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Exploring Notable Functional Foods in East of Asia, Health Benefits and Ideal Nutrition

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ABSTRACT
The functional food industry has been developing rapidly in recent years. The most important pharmacological properties of jujube are anti-diabetic effects, hypnotic-sedative and anxiolytic effect, neuroprotective activity, sweetness inhibitor, anti-cancer activity, antimicrobial activity, anti-ulcer activity, anti-inflammatory and anti-spastic effect, anti-allergic activity, permeability enhancement activity, cognitive activities, anti-fertility property, hypotensive and anti-nephritic effect, cardiovascular activity, immunostimulant effects, anti-oxidant effects, and wound healing activity. *N. nucifera* has various notable pharmacological activities such as anti-ischemic, antioxidant, anti-cancer, antiviral, antiobesity, lipolytic, hypocholestermic, antipyretic, hepatoprotective, hypogylcaemic, antidiarrhoeal, antifungal, antibacterial, anti-inflammatory and diuretic activities. Coix is a source of ornamental beads, a stable sustenance, and a productive fodder grass increasingly viewed as a potential energy source. The healing properties of lily include moisturizing the lungs, relieving cough from lung-dryness, clears heart-fire and tranquilizes the mind. Dried lily bulbs are commonly used in herbal formulas for promoting lung health, treating yin-deficiency of the heart which manifests as irritability, insomnia, dreaminess, palpitation and absent-mindedness, and promotes vital fluid and improves skin complexion. The most important tremella mushroom benefits are anti-aging, anti-inflammatory, lower cholesterol, combat obesity, protect nerves and may fight cancer. Functional foods are making inroads into Chinese diets with their promises to improve health and nutrition. Chinese consumers should choose nutritional and healthy food to maintain general health and reduce the risk of health problems.

Keywords: Functional Food, Jujube, Lotus Coix, Dry Lili, Tremella

INTRODUCTION

There are many parameters which influence functional food market and its potential in China. Functional foods and beverages are products with ingredients that are added for specific health benefits that are beyond basic nutrition. Food with function claims and nutrient supplements are both included in the system of classification and nutrient supplements are products intended to supply vitamins or minerals to replenish dietary insufficiency, defend against nutrition deficiency and reduce the risk of chronic degenerative diseases. Traditional

Chinese medicine (TCM) has played a positive role in the management of so many diseases (Shahrajabian *et al*., 2019a,b,c,d,e). TCM is an empirical healthcare system based on human experience dating back several thousand years and stands out as the only one with long history among the world 's traditional medical system (Ge *et al*., 2018; Ogbaji *et al*., 2018; Shahrajabian *et al*., 2018; Soleymani and Shahrajabian, 2012a; Soleymani and Shahrajabian, 2018). The most important parameter is in providing healthy diets for the decades to come in a world with rapid population growth (Khoshkharam *et al*., 2010; Esfandiary *et al*., 2011; Shahrajabian *et al*., 2013; Soleymani *et al*., 2010; Soleymani and Shahrajabian, 2011; Soleymani and Shahrajabian, 2012b; Soleymani and Shahrajabian, 2012c; Soleymani *et al*., 2013; Soleymani *et al*., 2016; Sun *et al*., 2019a,b; Shahrajabian *et al*., 2020a,b,c,d,e,f,g,h; Sun *et al*., 2020). With increasing needs for a healthier life in Chinese society, functional foods are becoming more popular, while from the market perspective, functional foods are difficult to quantify because of different definitions which used in the world.

Jujube

The Chinese jujube (*Ziziphus jujube* Mill.) which originates from China with a history of over 4000 years is recognized as the most important fruit species belongings to the Rhamnaceae family (Shahrajabian *et al*., 2019f). Chinese jujube (*Zizyphus jujuba* Mill.) and Indian jujube (*Ziziphus mauritiana* Lamk.) are largely use in traditional Asian medicine as super fruit. Indian jujube (*Ziziphus mauritiana* Lamk.) is known as ber, desert apple or Indian plum and it is a tropical/subtropical fruit native to the northern hemisphere (Pareek, 2013). Li *et al*. (2018) discovered that the Chinese jujube (*Ziziphus jujuba* Mill.) originates from sour jujube (*Ziziphus acidojujuba* Mill.) and is an economically important genus in the Rhamnaceae family. They also concluded that most jujube cultivars have a certain correlation with their origin and there are obvious gene exchanges between sour jujube and jujube cultivars. Its pulp is eaten mostly fresh, but may be dried or processed into confectionary recipes in bread, cakes, compotes, and candy (Krska and Mishra, 2008).

