Chapter
Herbal Medicine in the Management of Tinnitus
Mohammad Hossein Khosravi, Masoumeh Saeedi, Jaleh Yousefi, Ali Bagherihagh and Elnaz Ahmadzadeh

Abstract

Tinnitus, which is commonly defined as “ringing in the ears” by the patients, is a perception of an auditory sensation without any accompanying external stimulation. It accounts for a notable part of visits in otolaryngology clinics and has been estimated to involve about 5–15% of adult population making serious problems in 3–5% of patients. Tinnitus causes a lot of problems for patients, their family, and guardians and significantly decreases quality of life of patients. Many treatment methods have been proposed and presented for Tinnitus since the first year of diagnosis. These methods range from conservative management and chemical medications to surgical methods. As the other diseases and conditions, herbal medicine has been trying to treat Tinnitus and a variety of medications have been proposed. In this chapter, we aimed to have a comprehensive review on the current herbal medications of Tinnitus from all over the world.

Keywords: tinnitus, herbal medicine, treatment, epidemiology, Ginkgo biloba

1. Tinnitus: definition, etiology, and epidemiology

Tinnitus, which is commonly defined as “ringing in the ears” by the patients, is a perception of an auditory sensation without any accompanying external stimulation [1, 2]. It accounts for a notable part of visit in otolaryngology clinics and has been estimated to involve about 5–15% of adult population making serious problems in 3–5% of patients [1–5].

Tinnitus causes a lot of problems for patients, their family, and guardians and significantly decreases quality of life of patients. Most of the patients have complaints with sleep disorders, depression, decreased self-confidence, and altered social communications as well as difficulties in quotidian activities [2].

Tinnitus is generally categorized into two types: subjective and objective. A majority of patients suffer from a subjective tinnitus, which means perception of an auditory sensation without any evident stimulus. In some patients, a kind of organic measurable stimulus such as glomus tumor, by making turbulence of blood flow, is the cause for tinnitus, which is called objective tinnitus [1, 2]. This type of tinnitus can be found by examiner using an ear-canal microphone or stethoscope [6].

A variety of risk factors have been reported for subjective tinnitus so far; hearing loss, depression, head trauma, and medication-related ototoxicity [7–9]. Some other conditions may have a role in predisposing patients to tinnitus such as acoustic trauma and presbycusis, and it may be associated with temporomandibular joint (TMJ) or cervical spine dysfunctions (somatic tinnitus) as well as depression and anxiety [10–14].
2. Current treatments

Currently, United States Food and Drug Administration (FDA) or the European Medicine Agency has not approved any drug for the treatment of tinnitus [15]. The complex mechanism and innate diversity in etiology of tinnitus have made its treatment a dilemma for physicians and specially otolaryngologists. Despite considerable number of researches, none of the so far presented medications and treatments has resulted in a sustained reduction in perception of tinnitus [16]. No appropriately controlled clinical trials have been successful to prove efficacy of a single drug. Thus, pharmacological treatment of tinnitus seems to be ineffective [17, 18]. Antidepressants are more frequently prescribed for tinnitus and seem to be effective but with a notable number of side effects. Anticonvulsants, benzodiazepines, lidocaine, and antispasmodics are also among commonly prescribed medications [19]. Voice therapy, using hearing aids, adjuvant therapies as well as environmental sound enrichment are the most common nonmedical approaches to Tinnitus [20].

Regarding the abovementioned issues, there are varieties of complementary and alternative medicine (CAM) treatments, which have been experimented in clinical stage for tinnitus. Herbal medicine or acupuncture, as the most popular types of CAMs therapy among people, have been shown to be effective in management of tinnitus when prescribed solely or in combination [21, 22]. Most of the CAM studies have a small sample size and few methodological pitfalls make it difficult to decide firmly about these treatments.

