

Nine unique botanicals that present new opportunities for natural products brands

As scientific exploration uncovers health support benefits of botanicals, some herbs are emerging to provide new opportunities in dietary supplements and as functional ingredients in food and beverage applications. Eight emerging botanicals to become more familiar with include:

- Broccoli Seed
- Cistanche
- Eucommia
- Galla chinensis
- Honeysuckle
- Lychee
- Pu'er tea
- Sea Buckthorn
- Ziziphus jujube



Read more about recent discoveries regarding the potential health support benefits of these interesting botanicals:

Broccoli Seed

The seed of the broccoli plant is an abundant source of sulforaphane glucosinolate which is also known as glucoraphanin. It's a substance found in cruciferous plants such as broccoli, cauliflower, and cabbage that is converted in the body to sulforaphane a powerful sulfur containing compound that has been shown to have confer numerous health benefits like cardiovascular support, glucose utilization, and antioxidant protection to the human body ¹. Studies have shown that the extract from broccoli seed acts as an anti-inflammatory ², and can neutralize free radicals that can lead to unwanted proliferative cell growth ³. Additionally, it also may play a role in autism and osteoporosis ⁴.

1.) Clinical and molecular evidence of the consumption of broccoli, glucoraphanin and sulforaphane in humans Nutr Hosp. 2014 Nov 30;31(2):559-69. Conzatti A, et. al

2.) Glucoraphanin: a broccoli sprout extract that

ameliorates obesity-induced inflammation and insulin resistance; Adipocyte. 2018;7(3):218-225; Xu L et.al.

3.) Transcriptional changes in prostate of men on active surveillance after a 12-mo glucoraphanin-rich broccoli intervention-results from the Effect of Sulforaphane on prostate Cancer Prevention (ES-CAPE) randomized controlled trial Am J Clin Nutr

4.) Isothiocyanate from Broccoli, Sulforaphane, and Its Properties J Med Food2019 Feb;22(2):121-126 Alena Vanduchova et.al.

Cistanche

The compound echinacoside is typically associated with its namesake Echinacea, but another rich source of this naturally occurring phenol is from a plant that is completely unrelated to the purple coneflower. In fact, this plant does not produce any chlorophyll of its own and must obtain its vitamins, minerals, and water through its relationship with other plants. Cistanche tubulosa or desert ginseng, as it is commonly known, has been used in traditional Chinese medicine for thousands of years to support cognition, improve sexual health, prevent constipation, and promote longevity. By sup-

porting neuronal integrity, Cistanche has been shown to support blood flow to brain and preserve dopamine, an important neurotransmitter/hormone ^{1,2}. Animal studies have also shown that Cistanche can improve sexual health in both men and women^{3,4}. It can also increase intestinal osmotic pressure and promote regularity ⁵. Additionally, epidemiological studies of people living in the Hotan region of China who consume Cistanche on a regular basis have one of the longest lifespans in the world which epidemiologists theorize is associated with their consumption of Cistanche ⁶.

1.) Echinacoside's nigrostriatal dopaminergic protection against 6-OHDA-Induced endoplasmic reticulum stress through reducing the accumulation of Seipin J Cell Mol Med2017 Dec;21(12):3761-3775;Yajie Zhang et.al

2.) The Antidepressant and Cognitive Improvement Activities of the Traditional Chinese Herb Cistanche; Evid Based Complement Alternat Med 2017;2017:3925903; Dongfang Wang et.al

3.) Phenylethanoid glycosides from Cistanche tubulosa improved reproductive dysfunction by regulating testicular steroids through CYP450-

3β-HSD pathway; J Ethnopharmacol2020 Apr 6;251:112500; Qixin Wang et.al

4.) Phenylethanoid Glycosides of Cistanche on menopausal syndrome model in mice; Saudi Pharm J 2017 May;25(4):537-547; Shuo Tian et.al.

5.) Herbal Cistanche (Rou Cong-Rong): One of the Best Pharmaceutical Gifts of Traditional Chinese Medicine; Front Pharmacol 2016 Mar 1;7:41; Zhiming Li et. al

6.) Herba Cistanches: Anti-aging Aging Dis. 2017 Dec 1;8(6):740-759; Ningqun Wang et.al

Eucommia

Eucommia, also known as the hardy rubber tree, due to the stringy, waxy like, latex sap that appears on the bark and leaves is a tree native to Asia that is a nature source of chlorogenic acid. Chlorogenic acid, among its many benefits, supports circulation, blood pressure and glucose levels ¹. It is also an excellent antioxidant that promotes thermogenesis which can aid in weight management ². Chlorogenic acid also supports the immune system by enhancing the activity of white blood cells ⁴. In addition to these benefits, Eucommia also contains the compounds geniposidic acid and aucubin which have been studied for their ability to enhance collagen synthesis ⁵.