Jujube nutritional composition and chemical constituents

Chinese jujubes are lower in water content and titratable acidity and higher in total sugars (mostly reducing sugars) and phenolics. Chinese jujubes are very rich in ascorbic acid (vitamin C) content which increased with maturation to 559 mg/100 g fresh weight. Yan *et al*. (2014) found that five essential elements and two toxic elements (except cadmium) varied widely in their contents in the four jujube fruits. They announced that knowledge of the contents of these elements would provide consumers with information on the quality of jujube fruits. Chen *et al*. (2018) reported the Junzao cultivar contained relatively low level on the total dietary fiber, protein, total sugar, and total titratable acids. The Huizao cultivar possessed the mediate level of the sugar-to-acid ration and ascorbic acid. The Dazao cultivar showed high level of the total dietary fiber, protein, sugar, and total acids. In their experiment, principal components analysis indicated that the parameters that differentiated these jujube cultivars appeared to be the total dietary fiber, protein, total sugar, fructose, glucose, sucrose, and total titratable acids. Rahman *et al*. (2018) noted that Chinese jujubes consist of 51.99-71.75% edible part, 82.35-89.63% carbohydrates, 4.43-6.01% protein, 0.48-0.63% lipid, 2.80-4.80% polysaccharide, 45.64-88.97 mg/100 g ascorbic acid, 132.16-196.58 mg/100 g phenolics and 101.17-132.04 mg/100 g flavonoids in dry matter. Ertop and Atasoy (2018)

found that the jujube fruit is rich in mineral content, fiber and a good source of food for direct consumption and maybe a good additive for different foods when dried. In their study, they found that jujube fruit, especially in dried and powder form can be valorized in future studies as fortifying and hydrocolloid. Huang *et al*. (2008) also found that the fruits are nutritious, being high in flavonoids and vitamins C, B1, and B2, and because of that it can be considered as a so-called functional food, having nutritional as well as medicinal uses. Jujube as a nutritious fruit is important especially for low-income group people. Besides, it is grown successfully in unfertile land and drought prone areas. It is also a less perishable fruit and cultivating this fruit on a large scale can economically benefit farmers. Mineral composition of seeds of *Ziziphus mauritiana* is shown in Table 1.

Table 1. Mineral composition of the seeds of *Ziziphus mauritiana* (in mg/100 g).

Content	Dry weight (mg/100g)
Sodium (Na)	154.79±10.50
Magnesium (Mg)	6.23±0.12
Potassium (K)	589.08±10.69
Zinc (Zn)	3.52±0.05
Manganese (Mn)	1.15±0.14
Iron (Fe)	1.21±0.15
Phosphorus (P)	585.43±41.29

The values are means a standard deviations for three determinations.

Traditional medicinal uses and potential health benefits of jujube in modern medicine industry

The jujube leaf, which is the main byproduct of jujube, has also been used in TCM for thousands of year to improve sleep, to nourish the heart and soothe the nerves, and to reduce hemorrhaging and diarrhea (Goetz, 2009; Motevali *et al*., 2012; Hoshyar *et al*., 2015; Vafaei and Abdollahzadeh, 2015; Safizadeh *et al*., 2016; Gheibi *et al*., 2018). On the basis of Iranian traditional medicine, local traditional healers used powders of stem bark and leaves of jujube to cure wounds and oral wounds as aphthous. Hamedi *et al*. (2016) also discovered that fruits are widely used in Iranian folk medicine as antitussive, laxative agent and blood pressure reducer. In Persian traditional medicine, it is used in combination with other herbal medicines to treat colds, flu and coughing. Jujube fruit contains flavonoids, vitamins, amino acids, organic acids, polysaccharides, and microelement, which are found useful in spleen diseases and nourishment of blood in Chinese system of medicine. Tahergorabi *et al*. (2015) stated that different parts of jujube can be used for curing different kinds of diseases such as diabetes, diarrhea, skin infections, liver complaints, urinary disorders, obesity, fever, pharyngitis, bronchitis, anemia, cancer, insomnia, and for blood purification and tonification of the gastrointestinal tract. Hemmati *et al*. (2015) reported that jujube causes a decrease in the blood levels of glucose and lipids and it has been reported to make a significant decline in triglyceride, LDL and cholesterol levels.Mahajan and Chopda (2009) found that roots and the bark are used to treat dysentery. Furthermore, they did report that seeds cure eye diseases and are also useful in leucorrhoea, and the kernels increase flesh and strength and act as sedative. Recent phytochemical researches of jujube fruits have revealed their effects, such as the anticancer, anti-inflammatory, antiobesity, immune stimulating, antioxidant, hepatoprotective, and gastrointestinal protective activities and inhibition of foam cell formation in macrophages. They have also mentioned that jujube fruits are rich in bioactive compounds.