Some of medicinal herbs and their derivates have been evaluated in various phases of studies: in vitro, in vivo, and even in small to large scale clinical trials [23–30]. In fact, people in different regions of the world have different approaches to medicinal plants and use a variety of herbal medications for treating different diseases and conditions, which have not yet been scientifically assessed [31, 32]. In this chapter, we will discuss and review current traditional and herbal medicine treatments with approved or possible effects on management of Tinnitus.

3. Ginkgo biloba (Jinko)

_Ginkgo biloba_ from the Ginkgoaceae family is a Chinese traditional medicine herb, which is being used for the treatment of asthma and bronchitis for a long time [22, 33]. It has gotten popular also in western countries as well as in Asian ones [34]. _Ginkgo biloba_ is widely available as easily accessible, inexpensive, and relatively safe leaf extracts with various reported therapeutic benefits such as improved cognition and memory as well as sexual function [35, 36]. These improvements beside other biological effects of Jinko extracts such as improvement of microcirculation and neuroprotection are attributable to flavonoid glycosides and terpene lactones, active pharmacologic gradients of _Ginkgo biloba_. It should be pointed that seeds play a remarkable role in Chinese traditional medicine and they are the most commonly used parts of plants for herbal medications, while _Ginkgo biloba_ is processed from the plants’ leaves.

Jinko has been proposed for management of various central nervous system pathologies including tinnitus; however, some previous researches have reported no beneficial effects for _Ginkgo biloba_ in treatment of tinnitus [36–41]. Nevertheless, no certain decide can be made regarding effects of _Ginkgo biloba_ on management of tinnitus according to its complex pharmacological profile, which shows need for further accurate researches [42].
4. Bojungikgitang and banhabaekchulchonmatang (traditional Korean medicine)

Bojungikgitang and banhabaekchulchonmatang have been approved by Korea Food and Drug Administration and are being widely used in Korea for treatment of Tinnitus because of their very low rate of adverse effects [16]. These two herbal medications have found their places among Korean people and physicians. Traditional Korean medicine (TKM) believes that Tinnitus is mainly caused from irregularities in bowel and visceral (zang-fu) functioning [16]. According to TKM, gallbladder deficiency associated with tinnitus is managed by banhabaekchulchonmatang, and bojungikgitang is used to manage the pattern of qi-deficiency [21]. Both of these drugs are now fully covered by Korean National Health Insurance (KNHI).

5. Gushen Pianas

*Gushen Pianas* is a novel Chinese medicinal herb, which is being used in the treatment of sensorineural hearing loss and Tinnitus. Phlegm-accumulation stasis and splenonephric hypofunction are the two main proposed mechanisms of action for *Gushen Pianas* in treatment of Tinnitus [43]. This medication has been developed by Institute of Otorhinolaryngology of Chinese PLA General Hospital and Wuhan Kexing Biomedical Development Co.

Effectiveness of the drug was evaluated in a phase 2 double-blind randomized clinical trial on 120 patients with sensorineural deafness associated with tinnitus. Patients received five tablets of Gushen Pianas every 8 hours and the effect was assessed after 4 weeks. The findings suggested Gushen Pianas as a suitable treatment for hearing loss with no evident adverse effects [43].

6. *Panax ginseng* (Jinseng)

Root of the *Panax ginseng*, with local name of Jinseng, a Chinese medicinal plant from the Araliaceae family has been being used for treatment of Tinnitus since dawn of traditional medicine [44]. Korean red ginseng (KRG) is a traditional Korean herbal medication, which has been used for more than 2000 years, believed to have several benefits for human body [45]. It is considered that oxidative stress is the cause for idiopathic tinnitus and patients may take benefits from oral antioxidant therapy [46, 47]. So, KRG has been proposed for treatment of tinnitus as it inhibits production of reactive oxygen species (ROS) and also attenuates hydrogen peroxide-induced oxidative stress in human neuroblastoma cells [48, 49]. The effect of KRG (3000 mg/day) was evaluated in a randomized clinical trial in which the patients showed a significant reduction in tinnitus handicap inventory (THI) score and increased quality of life. Also some adverse effects have been reported for Jinseng and specially KRG in literature. Deficiency of vital energy (DE), known as qi-deficiency, is a traditional Chinese medicine syndrome, which indicates the disease emerging identity. Some studies believe that Ginseng, especially Korean Red Ginseng, might cause some adverse effects if the patient’s body constitution does not match the qi-deficiency. However, others have reported the Ginseng as the treatment of qi-deficiency caused by any reasons [50].

