

Herbal Anxiolytics

Received: 24 February 2023, **Revised:** 26 March 2023, **Accepted:** 28 April 2023

Dilsar Gohil^{1*}, Rajesh Maheshwari², Falakaara Saiyed³, Krupa Joshi⁴

1.Assistant Professor, 2.Professor, 3.Assistant Professor, 4.Assistant Professor

Department of Pharmacy, Sumandeep Vidyapeeth Deemed to be University, Piparia, Vadodara Gujarat, India-391760

Corresponding Author: Dilsarbanu I. Gohil

Assistant Professor, Department of Pharmacy, Sumandeep Vidyapeeth Deemed to be University, Piparia, Vadodara Gujarat, India-391760

Email Id: gohildilsar9624@gmail.com

Keywords

Anxiety treatments, Plant-based medicine, anxiolytic and hypnotic-sedative properties, modern healthcare services.

Abstract

Stress has become an unwelcome companion in modern society, causing many to suffer from anxiety, which can have a significant impact on daily life. While a certain amount of anxiety and stress can be useful, chronic stress can lead to anxiety that interferes with normal activities. Recent studies suggest that anxiety is caused by a malfunction in neurotransmitter activity and their receptors, making it an area of critical interest. Fortunately, plants have been used for centuries to heal illnesses, and traditional medicinal practices, such as Ayurveda and Unani, continue to utilize natural remedies to promote longevity and good health. The World Health Organization recognizes the efficacy of these herbal remedies for global health concerns. This comprehensive review categorizes the most popular herbal remedies for anxiety, providing a useful guide for those seeking natural alternatives to pharmaceutical drugs and medications. By highlighting the potential of natural herbs and herbal blends, individuals can explore safe and effective treatments for anxiety that have few side effects. With this knowledge, individuals can find relief from the burden of anxiety and experience the peace of mind and well-being that come with natural healing remedies.

1. Introduction

Anxiety is a prevalent mental health disorder and a leading cause of disability worldwide [1]. Traditional herbal remedies have gained attention in global health discussions as a possible solution for treating anxiety. The review focuses on 15 plant species belonging to 76 genera and 32 families. The most commonly used plant parts are leaves and flowers, utilized as infusions and decoctions. Asteraceae and Lamiaceae are the families with the most mentions [2, 3]. However, more research is needed to confirm the efficacy of these alternative therapies and to better understand the mechanism of action of bioactive compounds. The goal of this review is to highlight the sedative and insomnia-treating properties of anxiolytics derived from wild and domesticated Plants [4]. Anxiety and insomnia are two related mental health conditions that can lead to substantial impairment [5, 6]. Symptoms of anxiety include excessive worry, arousal, muscular

tension, and various motor and sensory symptoms [7]. In addition, anxiety can contribute to physical symptoms such as headaches, uncontrollable quivering, and sweating [8]. Insomnia is characterized by trouble falling asleep, interrupted sleep, and morning awakenings [9].

The neurotransmitter gamma-aminobutyric acid [GABA] plays a significant role in anxiety, as low GABA levels in the CNS can lead to anxiety and other neurological disorders [10, 11]. Strategies for increasing GABA levels include increasing GABA-A receptor affinity for the benzodiazepine [BZD] site, stimulating GluAD, and inhibiting GABA-T. However, drug treatments like SSRIs and SNRIs, commonly used for GAD, are associated with side effects like dependence, vomiting, muscle spasms, memory deficits, and increased risk of accidents and fractures [12-15].



Figure 1. Anxiety symptoms

As an alternative to drug treatments, natural remedies like herbal medicines are gaining popularity, particularly for mild to moderate anxiety and sleep disorders [16, 17]. Herbal medicine is becoming increasingly common in Western societies as a way to self-treat for various stress-related afflictions [18, 19]. It is now one of the most widely used complementary treatments for sleeplessness [20].

Over the past 50 years, therapeutic approaches for anxiety and depression have improved in terms of tolerance, availability, and variety. Research on the neurobehavioral and physiological mechanisms underlying chronic stress and anxiety has opened the door to new treatment modalities. However, despite these advances, a significant percentage of patients taking modern antidepressants do not achieve long-term anxiety symptom relief [21].

2. Current Status of Pharmacological Treatment for Anxiety Disorders

1. Antidepressant medications

Selective serotonin reuptake inhibitors [SSRIs] and serotonin–norepinephrine reuptake inhibitors [SNRIs]

Selective serotonin reuptake inhibitors [SSRIs] and serotonin-norepinephrine reuptake inhibitors

[SNRIs] are commonly used to treat anxiety disorders. SSRIs are safer in overdose circumstances and have a more survivable adverse reaction profile than the ancient tricyclic antidepressants. They are also effective for a wide scope of psychiatric conditions, including severe depression, disruptive mood dysregulation disorder, and eating disorders [22]. Monoamine oxidase inhibitors [MAOIs] are excellent and effective options for severe anxiety disorders, but they have the worst adverse reaction profile of all the antidepressants. Patients taking an MAOI may have dangerous hypertensive reactions if they consume tyramine-containing foods [such as cheese, beer, and wine] or even use specific drugs [e.g., Meperidine, decongestants, or energy drinks containing ephedrine or phenyl propylamine]. While taking MAOIs, they may experience weight gain, sleep disturbance, and daytime drowsiness [23].