Shi *et al*. (2018) indicated that the skin color of jujube fruit during maturation is due to changes in the levels of flavonoids, cartenoids, and anthocyanins. They concluded that the color changes are also associated with changes in antioxidant activity. Betulinic acid and jujuboside B could be the active components showing beneficial effects on cardiovascular system. Drying jujube guarantees a longer shelf time while preserving its quality to be used in medical and pharmaceutical industries. Taechakulwanijya *et al*. (2013) have found that all jujube seed extracts were not toxic to Vero cells, all jujubes cultivars tested are promising candidates for more elaborate study of their anticancer mechanisms. It has been reported that triterpenic acids were considered as active ingredients for the effect on anti-inflammatory and anti-cancer activities. The aqueous ethanol extract of the jujube leaf were used as energetic constituent for hepatosis and wound healing in animal trials. Shahrahmani *et al*. (2018) showed that *Zizuphus jujube* Fruit lotion can treat sore nipples faster than breast milk over a period of 10 days. Also, nipple pain in the jujube lotion group was less than the breast milk group. They have suggested that administration of high doses of jujube (up 5000 mg/kg) is nearly safe and did not exert hepato and nephrotoxicity in rats. Combination of *Zizyhpus jujube* and green tea extracts exerts excellent cytotoxic activity in HepG2 cells via reducing the expression of APRIL; also, jujuba extract and green tea extract mixture might provide a lead to a new drug design to treat hepatocellular carcinoma in the future APRIL. Anbarasi and Brindha (2013) found that methanolic extract of dried bark of *Ziziphusjujube* was found to cause a significant decrease in the levels of total cholesterol, triglycerides and LDL-cholesterol, and glucose levels in streptozotocin-induced diabetes in rats. *Z. Jujube* powder possesses hypolipidemic and anti-obesity properties and did not show any negative impact on liver function as measured by ALT and AST. The jujube polysaccharides composed of glucose (23%), xylose (31.3%), mannose (12.9%), and fructose (21.6%) possess antioxidant effects.

Lotus

Lian (*Nelumbo nucifera*) commonly known as Lotus is an amazing aquatic perennial native to a large area spanning from Vietnam to Afghanistan. Lotus is a herbaceous perennial, belonging to Nelumbonaceae family of aquatic plants (Pal and Dey, 2013). Lotus seeds and roots are a major crop in Hubei, Hunan, Fujian, and Jiangxi provinces. In Chinese culture, its uses range from religious symbolism to tasty foods (Zhu *et al*., 2017).Lotus is popular among Asian countries as aneconomically important aquatic vegetable. On the basis of Chinese Medical herbology and pharmacology, the lotus and its various parts are among the most versatile herbs in traditional Chinese herbal medicine. Every part of the plant has separate and distinct properties. The most common names of the lotus in Chinese medicine are lian zi (lotus seed), Lian fang (lotus root receptacles) and lian ye (lotus leaf). This unique plant has special properties in addition to being a powerful herb in Chinese medicine. Its seeds have ability to germinate after being dormant for more than a millennium. The surface structure of the leaf allows drops of water to roll off, taking dirt and insects with it while leaving the leaf clean dry at all times. The most important point about this crop is that, each part of the lotus plant has special uses such as the flower, the leaves, the stem, the rhizome, the seeds, the heart of the lotus seed and also its root. In Traditional Chinese Medicine (TCM), lotus roots are plants that belong to the 'Herbs that stop bleeding' category. Lotus roots also taste sour and sweet. The so-called "five elements" theory in Chinese Medicine states that the taste of TCM ingredients is a key determinant of their action in the body. Sour ingredients like lotus roots help with digestion and restrain abnormal discharges of fluids from the body, such as diarrhea or heavy sweating. On the other hand sweet ingredients tend to slow down acute

reactions and detoxify the body. They also have a tonic effect because they replenish Qi and Blood. The tastes of ingredients in TCM also determine the organs and meridians they target. As such lotus roots are thought to target the Stomach, the Liver and the Lung. In TCM the Stomach is responsible for receiving and ripening ingested food and fluids. It is also tasked with descending the digested elements downwards to the Small Intestine. The Liver on the other hand is often referred as the body's "general" because it is in charge of regulating the movements of Qi and body fluids. It also takes a leading role in balancing our emotions. In addition to performing respiration, the Lungs are thought to be a key part of the production chain for Qi and the body fluids that nourish the body.

Lotus composition and chemical constituents

Luo *et al*. (2016) reported that starch, protein and lipids, the major components in lotus seeds, affected taste and cooking properties of the food. The chemical compositions, gelatinization properties, crystal structure of the starch, compositions of fatty acids and soluble protein of lotus seeds, stored for 24 months, 12 months and as fresh were studied. The overall starch, protein and lipid contents in lotus seeds remained unchanged during storage, but structural changes occurred. The contents of amylose and free fatty acid increased significantly during prolonged storage, but the solubility of protein decreased dramatically. Lotus seeds energy chiefly comes from carbohydrates and protein unlike as in other tree nuts whose high calorific value is mainly because of fats. Varieties in the nutritional value and the organoleptic, therapeutic, and functional properties of the lotus are due to the varieties in the types, contents, and metabolic properties of the phenolic compounds (Limwachiranon *et al*., 2018). Nutritive value of lotus seeds is shown in Table 2. Per cent concentration of various elements of *Nelumbo nucifera* (seeds) is indicated in Table 3. Phytochemical analysis of *N. nucifera* seeds is presented in Table 4. Bioactive compounds in methanol extract of *Nelumbo nucifera* rhizome are shown in Table 5. Major chemical constituents present in *Nelumbo nucifera* seeds are shown in Figure 1.

Table 2. Nutritive value of lotus seeds (Indrayan *et al*., 2005).

Ash (%)	4.50
Moisture Content (%)	10.50
Crude Fat (%)	1.93
Protein (%)	10.60
Carbohydrate (%)	72.17
Crude Fibre (%)	2.70
Energy (cal/100 gm)	348.45

Tabel 3. Per cent concentration of various elements of *Nelumbo nucifera* (seeds) (Indrayan *et al*., 2005).