Further researches are needed to assess beneficial and adverse effects of KRG more accurately.
7. Garlic

Previous conducted researches have reported a lipid-lowering effect for garlic and some others have counted fibrinolytic activity and lowering blood pressure as therapeutic roles of garlic. Few studies have also reported garlic to be beneficial for treatment of tinnitus [6]. Garlic’s effect on tinnitus is attributable to improve blood flow of cochlea as a result of its antiplaque formation ability, stabilizing blood pressure, and augmentation in antioxidant capability of the blood. No scientific studies have been conducted for approving these effects and all of them are theoretical [51].

8. Yoku-kan-san

There are more than 120 plants approved by Japanese ministry of health, labor, and welfare, which are now being used in practice as traditional medications [52]. Yoku-kan-san, a traditional Japanese herbal medication, is one of these approved herbal medications composed from seven plants (Angelicae Radix, Atractylodis Lanceae Rhizoma, Bupleuri Radix, Poria, Glycyrrhizae Radix, Cnidii Rhizoma, and Uncariae Uncis Cum Ramlus). This combination is more frequently used as treatment of psychological conditions such as irritability, insomnia, night terrors, and hypnic myoclonia, especially in infant patients [53]. Although, there are not enough clinical investigation and convincing data for beneficial effect of Yoku-kan-san on tinnitus, but it has been shown to be effective for tinnitus resulted from undifferentiated somatoform disorder in a 44-year-old woman [54]. There is an obvious need for more clinical researches to support such kind of case reports.

Today’s world is going toward the use of medicinal plants and herbal medicines, which are now finding their place among people. Conditions with no precise pharmacologic treatment, such as tinnitus, are more probable to be resolved by herbal medications. In this chapter, we tried to review current medicinal plants for treatment of tinnitus; however, currently, there is a lack of clinical research in this issue. The effect of herbal medications on tinnitus should be investigated in more future clinical researches.
Herbal Medicine in the Management of Tinnitus
DOI: http://dx.doi.org/10.5772/intechopen.81320

Author details

Mohammad Hossein Khosravi¹,²,³*, Masoumeh Saeedi¹,³, Jaleh Yousefi³, Ali Bagherihagh³ and Elnaz Ahmadzadeh¹,⁴

1 International Otorhinolaryngology Research Association (IORA), Universal Scientific Education and Research Network (USERN), Tehran, Iran

2 Student Research Committee, Baqiyatallah University of Medical Sciences, Tehran, Iran

3 Department of Otorhinolaryngology-Head and Neck Surgery, Faculty of Medicine, Baqiyatallah University of Medical Sciences, Tehran, Iran

4 Department of Audiology, School of Rehabilitation, Shahid Beheshti University of Medical Sciences, Tehran, Iran

*Address all correspondence to: dr.mhkhosravi@gmail.com

IntechOpen
© 2018 The Author(s). Licensee IntechOpen. This chapter is distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/3.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.
References

[1] Michiels S, Naessens S, Van de Heyning P, Braem M, Visscher CM, Gilles A, et al. The effect of physical therapy treatment in patients with subjective tinnitus: A systematic review. Frontiers in Neuroscience. 2016;10:545

[2] Baguley D, McFerran D, Hall D. Tinnitus. The Lancet. 2013;382(9904):1600-1607

