health benefits
Garlic	Dried bulbs of *Allium sativum* (Liliaceae).	Alliin and allicin	Anti-inflammatory, antibacterial, antigout, nervine tonic
Maiden hair tree	Leaves of *Ginkgo biloba (Ginkgoaceae).*	Ginkgolide and bilobalide	PAF antagonist, memory enhancer, antioxidant
Ginger	Rhizomes of *Zingiber officinale* (Zingiberaceae.)	Zingiberene and gingerols	Stimulant, chronic bronchitis, hyperglycemia and throat ache
Echinacea	Dried herb of *Echinacea purpurea* (Asteraceae)	Alkylamide and echinacoside	Anti-inflammatory, immunomodulator, antiviral
Ginseng	Dried root of *Panax ginseng* (Araliaceae)	Ginsenosides and Panaxosides	Stimulating immune and nervous system and adaptogenic properties
Liquorice	Dried root of *Glycyrrhiza glabra* (leguminosae)	Glycyrrhizin and liquirtin	Anti-inflammatory and Anti-Allergic, Expectorant
St. John's wort	Dried aerial part of *Hypericum perforatum* (Hypericaceae)	Hypericin and hyperforin	Antidepressant, against HIV and hepatitis-c virus[18]
Turmeric	Rhizome of *Curcuma Longa* (Zingiberacae)	Curcumin	Anti-inflammatory, antiarthritic, anticancer and antiseptic
Onion	Dried bulb of *Allium cepa* Linn. (Liliaceae)	Allicin and alliin	Hypoglycemic activity, Antibiotic and anti-atherosclerosis
Valeriana	Dried root of *Valeriana officinalis* Linn. *(Valerianaceae)*	Valerenic acid and valerate	Tranquillizer, migraine and menstrual pain, intestinal cramps, bronchial spasm.
Aloes	Dried juice of leaves *Aloe barbadensis* Mill. (Liliaceae)	Aloins and aloesin	Dilates capillaries, anti-inflammatory, emollient, wound healing properties
Goldenseal	Dried root of *Hydrastis Canadensis*. (Ranunculaceae)	Hydrastine and berberine	Antimicrobial, astringent, antihemorrhagic, treatment of mucosal inflammation
Senna	Dried leaves of *Cassia angustifolia* (Leguminosae)	Sennosides	Purgative,
Asafoetida	Oleo gum resin of Ferula assafoetida L. (Umbelliferae)	Ferulic acid and umbellic acid	Stimulant, carminative, expectorant
Bael	Unripe fruits of *Aegle marmelos Corr. (Rutaceae)*	Marmelosin	Digestive, appetizer, treatment of diarrhea and dysentery
Brahmi	Herbs of *Centella asiatica* (Umbelliferae)	Asiaticoside and madecassoside	Nervine tonic, spasmolytic, anti-anxiety

Functional properties
Herbal foods are valued for their nutritional, antioxidant, antimicrobial and medicinal properties.

Nutritional properties
Most of the herbal spices are rich sources of protein, vitamins, especially vitamins A, C and B, and minerals such as calcium, phosphorus, sodium, potassium and iron. Parsley is the richest source of vitamin A, while coriander is one of the richest sources of vitamins C and A. Parsley and chervil are also rich sources of vitamin K.

Antioxidant properties
Antioxidants are added to foods to preserve the lipid components from quality deterioration. Synthetic antioxidants such as butylatedhydroxy anisole (BHA), butylatedhydroxy toluene (BHT), propyl gallate (PG) and *tert*-butyl hydroquinone (TBHQ) are the commonly used synthetic antioxidants. Owing to their suspected action as promoters of carcinogenesis, there is growing interest in natural antioxidants.

Common culinary herbs can come from various different plant families and differ considerably in taste, aroma and chemical constituents. Besides their antioxidant activity, phenolic compounds have anti-inflammatory, anti-allergic, anti-microbial and anti-cancer properties.

The antioxidant activity of culinary herbs and their constituent compounds has been their most widely researched aspect, along with their antimicrobial activity. This research has been driven at least partially by industry seeking natural preservatives. Herbs and their components have high antioxidant activity, which in a food matrix can delay spoilage through retarding the development of rancidity in products such as oils, plus anti-microbial properties. In this regard, total phenolics are also often measured, as a large proportion of antioxidant activity is attributable to the presence of phenolic compounds. However, there is also relevance to human health as antioxidant activity is believed to play a part in the prevention of most major chronic diseases. There has been most research is focused in various anti-cancer effects of herbs, through such mechanisms as increasing endogenous protective enzymes, protecting DNA from free radical-induced structural damage, encouraging the self-destruction of aberrant cells (apoptosis) and inhibiting tumor growth. Other findings include cardiovascular protective effects such as anti-thrombotic and anti-platelet aggregation activity, anti-diabetes activity, and some show possible protection

against Alzheimer‟s disease. Some herbs and their components also possess anti-inflammatory activity, important because inflammation is thought to be a key step in the initiation of many chronic diseases and health problems associated with ageing.

Antioxidants play an important role in inhibiting and scavenging free radicals, thus providing protection to human against infections and degenerative diseases. (Rahmat et al., 2004).

Some of these are common to a number of herbs, and some are more specific to a particular family. For example theAlliaceae contain particular allylsulphur compounds, the Brassicaceaecontain glucosinolates, and the Lamiaceae herbs contain rosmarinic acid (Shan et al. 2005), an important bioactive with antioxidant and anti-inflammatory activities.

2. Applications

- **Ayurveda:** Ayurveda, anIndian traditional medical science has found several ways in which the medicinal benefits ofherbs could be conveyed via certain foods as carriers.
- **Food industry:** „Nutraceuticals‟ often referred to as „phytochemicals‟ are natural bioactive, chemical compounds that have health promoting, disease preventing or medicinal properties. Nutraceuticals may range from isolated nutrients, herbal products, dietary supplements and diets to genetically engineered "designer" foods and processed products such as cereals, soups and beverages.
- **Pharmaceutical**: The diversity of plants growing with their known ethno- pharmacological uses is wealth of India. According to World Health Organization, medicinal plants are the best source to obtain a variety of newer herbal drugs. About 80 % of individuals from developed and developing countries use traditional medicine, which has compounds derived from medicinal plants. The extracts of many plant species have become popular in recent years and attempts to characterize their bioactive principles have gained momentum for varied pharmaceutical applications (Lis-Balchin and Deans, 1997).

3. Conclusion

Nowadays, herbal foods have received high interests due to their potential nutritional, safety and therapeutic effects. The interest in herbal foods continues to grow, powered by progressive research efforts to identity the properties, bioactive components and potential applications and which are coupled with public interest and consumer demand. Owing to its safety, its application is growing in different field studies like Ayurveda, Food industry and Pharmaceutics etc.

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