Chromium	0.0042
Sodium	1.00
Potassium	28.5
Calcium	22.10
Magnesium	9.20
Copper	0.0463
Zinc	0.0840
Manganese	0.356
Iron	0.1990

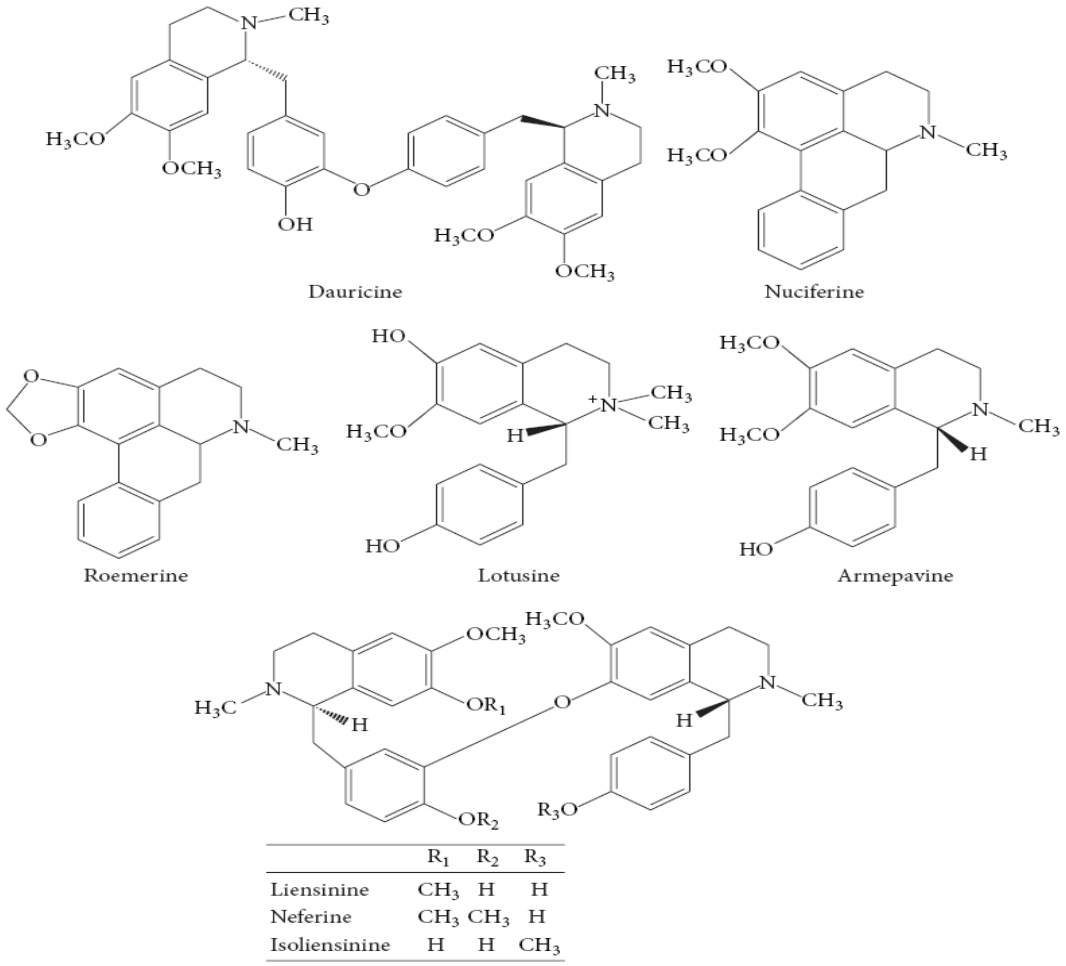
Table 4. Phytochemical analysis of *N. nucifera* seeds (Sujitha *et al*., 2013).

Chemical test	*N. nucidera* (methanol)
Alkaloids	-
Carbohydrates	+++
Saponins	-
Proteins	+++
Phenolic compounds	++
Flavonoids	+
Tannins	-

(-) denotes absent, (+) denotes mild, (++) denotes average, (+++) denotes large.

Table 5. Bioactive compounds in methanol extract of *Nelumbo nucifera* rhizome (Sruthi *et al*., 2019).

Compounds	Retention time	Mass	Formula
Betulinic acid	21.28	456.3529	$C_{30}H_{48}O_3$
Rutin	16.98	610.1399	$C_{27}H_{30}O_{16}$
Isoquercetin	16.12	464.0916	$C_{21}H_{20}O_{12}$
2R-aminohexadecanoic acid	15.17	271.2451	$C_{16}H_{33}NO_2$
Phytosphingosine	14.91	317.2858	$C_{18}H_{39}NO_3$
Sphinganine	14.80	273.2650	$C_{16}H_{35}NO_2$
Phorbol	14.48	364.1825	$C_{20}H_{28}O_6$
Ginkgolide B	14.33	424.1431	$C_{20}H_{24}O_{10}$
Tetrahydroxy-2,6-dimethyl anthroquinone	13.90	300.0619	$C_{16}H_{12}O_6$
Pseudouridine	13.08	244.0665	$C_9H_{12}N_2O_6$
p-Hydroxyphenobarbital	10.09	248.0782	$C_{12}H_{12}N_2O_4$
Fluoroacetate	1.20	78.0112	$C_{12}H_{12}N_2O_6$
Isoamyl nitrite	1.14	117.0762	$C_5H_{11}NO_2$
Metronidazole	1.03	171.0647	$C_6H_9N_3O_3$
Napthaldehyde	0.89	156.0596	$C_{11}H_8O$
Acetoin	0.38	88.0523	$C_4H_8O_2$