[3] Axelsson A, Ringdahl A. Tinnitus—A study of its prevalence and characteristics. British Journal of Audiology. 1989;23(1):53-62

[4] Heller AJ. Classification and epidemiology of tinnitus. Otolaryngologic Clinics of North America. 2003;36(2):239-248

[5] Gilles A, De Ridder D, Van Hal G, Wouters K, Punte AK, Van de Heyning P. Prevalence of leisure noise-induced tinnitus and the attitude toward noise in university students. Otology & Neurotology. 2012;33(6):899-906

[6] Smith GS, Romanelli-Gobbi M, Gray-Karagrigoriou E, Artz GJ. Complementary and integrative treatments: Tinnitus. Otolaryngologic Clinics of North America. 2013;46(3):389-408

[7] Doménech J, Cuchí M, Carulla M. High-frequency hearing loss in patients with tinnitus. Inner Ear Pathobiology. Karger Publishers. 1990;45:203-205

[8] Ceranic BJ, Prasher DK, Raglan E, Luxon LM. Tinnitus after head injury: Evidence from otoacoustic emissions. Journal of Neurology, Neurosurgery & Psychiatry. 1998;65(4):523-529

[9] Trevis KJ, McLachlan NM, Wilson SJ. Psychological mediators of chronic tinnitus: The critical role of depression. Journal of Affective Disorders. 2016;204:234-240

[10] McKenna L, Hallam RS, Hinchcliffe R. The prevalence of psychological disturbance in neuro-otology outpatients. Clinical Otolaryngology. 1991;16(5):452-456

[11] Teachev WS, Wijtmans EH, Cardarelli F, Levine RA. Tinnitus of myofascial origin. The International Tinnitus Journal. 2012;17(1):70-73

[12] Saldanha ADD, Hilgenberg PB, Pinto LMS, Conti PCR. Are temporomandibular disorders and tinnitus associated? Cranio. 2012;30(3):166-171

[13] Abel MD, Levine RA. Muscle contractions and auditory perception in tinnitus patients and nonclinical subjects. Cranio. 2004;22(3):181-191

[14] Michiels S, De Hertogh W, Truijens S, Van de Heyning P. Cervical spine dysfunctions in patients with chronic subjective tinnitus. Otology & Neurotology. 2015;36(4):741-745

[15] Langguth B, Elgoyhen AB. Emerging Pharmacotherapy of Tinnitus. Taylor & Francis; 2011

[16] Kim N-K, Lee D-H, Lee J-H, Oh Y-L, Yoon I-H, Seo E-S, et al. Bojungikgitang and banhabaekchulchonmatang in adult patients with tinnitus, a randomized, double-blind, three-arm, placebo-controlled trial-study protocol. Trials. 2010;11(1):34

[17] Dobie RA. A review of randomized clinical trials in tinnitus. The Laryngoscope. 1999;109(8):1202-1211

[18] Lockwood AH. Tinnitus. Neurologic Clinics. 2005;23(3):893-900

[19] Mahmoudian-Sani MR, Hashemzadeh-Chaleshtori M, Asadi-Samani M, Luther T. A review of medicinal plants for the treatment
Herbal Medicine in the Management of Tinnitus

The International Tinnitus Journal. 2017;21(1):44-49

[20] Ahmad N, Seidman M. Tinnitus in the older adult. Drugs & Aging. 2004;21(5):297-305

[21] Kim H-Y, Choi Y-J, Sung E-J, Jo E-H, Kim H-Y, Park M-C. A clinical study of tinnitus. The Journal of Korean Medicine Ophthalmology and Otolaryngology and Dermatology. 2009;22(2):139-152

[22] Enrico P, Sirca D, Mereu M. Antioxidants, minerals, vitamins, and herbal remedies in tinnitus therapy. Progress in Brain Research. 2007;166:323-330

[23] Samarghandian S, Borji A, Farahmand SK, Afshari R, Davoodi S. Crocus sativus L. (saffron) stigma aqueous extract induces apoptosis in alveolar human lung cancer cells through caspase-dependent pathways activation. BioMed Research International. 2013;2013

