

Analysis of Nutritional Components of Common Tonifying Traditional Chinese Medicines and Research on Their Compatibility in Daily Diet

Jiatian Kang¹

¹ Shanxi Agricultural University, Shanxi, China

Correspondence: Jiatian Kang, Shanxi Agricultural University, Shanxi, China.

doi:10.63593/CRMS.2026.07.02

Abstract

Tonifying traditional Chinese medicines (TCMs) are widely applied in clinical TCM practice, primarily used to ameliorate physical debilitation and treat various deficiency disorders based on the TCM theory of “strengthening healthy qi and consolidating the root”. In recent years, the concept of “medicine and food sharing the same origin” has gained increasing attention, and the application of tonifying TCMs in daily diets has expanded gradually. This paper takes several common tonifying TCMs including Ginseng, Astragalus, Chinese Angelica, Lycium barbarum, Polygonatum, Codonopsis and Hedysarum polybotrys as research objects. It sorts out major nutritional and active components such as polysaccharides, amino acids, trace elements, saponins and flavonoids contained in these herbs. Combined with recent relevant studies, this paper analyzes the correlation between these components and the tonifying effects of the herbs. Furthermore, integrating classical medicinal food compatibility experience and modern pharmacological research (covering immune regulation, cardiovascular protection, anti-hypoxia, intestinal microflora regulation and other fields), it discusses the scientific rationality of matching tonifying TCMs with daily food ingredients.

The study concludes that the nutritional and active components in these herbs not only scientifically explain their tonifying efficacy, but also form the material basis for daily dietary compatibility. Integrating the TCM principle of dietary therapy based on syndrome differentiation with modern nutrition science is an effective path to promote the rational development and utilization of tonifying TCMs. This paper can provide learning references for students majoring in TCM Resources and Development, and offer theoretical support for the research and development of health products.

Keywords: Tonifying traditional Chinese medicines, nutritional components, medicine-food homology, dietary compatibility, pharmacological effects

1. Introduction

Tonifying TCMs are categorized into four types: qi-tonifying, blood-tonifying, yin-nourishing and yang-warming, which are frequently used in both

clinical prescriptions and daily health preservation. Statistics show that tonifying medicinal diets account for more than 30% of all therapeutic food recipes, serving as a vital approach to reinforce healthy qi and delay aging.

However, the application of these herbs used to rely merely on traditional experience, lacking modern scientific explanations for their material basis and functional mechanisms.

Thanks to the rapid advancement of analytical chemistry and pharmacology in recent decades, their mechanisms have been gradually clarified. Researches reveal that tonifying TCMs are generally rich in polysaccharides, oligosaccharides, various amino acids, trace elements including iron, zinc, calcium and selenium, as well as secondary metabolites such as saponins and flavonoids (Xie Y F, Jiang X M, Pan P, et al., 2025). These substances act as nutritional active factors from a nutritional perspective, and also serve as pharmacological substrates for immune regulation, anti-oxidation and energy metabolism improvement (Liu S S, Ai Q D & Chen N H., 2016). Notably, recent studies have indicated that they exert cardiovascular protective effects by regulating the composition of intestinal microflora and their metabolites (e.g., short-chain fatty acids, bile acids) (Le N Q, Liu Q, Tang Y, et al., 2026; Le N Q, Liu Q, Tang Y, et al., n.d.; Luo W, Feng L M & Zhu F., 2024). This innovative perspective provides a new angle to interpret the TCM concept of “strengthening healthy qi”.

The term “medicine and food sharing the same origin” originally describes the unified origin of medicinal materials and food, and tonifying TCMs fall into both categories—they can function as nutritional supplements as well as conditioning agents for sub-health conditions. How to organically combine modern nutritional analysis with classical compatibility experience has become a valuable research topic in the field of TCM resource development. Starting from nutritional components, this paper combines pharmacological evidence to conduct a study on the nutritional components of common tonifying TCMs and their compatibility in daily diets.

2. Nutritional Component Characteristics of Common Tonifying TCMs

From the perspective of nutritional chemistry, tonifying TCMs contain abundant ingredients which can be generally divided into two categories. The first category consists of primary metabolites including polysaccharides, proteins, amino acids and trace elements, which mainly supply nutrients to the human body and sustain normal physiological activities. The second category includes secondary metabolites such as

saponins, flavonoids and volatile oils, which are closely associated with pharmacological activities. Though the two types of components differ in functions, they often act synergistically in the human body. Therefore, tonifying TCMs possess both nutritional value and satisfactory tonifying efficacy.