	R_1	R_2	R_3
Liensinine	CH_3	H	H
Neferine	CH_3	CH_3	H
Isoliensinine	H	H	CH_3

FIigure 1. Major chemical constituents present in *Nelumbo nucifera* seeds (Paudel and Panth, 2015).

Lotus Health benefits

All parts of the lotus plant are used: the rhizome is used as food, seed as medicine, thalamus as fruit, leaves as plate, stalks as pickle, petals for colour extraction, and tender leaves as food after being blended with vegetables (Mandal and Bar, 2013).The seeds are roasted or candied for eating directly; made into a paste for producing sauces and cake fillings, and cooked in soups, usually with chicken or beans. In the traditional Chinese medicine, lotus seeds and plumule occupy special therapeutic importance. Various researches suggest that alkaloids in lotus plumule like liensiline, neferine and isoliensiline possess sedative, antispasmodic and antihypertensive properties which is beneficial to heart. TCM recognizes lotus seed as a yin energy food. It dispels excess heat from the hearth and spontaneous bleeding episodes due to heat. On the basis of TCM lotus seed falls in category of sweet flavor food. The alkaloid compounds actually slow down acute reactions and neutralize the toxic effects of other foods, and also lubricate and nourish the body. In TCM lotus plumule has been advocated for sleep promotion, and to ease conditions associated with seminal and vaginal discharge. *Nelumbo nuciferaor* lotus is anaquatic rhizomatous herb consists of elongated, slender, nodal roots with creeping stem. Lotus seeds are classified as astringents, being sweet and neutral, and benefiting the spleen, kidney, and heart. The sweet taste and nourishing qualities of the seed are responsible for the benefit to the spleen; this

helps stop diarrhea associated with qi deficiency. The astringent quality helps prevent loss of kidney essence, so the seeds are used to treat weak sexual function in men and leukorrhea in women. The seed also has calming properties that alleviate restlessness, palpitations, and insomnia (more so in the whole seed with embryo). The medicinal dosage is 6-15 grams when it is combined with other herbs that have similar applications and double that when used as the main ingredient. Cao et al.(2018) found that lotus seed epicapr amerliorated obesity, insulin resistance and oxidative damage in obese mice, suggesting they are good candidates for value-added functional food and nutraceutical ingredients. The lotus leaves are also bitter, but neutral, and are said to benefit the stomach, spleen, and liver. They are used for treatment of summer heat syndrome and dampness accumulation; they also contain the lotus alkaloids with hypotensive effect. Lotus leaf has become popular for lowering blood lipids and treating fatty liver; it is commonly combined with crataegus, which promotes blood circulation and lowers blood fats, for that purpose. Lotus stems are used medicinally in the same way as the leaves for treatment of summer heat and are used also to treat tightness in the chest due to obstruction of qi circulation. Zeng *et al*. (2013) reveals that the lotus seed protein was nutritionally well-balanced protein and might be of significant importance in the formulation of diets for humans. Kim *et al*. (2018) stated that lotus seed increased the viscosity of the soy porridge as well as its antioxidant and antibacterial effects. Kim and Shin (2012) concluded that the high antioxidant capacity of lotus water fraction could be available as natural additive in food. Modern pharmacological actions of lotus seeds are 1) The oxoushinsunine has inhibitory effect on nasopharynx cancer (NPC); 2) The non-crystalline alkaloid N-9 can lower blood pressure; 3) The alkaloids are with significant cardiac effects; 4) The liensinine has strong anti-calcium and antiarrhythmic effects; 5) The raffinose is a tonic for both young and old, especially for bedridden patients, postpartum woman, or the frail elderly; 6) The liensinine can control sexual desire.Jeon *et al*. (2009) found that palmitic acid methyl ester clearly induced melanogenesis as the result of increased tyrosinase expression, thereby indicating that it may play a role in the regulation of melanin content. They reported that lotus flower oil may prove useful in the development of gray hair prevention agents or tanning reagents. Wang *et al*. (2012) noted that lysicamine extracted from lotus leaves may be a potential antibacterial and anti-inflammation agent for oral infection. Activities of different parts of the plant used is presented in Table 12.