[24] Mansouri E, Asadi-Samani M, Kooti W, Ghasemiborou M, Ashtary-Larky D, Alamiri F, et al. Anti-fertility effect of hydro-alcoholic extract of fennel (Foeniculum vulgare Mill) seed in male Wistar rats. Journal of Veterinary Research. 2016;60(3):357-363

[25] Samini F, Samarghandian S, Borji A, Mohammadi G. Curcumin pretreatment attenuates brain lesion size and improves neurological function following traumatic brain injury in the rat. Pharmacology Biochemistry and Behavior. 2013;110:238-244

[26] Moradi M, Karimi A, Alijadi S, Ghasemi-Dehkordi P, Ghaffari-Goosheh M. Cytotoxicity and in vitro antioxidant potential of Quercus brantii acorn extract and the corresponding fractions. International Journal of Pharmacognosy and Phytochemical Research. 2016;8(4):558-562

[27] Karimi A, Mohammadi-Kamalabadi M, Rafieian-Kopaei M, Amjad L. Determination of antioxidant activity, phenolic contents and antiviral potential of methanol extract of Euphorbia spinidens Bornm (Euphorbiaceae). Tropical Journal of Pharmaceutical Research. 2016;15(4):759-764

[28] Karimi A, Moradi M-T, Alidadi S, Hashemi L. Anti-adenovirus activity, antioxidant potential, and phenolic content of black tea (Camellia sinensis Kuntze) extract. Journal of Complementary and Integrative Medicine. 2016;13(4):357-363

[29] Samarghandian S, Borji A, Hidar Tabasi S. Effects of Cichorium intybus linn on blood glucose, lipid constituents and selected oxidative stress parameters in streptozotocin-induced diabetic rats. Cardiovascular & Haematological Disorders-Drug Targets (Formerly Current Drug Targets-Cardiocascular & Hematological Disorders). 2013;13(3):231-236

[30] Hajzadeh M, Rajaei Z, Shafiee S, Alavinejhad A, Samarghandian S, Ahmadi M. Effect of barberry fruit (Berberis vulgaris) O serum glucose A lipids I streptozotocci-diabetic rats. Pharmacology Online. 2011;809-817

[31] Samarghandian S, Azimi-Nezhad M, Samini F. Ameliorative effect of saffron aqueous extract on hyperglycemia, hyperlipidemia, and oxidative stress on diabetic encephalopathy in streptozotocin induced experimental diabetes mellitus. BioMed Research International. 2014;2014

[32] Bahmani M, Rafieian-Kopaei M, Jeloudari M, Eftekhari Z, Delfan B, Zargaran A, et al. A review of the health effects and uses of drugs of plant licorice (Glycyrrhiza glabra L.) in...
Management of Tinnitus - The Views of Various Disciplines

[33] Khodami N, Shahtoosi M, Amani S, Khodami A. The comparison of *Ginkgo biloba* and Cinnarizine effectiveness in tinnitus intensity of patients with subjective tinnitus. Journal of Birjand University of Medical Sciences. 2015;21(4):416-424

[34] Spinella M. The Psychopharmacology of Herbal Medicine: Plant Drugs that Alter Mind, Brain, and Behavior. Cambridge (MA): MIT Press; 2001

[35] Bent S, Goldberg H, Padula A, Avins AL. Spontaneous bleeding associated with *Ginkgo biloba*. Journal of General Internal Medicine. 2005;20(7):657-661

[36] Birks J, Grimley Evans J. *Ginkgo biloba* for cognitive impairment and dementia. The Cochrane Library. 2009

[37] Jastreboff PJ, Zhou S, Jastreboff MM, Kwapisz U, Gryczynska U. Attenuation of salicylate-induced tinnitus by *Ginkgo biloba* extract in rats. Audiology and Neurotology. 1997;2(4):197-212