1.) Chemical constituents, biological functions and pharmacological effects for comprehensive utilization of Eucommia ulmoides Oliver; Food Science and Human Wellness Volume 8, Issue 2, June 2019, Pages 177-188; Yi-FanXinc et.al

2.) Chlorogenic Acid Stimulates the Thermogenesis of Brown Adipocytes by Promoting the Uptake of Glucose and the Function of Mitochondria; J Food Sci2019 Dec;84(12):3815-3824; Xue Han et. al

4.) Ethnobotany, Phytochemistry and Pharmacological Properties of Eucommia ulmoides: A Review; Am J Chin Med019;47(2):259-300; Chao-Yong Wang et.al

5.) The promoting effect of eucommiol from Eucommiae cortex on collagen synthesis; Biol Pharm Bull 2000 Jan;23(1):54-9; Y Li et. al

Galla chinensis

Galla chinensis or nutgall tree is a member of the sumac family which is rich in polyphenols such as ellagic acid. Its na-

tive to Asia and has been used in traditional healing modalities to aid digestion, support the liver, and reduce inflammation. The herb is also been used to promote dental health by inhibiting the proliferation of bacteria that can cause tooth decay ¹. Ellagic acid is one of the most studied antioxidants that aids in detoxification and has been shown to support the liver by scavenging the free radicals that can promote disease ². Used topically, ellagic acid can also support healthy skin through its antioxidant activity which inhibits premature aging, fine lines, and wrinkles³.

1.) Anti-cariou Effects of Galla chinensis: A Systematic Review; Phytother Res2015 Dec;29(12):1837-42; Tieting Zhang et.al

2.) Ellagic acid: Pharmacological activities and molecular mechanisms involved in liver protection - PubMed (nih.gov); Pharmacol Res 2015 Jul;97:84-103; Wylly Ramsés García-Niño

3.) Ellagic and tannic acids protect newly synthesized elastic fibers from premature enzymatic degradation in dermal fibroblast cultures; J Invest Dermatol2006 Jun;126(6):1272-80; Felipe Jimenez et.al

Honeysuckle

The antiseptic and anti-inflammatory properties of honeysuckle extract is one of the primary reasons it is used to soothe skin conditions such as eczema, rosacea, acne, and other skin irritations ¹. Abundant in flavonoids and saponins; these naturally occurring compounds in honeysuckle can also protect against



skin damage by neutralizing free radicals due to sun exposure and other environmental factors. As a beauty aid, honeysuckle is also used as a natural treatment for uneven skin tone and dullness ². Because of these many health benefits and its slightly citrusy, honey like scent; honeysuckle is a valued ingredient found in many natural cosmetic preparations.

1.) Evaluation of in vitro anti-oxidant and anti-inflammatory activities of Korean and Chinese Lonicera caerulea; Nutr Res Pract 2018 Dec;12(6):486-493; You-Suk Lee et. al

2.) Modulation effects of sweroside isolated from the Lonicera japonica on melanin synthesis; Chem Biol Interact2015 Aug 5;238:33-9; Yong Tae Jeong et. al

Lychee

Besides being a delicious fruit that is a good source of Vitamin C, B Vitamins, and minerals such as magnesium and potassium. Lychee extract also helps to build immunity, improve cognition, support healthy blood pressure and circulation through the polyphenolic compounds that naturally occur in this fruit and seed ^{1,2}. Studies have shown, for example, that the extract can arrest errant, proliferating cells in cell line and animal studies which shows its potential for use in chemoprevention. The extract has also shown to build neuronal integrity thereby supporting nerve transmission and cognition. In addition to its immune enhancing and cognitive building attributes, Lychee extract is also a powerful antioxidant which can benefit healthy

skin by inhibiting oxidative damage to skin cells that can result in premature aging, wrinkles, and dark spots ³.