Coix lacryma-jobi

Coix origin and Coix nutritional composition and chemical constituents

Coix lacryma-jobi L. is a distant relative of maize in the Maydae tribe of the grass family, Poaceae or Graminaeae (Leseberg and Duvall, 2009; Chaisiricharoenkul and Tongta, 2011). Its seeds are mainly produced in East and South-East Asia, including China, Japan, the Philippines, Burma, and Thailand (Bhandari *et al*., 2012). The current planting area in China is estimated around 73,000 ha with a grain yield of 0.22 million tons (Diao, 2017). It has higher protein content than other cereals that makes it a good source of nutrition for humans and animals (Capule and Trinidad, 2016). It is documented that *Coix lacryma-jobi* seed was found at the Hemudu site, indicating that *Coix lacryma-jobi* has been cultivated in China for more than 6000 years (Chen, 2003). This native of tropical Asia has long been cultivated for its bead-like seeds, resulting in it becoming widely naturalized throughout the tropical and sub-tropical regions of the world. Job 's tears is a robust grass usually growing 1-2 m tall. Its upright stems are relatively thick and produce prop roots from their lower joints. The

alternately arranged leaves are large (10-50 cm long and 2-5 cm wide) and have a stem-clasping base. These leaves are mostly hairless, but their margins may be fringed with fine hairs. Chemical composition of whole grain and degermed job 's tear flours is shown in Table 13. Composition of coix seed compared with other grains.

Coix Health Benefits

Hsu *et al*. (2003) reported that Adlay seeds have been used to treat warts, chapped skin, rheumatism and neuralgia, and it is an anti-inflammatory and anthelmintic agent. Besides, a number of benzoxaziones in adlay seed 's exhibit anti-inflammatory activity (Huang *et al*., 2009; Geetha *et al*., 2018). Coix seed can inhibit the proliferation of tumor, inhibit the invasion and metastasis of tumor cells, inhibit the formation of tumor blood vessels, induce apoptosis of tumor cells, the synergistic and attenuating effects on chemotherapy, enhance the sensitivity of tumor cells to tumors and adjust the body 's immune function and also relieve the pain of advanced tumors. Numata *et al*. (1994) reported that adlay grains may have anti-tumor activity. Han *et al*. (2017) discovered that the compositions of proteins and polysaccharides of coix seed had the most effect in regulating the water transport of spleen deficiency. Das *et al*. (2017) reported that the chloroform extracts (leaves and seeds) showed efficacy for both bacterial infections and parasitic disease, which ensure the traditional uses of *Coix lacryma-jobi* L.Xi *et al*. (2016) revealed that the proportion of palmitic acid and linoleic acid to oleic acid displayed a highly significant positive correlation with the inhibition rates of Job 's tears seed oil for T24 cells, and thus can be an important indicator for quality control for Job 's tears. Root extract of *Coix lacryma-jobi* is commonly used for treatment of snake bites by traditional healers of south India, in particular coastal Karnataka (Rajesh *et al*., 2017). Son *et al*. (2017) stated that *Coix lacryma-jobi* inhibited migration, invasion, and adhesion of colon cancer cells and tube formation by HUVECs via repression of the ERK1/2 and AKT pathways under hypoxic conditions.

Dry lili Bulb
Origin, health benefits and constitution of lili bulb

Lilies are attractive economic flowering plants grown in pots or as cut flowers (Pobudikiewicz and Treder, 2006; Younis *et al*., 2014). Lili flower has long been used by many cultures as a symbol of tranquility, peace and prosperity. The Roman Catholic Church used lily flowers to symbolize the Virgin Mary and to represent its own state of independence and prosperity. The Chinese culture uses lily bulb to make desserts for festivities and weddings to symbolize good luck and longevity of marriages. Lilium is recognized as a valuable cut flower and many breeding companies are working on the development of new cultivars of the species belonging to different sections of genus (Lucidos *et al*., 2017). Lilies grow best in well-drained soil. Add organic matter to heavy clay or sandy soils before planting. Dry lili buds (huang hua) also known as golden needles and tiger lilies. Dired lily buds are among the most notable of edible flowers in Chinese cuisine. Dried lili bulbs are typically yellow-gold in color and are generally two or three inches long. They are also known to have a delicate flower, often described as musky, earthy and sometimes even sweet or slightly tart. Dried lily buds are used for their unique aroma which is fruity and flowery. Dried Lily flowers are used in Chinese cooking as a flavor enhancer, primarily in vegetarian dishes, but also in various stews and soups.