[38] Logani S, Chen MC, Tran T, Le T, Raffa RB. Actions of *Ginkgo biloba* related to potential utility for the treatment of conditions involving cerebral hypoxia. Life Sciences. 2000;67(12):1389-1396

[39] Maclennan KM, Darlington CL, Smith PF. The CNS effects of *Ginkgo biloba* extracts and ginkgolide B. Progress in Neurobiology. 2002;67(3):235-257

[40] Hilton M, Stuart E. *Ginkgo biloba* for tinnitus. Cochrane Database of Systematic Reviews. 2004;2

[41] Smith PF, Zheng Y, Darlington CL. *Ginkgo biloba* extracts for tinnitus: More hype than hope? Journal of Ethnopharmacology. 2005;100(1-2):95-99

[42] Drew S, Davies E. Effectiveness of *Ginkgo biloba* in treating tinnitus: Double blind, placebo controlled trial. BMJ. 2001;322(7278):73

[43] Zhai S, Fang Y, Yang W, Gu R, Han D, Yang S. Clinical investigation on the beneficial effects of the Chinese medicinal herb Gushen Pian on sensorineural deafness and tinnitus. Cell Biochemistry and Biophysics. 2013;67(2):785-793

[44] Salehi Sormaghi MH. Medicinal Plants and Herbal Medicine. Tehran, Iran: The Cultural Institute of Nutrition and Health Press; 2009. chap 1. (In Persian)

[45] Kim TS, Lee HS, Chung JW. The effect of korean red ginseng on symptoms and quality of life in chronic tinnitus: A randomized, open-label pilot study. Journal of Audiology & Otology. 2015;19(2):85

[46] Neri S, Mauceri B, Cilio D, Bordonaro F, Messina A, Malaguarnera M, et al. Tinnitus and oxidative stress in a selected series of elderly patients. Archives of Gerontology and Geriatrics. 2002;35:219-223

[47] Savastano M, Brescia G, Marioni G. Antioxidant therapy in idiopathic tinnitus: Preliminary outcomes. Archives of Medical Research. 2007;38(4):456-459

[48] Cheng Y, SHEN L, ZHANG J. Anti-amnestic and anti-aging effects of ginsenoside Rg1 and Rb1 and its mechanism of action. Acta Pharmacologica Sinica. 2005;26(2):143-149

[49] Im GJ, Chang JW, Choi J, Chae SW, Ko EJ, Jung HH. Protective effect of Korean red ginseng extract
on cisplatin ototoxicity in HEI-OC1 auditory cells. Phytotherapy Research. 2010;24(4):614-621

[50] Lin H, Pi Z, Men L, Chen W, Liu Z, Liu Z. Urinary metabonomic study of Panax ginseng in deficiency of vital energy rat using ultra performance liquid chromatography coupled with quadrupole time-of-flight mass spectrometry. Journal of Ethnopharmacology. 2016;184:10-17

[51] Linde K, ter Riet G, Hondras M, Vickers A, Saller R, Melchart D. Systematic reviews of complementary therapies–An annotated bibliography. Part 2: Herbal medicine. BMC Complementary and Alternative Medicine. 2001;1(1):5

[52] Seidman MD, Babu S. Alternative medications and other treatments for tinnitus: Facts from fiction. Otolaryngologic Clinics of North America. 2003;36(2):359-381

[53] Aizawa R, Kanbayashi T, Saito Y, Ogawa Y, Sugiyama T, Kitajima T, et al. Effects of Yoku-kan-san-ka-chimpi-hange on the sleep of normal healthy adult subjects. Psychiatry and Clinical Neurosciences. 2002;56(3):303-304

[54] Okamoto H, Okami T, Ikeda M, Takeuchi T. Effects of Yoku-kan-san on undifferentiated somatoform disorder with tinnitus. European Psychiatry. 2005;20(1):74-75