2.1 Carbohydrates and Polysaccharides

Carbohydrates exist abundantly in tonifying TCMs and are the most extensively studied nutritional components. Characteristic substances of corresponding herbs, namely ginseng polysaccharide, astragalus polysaccharide, angelica polysaccharide, lycium barbarum polysaccharide and polygonatum polysaccharide, have been proven to exert biological activities including immune enhancement, anti-oxidation and anti-aging (Liu S S, Ai Q D & Chen N H., 2016). Taking Polygonatum produced in Wuling Mountain as an example, it contains high crude polysaccharide content with crude starch at 22.80% and crude protein at 3.32%, reflecting the dual value of such herbs for nutritional supplementation and physiological regulation. The inulin, fructose and oligosaccharides contained in Codonopsis have attracted growing attention in recent years, with great potential in regulating intestinal microecology. Overall, polysaccharides widely exist in tonifying TCMs with considerable content, which can be regarded as an important chemical marker distinguishing this category from other TCMs.

2.2 Amino Acid Composition and Trace Element Spectrum

Tonifying TCMs share highly consistent amino acid profiles. Lycium barbarum contains 18 kinds of amino acids, among which 8 are essential amino acids for human beings; Polygonatum contains 17 kinds, with medicinal amino acids accounting for 77.41% of total amino acids; Codonopsis also contains 17 kinds, including 7 essential amino acids. Such complete amino acid spectra enable these herbs to provide comprehensive nitrogen sources when used as dietary supplements.

In terms of trace elements, over 20 elements including iron, calcium, selenium, zinc, manganese and chromium have been detected in Chinese Angelica, and its blood-tonifying effect is largely related to high iron content. Calcium is the dominant macroelement in Polygonatum, while iron ranks first among its trace elements.

Xie Yefei et al. (2025) pointed out that the type and content of inorganic elements are closely correlated with herb quality and efficacy, while health risk assessment of harmful heavy metals should also be conducted, offering practical guidance for safe daily consumption of tonifying herbs.

2.3 Vitamins and Liposoluble Components

Many tonifying TCMs contain various vitamins. Astragalus contains approximately 65 µg folic acid per 100 g dried root; Chinese Angelica contains vitamin A and vitamin E; Lycium barbarum is rich in provitamin A (carotenoids), vitamin C and vitamin E; Polygonatum contains vitamin C and B vitamins. In terms of lipids, Astragalus contains unsaturated fatty acids such as linoleic acid and linolenic acid, while fatty acids in Polygonatum are dominated by linoleic acid (accounting for 40.62% of total fatty acids), further enhancing their nutritional value. In particular, Lycium barbarum stands out among vision-improving herbs due to its high zeaxanthin and carotenoid content.

In summary, the nutritional components of tonifying TCMs feature diverse types, sufficient content, prominent polysaccharides and rich trace elements. These material foundations not only explain their traditional therapeutic effects, but also lay a foundation for the subsequent discussion on dietary compatibility.

3. Pharmacological Effects of Tonifying TCMs and Their Nutritional Basis

Modern pharmacological researches have verified the traditional efficacy of tonifying TCMs from multiple dimensions. This section only elaborates on research directions closely linked to nutritional components to clarify the logical chain of “nutrients – active substances – therapeutic effects”.

3.1 Immune Regulation and Anti-aging: Polysaccharides and Saponins

Immune regulation is the core function of tonifying TCMs. Hedysarum polybotrys, a genuine qi-tonifying herb native to Gansu Province, can enhance immune function via multiple pathways including improving the morphology of immune organs, promoting proliferation and activation of immune cells, and regulating cytokine secretion (Yan Y T, Li X R & Li Y., 2024). Polysaccharides are universally recognized as its primary effective components. Similarly, polysaccharides and saponins jointly

exert anti-aging effects by scavenging free radicals, increasing antioxidant enzyme activity and slowing telomere shortening (Liu S S, Ai Q D & Chen N H., 2016). The chain of “immunity enhancement – anti-oxidation – anti-aging” perfectly matches the TCM theory of “strengthening healthy qi and consolidating the root”.

3.2 Cardiovascular Protection and Intestinal Microflora Regulation

Cardiovascular protection has become a hot research topic in recent years. Luo Wei et al. (2024) found that the compatibility of tonifying and blood-activating medicinal herbs can prevent and treat chronic heart failure by regulating intestinal flora, with mechanisms involving indirect cardiac regulation by microbial metabolites such as short-chain fatty acids and TMAO. Le Nanqian et al. (2026; n.d.) systematically summarized the pathways through which tonifying, heat-clearing and blood-stasis-resolving herbs affect intestinal flora and metabolites including bile acids and phenylacetylglycine, thereby alleviating myocardial ischemia-reperfusion injury. This links polysaccharides and oligosaccharides (acting as prebiotics) in tonifying TCMs to intestinal microecology and cardiovascular health, providing solid scientific evidence for their multi-target and holistic regulatory effects.