In Chinese traditional medicine, lily buds aid the brain functions and help blood clots, and also aid to cool your blood and aid urination. Lily-Bulb has three primary sets of active components: alkaloids (steroidal alkaloids, such as etioline as well as small pyrrolines like jatrophine, also called lilidine); steroidal saponins; and phenols (mainly flavonoids). The combination of steroidal alkaloids and steroidal saponins are likely responsible for the treatment of various nervous system disorders. Lilies are good source of starch and protein. Lili bulbs are said to have calcium, iron, phosphorus, folate, potassium and vitamins B1, B2 and C. According to the principles of traditional Chinese medicine, lily bulbs have sweet and slightly cold properties, and are associated with the Lung and Heart meridians. Lily bulbs are used to relieve coughs, dry throats and other respiratory conditions, to clear away heat, and to treat insomnia and heart palpitations. Its tonic properties make it a good herb for promoting restful sleep and treating restlessness and irritability. Lily bulb is often combined with other herbs, such as scrophularia, rehmannia root and anemarrhena. The health benefits of lily bulb are 1) lily bulb provides protein and starch. Additionally, they contain small amounts of calcium, iron, phosphorus and vitamins B1, B2 and C, 2) In traditional Chinese medicine, lily bulb is considered sweet and cooling in properties. The herb is also associated to the lung and heart meridians and help to relieve coughs, dry throats, clear heat, and moisten the lung. Dried lily bulb is also used as an herb to calm the spirit, promote restful sleep and lessen irritability, 3) Fresh and dried lily bulb can be used in both sweet dessert soups and savory soups in Chinese cooking. Side effects of lily bulbs are 1) as with all herbs, use in moderation and consult with a physician first, 2) according to traditional Chinese herbology, those with wind-cold or diarrehea should avoid using lily bulb. In TCM, lily bulbs are used, 1) for lung and kidney Yin deficiency associated with chronic bronchitis, asthma or chronic pharyngitis combine lily bulbs with prepared rehmannia (Shu Di huang), unprepared rehmannia (Di Huang), dwarf lilyturf roots (Mai Dong), white peony roots (Bai Shao), dong quai (Dang Gui), ningpo figwort roots (Xuan Shen), platycodon roots (Jie Geng), fritillary bulbs (Chuan Bei Mu), and liquorice (Gan Cao), 2) for irritability, restlessness, nervous anxiety and insomnia combine lily bulbs with lotus seeds (Lian Zi), glehnia roots (Bei Sha Shen), jujube seeds (Suan Zao Ren), biota seeds (Bo Zi Ren), and poria-cocos mushrooms (Fu Ling), 3) for lung abscesses combine lily bulbs with snow ear mushrooms (Bai Mu Er) and glehnia roots (Bei Sha Shen), 4) for Yin deficiency with dry cough and bloody sputum combine lily bulbs with coltsfoot flowers (Kuan Dong Hua), 5) for mild cases of insomnia and anxiety combine lily bulbs with longans (Long Yan Rou). The most important health benefits of lily bulb are shown in Table 6.

Table 6. The most important health benefits of lily bulb.

1-	Improving sleep quality
2-	Treating low-grade fever
3-	Alleviating symptoms of irritable bowel syndrome
4-	Stopping heart palpitations
5-	Preventing and stopping diarrhea
6-	Improving concentration and focus

Tremella
Origin, Chemical Constituents and Health Benefits

Tremella is a genus of fungi in the family Tremellaceae. Over 100 species of Tremella are currently recognized worldwide (Han *et al*., 2015). Two species, *Tremella fuciformis* and *Tremella aurantialba*, are commercially cultivated for food. It is rich in polysaccharides,

triterpenoids, protein, dietary fiber, vitamins and chitin (Zhang *et al*., 2011). Tremella was one of the original genera created by Linnaeus in his Species Plantarum of 1753. The name comes from the latin tremere meaning to temble (Liu and Wu, 2019). Linnaeus placed Tremella in the algae, including within it a variety of gelatinoud growth, including seaweeds, cyanobacteria and myxomycetes as well as fungi (Ruan *et al*., 2018). *Tremella fuciformis* is one of the great superfood mushrooms and longevity tonic herbs in traditional Chinese medicine (TCM). In ancient times, like many of the other revered medicinal mushrooms such as Reishi and *Cordyceps sinensis*, Tremella was only reserved for royalty, ruling family members or for rich people who could afford this highly valued superfood (Wu *et al*., 2019). Tremella mushroom belongs to the jelly fungus family and has many different names. In Chinese, it is called silver ear mushroom, white wood-ear mushroom and in Japanese, it is called shiro kikurage which translates to white tree jellyfish. It is also commonly known as snow fungus, or the beauty mushroom. Tremella has been a popular staple of Chinese cuisine for centuries, rich in dietary fibers, protein, minerals, antioxidants, and high in vitamin D. It is used in China in a variety of dishes from anti-aging soups to desserts. Tremella has traditionally been used by Chinese and Japanese herbalists as a potent Jing and Chi (Qi) tonic for thousands of years. It is believed to nourish the lungs, kidneys, heart, brain, stomach, and acts as a powerful tonic for the immune system. Tremella has been clinically used to help clear heat and dryness, replenish fluids in the body (Yin deficiency), to treat chest congestion, asthma, constipation, balance blood sugar levels and cholesterol (reduces LDL), and lower inflammation. Its rehydration and fluid replenishment qualities may be the best reasons to support its claims as one of the best beauty foods for the skin. In ancient China, Yang Guidei was one of the Four Great Beauties, an imperial concubine that is considered one of the most beautiful women in Chinese history. She used it regularly to maintain her glowing complexion and youthful skin. Tremella 's polysaccharides also stimulates the production of superoxide dismutase (SOD) in the brain and liver. SOD is one of the most important super antioxidant enzymes in the body. SOD helps to protect and regenerate skin and effectively prevent wrinkling and sagging of the skin. Tremella consists of lots of vitamin D, lots of protein, and also contain other vitamins, minerals, immune boosting polysaccharides, trace minerals, carbs, and a little fat (Kuot *et al*., 2015; Ohiri, 2017). Wang *et al*. (2015) reported that Tremela polysaccharides (TP) are the major component and activity unit of Tremella. Park *et al*. (2007) concluded that *T. fuciformis* might potentially be used as a precautionary agent in neurodegenerative disease, such as Alzheimer 's disease. Shen *et al*. (2017) indicated that *Tremella fuciformis* polysaccharide (TFPS) alleviated hydrogen peroxide-induced oxidative stress and apoptosis in skin fibroblasts via upregulation of SIRT1 expression, indicating that TFPS may act as a potential therapeutic agent for oxidative agent for oxidative-stress-associated skin diseases and aging. Composition of Tremella polysaccharides is presented in Table 7. The most famous beauty and skin enhancing properties of Tremella mushroom is presented in Table 8. Proven health benefits of Tremells is shown in Table 9.