1.) Dietary litchi pulp polysaccharides could enhance immunomodulatory and antioxidant effects in mice; *Int J Biol Macromol.* 2016 Nov;92:1067-1073; Huang F et. al

2.) Lychee seed extract protects against neuronal injury and improves cognitive function in rats with type II diabetes mellitus with cognitive impairment; *Int J Mol Med.* 2018 Jan;41(1):251-263; Tang Y et. al

3.) Structural elucidation and cellular antioxidant activity evaluation of major antioxidant phenolics in lychee pulp; *Food Chem* 2014 Sep 1;158:385-91; Dongxiao Su et. al

Pu'er tea

Pu'er tea, like matcha and kombucha, has a long-storied history of use in Asia for the benefits bestowed through the fermentation process that is used to produce this unique tea. It begins by taking green tea leaves that have been carefully selected & processed and then forming them into a ball or brick that will be subjected to hot, humid conditions for months or years. During this curing process beneficial bacteria, fungi and mold develop whose net result is a pot-pourri of prebiotic activity that has been attributed to the many benefits ascribed to this tea for supporting digestive health, weight loss, liver health and cardiovascular integrity ^{1,2}. In addition to its prebiotic activity, Pu'er tea is also a rich source of polyphenols which also play a role in supporting bone densification, and cardiovascular health ^{3,4}.

1.) Bacterial and fungal communities in Pu'er tea samples of different ages; *J Food Sci* 2013 Aug;78(8):M1249-56; Jianqing Tian et. al

2.) Polyphenol- and Caffeine-Rich Post fermented Pu-erh Tea Improves Diet-Induced Metabolic Syndrome by Remodeling Intestinal Homeostasis in Mice; *Infect Immun* 2017 Dec 19;86(1): e00601-17; Xiaoyu Gao et. al

3.) Polyphenol-Rich Foods and Osteoporosis; *Curr Pharm Des* 2019;25(22):2459-2466; Emanuele Chisari et.al

4.) Protective Role of Polyphenols against Vascular Inflammation, Aging and Cardiovascular Disease - PubMed (nih.gov); *Nutrients.* 2018 Dec 28;11(1):53; Serino A et. al



Ziziphus jujube

Sea Buckthorn

Also known as holy fruit in Tibet, Sea Buckthorn is a shrub that only grows in high mountainous regions of the world and whose fruit it bears is an excellent source of palmitoleic acid or omega 7 as it is more commonly known. Omega 7 is an unsaturated fatty acid that has been studied extensively for its cardiovascular benefits as well as its ability to support insulin sensitivity and promote skin health ¹. Studies have shown that omega 7 acts as an anti-inflammatory thereby supporting the integrity of healthy blood vessels which benefits blood pressure and unwanted plaque formation ². Omega 7 also facilitates glucose utilization and as an aid to healthy skin supports the development of new skin cells through the synthesis of elastin and collagen.

1.) Abundance of active ingredients in sea-buckthorn oil; *Lipids Health Dis* 2017 May 19;16(1):95; Aleksandra Zielińska et. al

2.) Palmitoleic Acid has Stronger Anti-Inflammatory Potential in Human Endothelial Cells Compared to Oleic and Palmitic Acids; *Mol Nutr Food Res* 2018 Oct;62(20); Camila Oliveira de Souza et al.

Ziziphus jujube

Known commonly as jujubes the fruit of this small, shrub that is native to Europe the Middle East and Asia is known for its sedative and anxiety reducing effects. Used in many traditional healing modali-

ties, jujube has a long anecdotal history of use for combating stress, depression, and pain ¹. The bioactivity of the polysaccharides is one of the reasons for its immunological, cognitive, and antioxidant activity but plant glycosides called jujubosides are also responsible for its mechanism of action by affecting receptors sites in the brain and inhibiting enzymes that can have a deleterious effect on nerve transmissions that can affect mood and cognitive health ².

1.) Anxiolytic effect of seed of Ziziphus jujuba in mouse models of anxiety.; *J Ethnopharmacol.* 2000 Oct;72(3):435-41; Peng WH et.al

2.) A Review of Dietary Ziziphus jujuba Fruit (Jujube): Developing Health Food Supplements for Brain Protection; *Evid Based Complement Alternat Med* 2017; Jianping Chen et. al

These botanicals offer exciting possibilities for nutraceutical, personal care and wellness brands at a time when consumers are increasingly demanding healthier, clean label, functional botanical ingredients backed by modern science. ●

About the Author

James Roza is Chief Science Advisor at Layn Natural Ingredients-USA. For over 30 years he has driven and directed research, product development and quality assurance for leading nutraceutical manufacturers, and has been instrumental in establishing standards in the natural products industry.