3.3 Anti-Fatigue and Anti-Hypoxia: Energy Metabolism

Fatigue and hypoxia are typical manifestations of sub-health. Xuan Qiwen et al. (2023) summarized tonifying TCMs with anti-fatigue effects, discovering that Ginseng, Astragalus and Codonopsis can regulate energy metabolism substrates, eliminate fatigue factors such as lactic acid and relieve oxidative stress. Liu Xiaoqi et al. (2021) specially sorted out the anti-hypoxia mechanisms of Astragalus, Rhodiola, Ginseng, American Ginseng, Chinese Angelica and Lycium barbarum, which are related to improving myocardial energy metabolism and elevating tissue oxygen utilization efficiency. From a nutritional perspective, polysaccharides, amino acids and B vitamins contained in these herbs serve as substrates and cofactors in energy metabolism pathways, forming a clear causal relationship.

3.4 Other Applications

Apart from the above effects, certain research progress has been made on the prevention and

treatment of other diseases with tonifying TCMs. For instance, some studies confirm that tonify (Lin X Y, Geng X & Chi W C., 2023); they can prevent osteoporosis by regulating factors such as VEGF (Guo H, Yu P F & Li W., 2024); relevant researches also cover the prevention of radiation pneumonia (Yang L C, Zhao C Y & Cai J Y., 2019) and regulation of natural immune molecules (Wang Y X & Xu B, 2017).

4. Principles and Practice of Daily Dietary Compatibility

The nutritional components and pharmacological activities of tonifying TCMs can only be fully exerted through reasonable matching with daily food ingredients. Food carriers not only improve taste, but their fat and protein also facilitate the absorption of liposoluble active components.

4.1 Compatibility Rules of Tonifying Medicinal Diets

Shi Hongfei et al. conducted statistical analysis on 480 tonifying medicinal diets recorded in Dictionary of Chinese Medicinal Diets. The results showed that Astragalus, Codonopsis, Chinese Angelica and Ginseng are the most frequently used tonifying TCMs; meanwhile, dual-purpose medicinal and edible ingredients including Lycium barbarum, longan, Chinese yam and jujube are common matching materials. Main food carriers include japonica rice, chicken, lean meat and eggs, and medicinal diets are mostly prepared as dishes, followed by soups, congee, thick soups and herbal teas. This matching pattern is not random, guided by the principle of “herbs boost the efficacy of food, and food enhances the potency of herbs”. Qi-tonifying herbs are usually stewed with high-protein meat to realize complementary amino acids; blood-tonifying herbs are often matched with ingredients rich in iron and vitamin C to boost trace element absorption.

4.2 Examples of Dietary Matching for Common Tonifying Herbs

Based on the principle of dietary therapy according to syndrome differentiation, typical matching schemes are listed as follows: Ginseng strongly tonifies primordial qi, and can be stewed with chicken or japonica rice to make ginseng chicken soup or ginseng congee, suitable for people with qi deficiency, yet contraindicated for patients with excess and heat syndromes; Astragalus tonifies qi and lifts yang, and its combination with Chinese Angelica forms the classic Danggui Buxue Decoction, with

Astragalus-jujube lean meat soup achieving remarkable effects; Chinese Angelica nourishes and activates blood, and the classic Danggui Shengjiang Mutton Soup warms the middle energizer and tonifies blood; cooking it with eggs and jujubes also delivers satisfactory curative effects; Lycium barbarum boasts flexible application methods, including direct chewing, brewing tea, or matching with chrysanthemum and Chinese yam; Polygonatum nourishes yin and moistens the lung, and stewing lean meat or cooking congee with Lycium barbarum and Codonopsis is suitable for daily conditioning of qi-yin deficiency; Hedysarum polybotrys can be used as a substitute for Astragalus in chicken stews or herbal teas, especially suitable for people living in northwest China such as Gansu Province. It should be noted that all these dietary schemes require a clear understanding of personal physical constitutions, and blind following of popular recipes should be avoided.

4.3 Optimization of Compatibility from the Perspective of Modern Nutrition Science

Further optimization can be realized based on modern nutrition theories. For example, carotenoids in Lycium barbarum are liposoluble, and their absorption rate rises significantly when cooked with meat; Chinese Angelica contains abundant iron, and pairing it with vegetables rich in vitamin C such as tomatoes and green peppers facilitates iron absorption. Astragalus polysaccharides are water-soluble and easily dissolved during soup simmering, so drinking the soup allows sufficient intake of active components; co-consumption with fat slows gastric emptying and prolongs the action time of active ingredients. These micro-level details endow traditional medicinal diets with precision and scientific support.