Table 7. Composition of *Tremella* polysaccharides (Khondkar, 2009).

Organism	Moisture content (%)	Ash content (%)	Protein content (%) a	Protein content (%) b	Acetyl group content (%)	Carbohydrate content (%)
T. fuciformis (TFU)	11.4 (±0.1)	3.4 (±0.2)	5.7 (±0.2)	0.8 (±0.1)	2.9 (±0.1)	76.6 (±0.0)

Table 8. The most famous beauty and skin enhancing properties of Tremella mushroom.

1-	Nourishes Skin
2-	Naturally Moisturises
3-	Improves Elasticity
4-	Slows Skin Aging
5-	Brightens Complexion
6-	Deeply Hydrates Inside and Out

Table 9. Proven health benefits of Tremella mushrooms.

1-	Creates youthful skin
2-	Improved memory and learning capabilities
3-	Lowers Cholesterol
4-	Neurological Damage Repair
5-	Lowers Blood Sugar
6-	Anti-inflammatory for the Skin and Whole Body
7-	Great for Chronic Coughs
8-	Cancer
9-	Protects the Liver
10-	Prevents Osteoporosis
11-	Stomach Health
12-	Intestinal Health
13-	Weight Loss
14-	Protects the Circulatory System
15-	Anti-Aging Agent

CONCLUSIONS

China is the home of traditional Chinese medicine. There is an ancient saying that food and medicine are from the same source, which is also the foundation of functional foods today. In recent years, China is one of the world's most important and developed markets for functional foods, which are based on traditional dietary culture and the rapid economic development among individuals and communities. Functional food is defined as a food that has special health functions and it is suitable for consumption by special groups of people and has the role of regulating human body functions but is not used for therapeutic purposes. The most important pharmacological properties of jujube are anti-diabetic effects, hypnotic-sedative and anxiolytic effect, neuroprotective activity, sweetness inhibitor, anti-cancer activity, anti-ulcer activity, anti-inflammatory effect, anti-spastic effect, anti-allergic activity, permeability enhancement activity, cognitive activities, anti-fertility, hyptensive and anti-nephritic effect, cardiovascular activity, immunostimulant effects, anti-oxidant effects and wound healing activity. In Traditional Chinese Medicine (TCM), lotus roots are plants that belong to the 'Herbs that stop bleeding' category. Like the name indicates these herbs tend to have hemostatic properties, meaning that they help stop various types of hemorrhages. Lotus has various notable pharmacological activities such as anti-ischemic, antioxidant, anti-cancer, antiviral, antiobesity, lipolytic, hypocholestermic, antipyretic, hepatoprotective, hypogylcaemic, antidiarrhoeal, antifungal, antibacterial, anti-inflammatory and diuretic activities. Coix is a source of ornamental beads, a stable sustenance, and a productive fodder grass increasingly viewed as a potential energy source. Root extract of *Coix lacryma-jobi* is commonly used for treatment of snake bites by traditional healers of south India. Lili flower has long been used by many cultures as a symbol of tranquility, peace and prosperity. Lily-Bulb has three primary sets of active components: alkaloids (steroidal alkaloids, such as etioline as well as small pyrrolines like jatrophine, also called lilidine); steroidal saponins; and phenols (mainly flavonoids). Lily bulbs are used to relieve coughs, dry throats and other respiratory conditions, to clear away heat, and to treat insomnia and heart palpitations. Its

tonic properties make it a good herb for promoting restful sleep and treating restlessness and irritability. The health benefits of lily bulb are 1) lily bulb provides protein and starch. Additionally, they contain small amounts of calcium, iron, phosphorus and vitamins B1, B2 and C, 2) in traditional Chinese medicine, lily bulb is considered sweet and cooling in properties. The herb is also associated to the lung and heart meridians and help to relieve coughs, dry throats, clear heat, and moisten the lung. Tremella has been a popular staple of Chinese cuisine for centuries, rich in dietary fibers, protein, minerals, antioxidants, and high in vitamin D. Tremella has traditionally been used by Chinese and Japanese herbalists as a potent Jing and Chi (Qi) tonic for thousands of years. Tremella has been clinically used to help clear heat and dryness, replenish fluids in the body (Yin deficiency), to treat chest congestion, asthma, constipation, balance blood sugar levels and cholesterol (reduces LDL), and lower inflammation. Traditional Chinese Medicine included fruits and herbs are increasingly and extensively used by a substantial part of the population. Jujube has numerous important pharmacological activities and it can be considered as a valuable source of nutraceuticals.

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