5. Conclusion and Prospect

In general, common tonifying TCMs universally contain polysaccharides, amino acids, trace elements, vitamins, as well as saponins, flavonoids and other nutritional active components. These substances can partially meet human nutritional demands, and serve as crucial material basis for tonifying TCMs to exert immune regulation, anti-fatigue, anti-oxidation, cardiovascular protection and other effects. Existing research demonstrates that traditional tonifying theories can be partially interpreted by modern scientific studies, with no obvious contradictions but mutual corroboration between

the two systems.

Nevertheless, current researches on tonifying TCMs still have limitations. For example, differences in nutritional components among herbs from different producing regions remain to be further compared; although some pharmacological effects have been verified by experimental studies, relevant clinical evidence is relatively insufficient; the impact of different medicinal diet compatibility modes on the absorption and utilization rate of active components requires more verification via experiments. Therefore, future researches can integrate modern analytical technology, nutrition science and clinical medicine to conduct systematic studies on tonifying TCMs, so as to provide sufficient scientific evidence for their development and utilization.

References

- Du Y S, Zhang Z, He X. (2018). Tonifying Traditional Chinese Medicines Improve Sub-health Physical Conditions. *Acta Neuropharmacologica*, 8(6), 40.
- Guo H, Yu P F, Li W. (2024). General Situation of Researches on Tonifying and Blood-Activating Traditional Chinese Medicines Regulating Vascular Endothelial Growth Factor to Prevent and Treat Osteoporosis. *Journal of Clinical Chinese Medicine*, 36(9), 1821-1826.
- Le N Q, Liu Q, Tang Y, et al. (2026). Research Progress on Tonifying, Heat-Clearing and Blood-Stasis-Resolving Traditional Chinese Medicines, Their Extracts and Compound Prescriptions Regulating Intestinal Microflora Composition and Metabolites to Alleviate Myocardial Ischemia-Reperfusion Injury. *Pharmacology and Clinics of Chinese Materia Medica*, 42(6), 152-160.
- Le N Q, Liu Q, Tang Y, et al. (n.d.). Research Progress on Tonifying, Heat-Clearing and Blood-Stasis-Resolving Traditional Chinese Medicines Regulating Intestinal Microflora Composition and Metabolites to Alleviate Myocardial Ischemia-Reperfusion Injury. *Pharmacology and Clinics of Chinese Materia Medica*.
- Lin X Y, Geng X, Chi W C. (2023). Pharmacological Research Progress on Anti-Lung Cancer Effects of Tonifying Traditional Chinese Medicines. *Modern Journal of Integrated Traditional Chinese and Western Medicine*, 32(15), 2177-2181.
- Liu S S, Ai Q D, Chen N H. (2016). General Review on Anti-Aging Active Components of Tonifying Traditional Chinese Medicines. *Journal of Hunan University of Chinese Medicine*, 36(4), 74-78+86.
- Liu X Q, Niu X J, Hu J P. (2021). Anti-Hypoxia Effects of Tonifying Traditional Chinese Medicines. *Chinese and Foreign Medical Research*, 19(35), 185-188.
- Luo W, Feng L M, Zhu F. (2024). Tonifying and Blood-Activating Traditional Chinese Medicines Preventing and Treating Chronic Heart Failure via Regulating Intestinal Flora. *Hebei Journal of Traditional Chinese Medicine*, 46(5), 858-862.
- Wang Y X, Xu B. (2017). Research Progress on Heat-Clearing and Tonifying Traditional Chinese Medicines Regulating Natural Immune Molecules. *Shanghai Journal of Traditional Chinese Medicine*, 51(5), 102-105.
- Xie Y F, Jiang X M, Pan P, et al. (2025). Research Progress on Inorganic Element Analysis and Health Risk Assessment of Tonifying Traditional Chinese Medicines. *Ginseng Research*, 37(5), 85-91.
- Xuan Q W, Shen D, Du J. (2023). Research Progress on Tonifying Traditional Chinese Medicines with Anti-Fatigue Effects. *Modern Journal of Integrated Traditional Chinese and Western Medicine*, 32(2), 275-280+292.
- Yan Y T, Li X R, Li Y. (2024). Research Progress on Immune Regulation Mechanism of Hedysarum polybotrys, a Tonifying Herb. *Chinese Herbal Medicines*, 55(16), 5656-5668.
- Yang L C, Zhao C Y, Cai J Y. (2019). Systematic Review on Preventive Effect of Tonifying Traditional Chinese Medicines against Radiation Pneumonia. *Herald of Medicine*, 38(8), 1069-1078.
- Zeng S S, Xie L, Wu D H. (2023). Systematic Review Re-evaluation of Tonifying Traditional Chinese Medicine Injections for Ischemic Stroke. *Chinese Journal of Experimental Traditional Medical Formulae*, 29(6), 137-146.