2. Benzodiazepines

Benzodiazepines are prescribed for their strong, short-term effects, particularly in the first few weeks when the anxiolytic effects of an antidepressant have not yet started or to help people feel less anxious when flying on an airplane [24]. However, chronic use of benzodiazepines can lead to physiological dependence, short-term psychomotor and cognitive impairment, and rebound anxiety after

stopping. Patients who have a history of substance abuse are more likely to abuse benzodiazepines. When clinically necessary, benzodiazepines can be slowly reduced in dosage until they are eventually stopped over the course of several months while beginning some other medication or cognitive-behavioral therapy [CBT] [25].

3. Anticonvulsants that block the alpha-delta calcium channel

Anticonvulsants that block the alpha-delta calcium channel and the alpha-delta calcium channel class of anticonvulsants, which includes gabapentin and the relatively new agent pregabalin, are effective in reducing neuronal excitability and are similar to diazepam in their ability to alter the balance of both excitator and inhibitory neuronal activity. These drugs have a quick onset of action like benzodiazepines but have fewer issues with abuse potential, tolerance, and withdrawal than sedatives. They have also been used to treat alcohol and stimulant addiction [26, 27].

4. Azapirones and beta blockers

Azapirones and beta blockers Beta-blockers and azapirones have more limited applications. Single-dose beta-blockers have been prescribed for people who experience performance-related anxiety since they can reduce peripheral anxiety-related physical signs [e.g., palpitations and arm trembling] within 30-60 minutes. However, they have no effect on mental or emotional anxiety symptoms. Azapirones affect serotonin neuron firing by binding to the serotonin receptor and changing its control. They generally take weeks to take effect, are usually well tolerated, and do not have the dependence problems associated with benzodiazepine use [28].

The following is a list of commonly cited species that possess anxiolytic and hypnotic-sedative properties.

Anthemis arvensis L.

Anthemis arvensis L. Corn chamomile [*Anthemis arvensis* L.] is a European annual herbaceous plant that is frequently used in Italian folk medicine as a sedative, digestive, spasmolytic, expectorant, and anti-inflammatory agent. However, there is currently no scientific research available on pre-clinical and clinical trials of

corn chamomile for the treatment of insomnia and anxiety. Therefore, further in-vitro and in-vivo studies are required to establish its efficacy as a sedative and to identify its mechanism of action [29-31].

Humulus lupulus L.

Humulus lupulus L. Common hop [*Humulus lupulus* L.] is a perennial herbaceous climbing plant native to Europe, southwestern Asia, and North America. The plant's female flowers are arranged in clusters that resemble cones, and its leaves are lobed. In traditional medicine, the leaves are used to treat dysmenorrhea, digestive issues, and toothaches. The neuropharmacological effects of hop extracts are attributed to the presence of molecules with GABA-like activity and the interaction of some hop compounds with melatonin and serotonin receptors [32-38].

Lavandula angustifolia Mill.

Lavandula angustifolia Mill. Lavender [*Lavandula angustifolia* Mill.] is a fragrant, annual herb dwarf shrub native to the Mediterranean basin. The plant has linear to lanceolate-linear leaves that are densely grey stellate tomentose and clustered on leafy shoots. Lavender is also used in folk medicine to treat gastrointestinal, urinary, and respiratory diseases, as well as headaches. Recent studies have confirmed lavender's anxiolytic and sedative properties. The sedative properties of lavender essential oil and its main constituents, linalool [37.3%] and linalyl acetate [41.6%], have been studied in mice after inhalative absorption [39-43].

Malva sylvestris L.

Malva sylvestris L. Common mallow [*Malva sylvestris* L.] is an annual or perennial herbaceous plant native to Europe, northern Africa, and southwestern Asia that can be found almost everywhere in the world. Its harsh leaves are deeply 3-7 lobed, and its vivid rose-purple flowers can bloom singly or in axillary clusters of three to five flowers. Due to its therapeutic properties, common mallow has a wide range of uses in folk medicine [44].

Clinopodium nepeta L.

Journal of Coastal Life Medicine

Clinopodium nepeta L. Lesser calamint [*Clinopodium nepeta* [L.] Kuntze subsp. *nepeta*] is an erect, perennial herbaceous species that is native to southern Europe and can occasionally be woody at the base. Lesser calamint is commonly used as a flavoring in salads and soups. It is also used in folk phytotherapy to treat diarrhea and vomiting, toothaches, and as an emollient due to its sedative effects [45, 46].

***Crataegus monogyna* Jacq.**

Hawthorn [*Crataegus monogyna* Jacq.] is a thorny shrub native to Europe, West Asia, and Northwest Africa that is now commonly found in North America and other parts of the world. The shrub produces dense corymbs of flowers with five white petals and numerous red stamens, while the leaves have deep lobes. Its fruit is a single-seeded red pome that resembles a berry. Hawthorn is frequently used in traditional phytotherapy as a sedative and a hypotensive for cardiovascular diseases [47]. Scientific evidence suggests that *Crataegus* species contain active components, nutrition, and cosmeceuticals [48].

***Matricaria chamomilla* L.**

Chamomile [*Matricaria chamomilla* L.], an annual herbaceous plant, is native to Southwest Asia and Southeastern Europe but has since become widely naturalized on all continents. The flower heads, or capitula, have yellow tubulose flowers in the center and white ligulate peripheral flowers [ray flowers] on the outside, with a conical receptacle that is hollow on the inside. The leaves are bi- or tripinnate and have lanceolate shapes lowered to linear laciniae. In traditional phytotherapy, inflorescences are used to make infusions. Chamomile flowers contain over 120 biologically active metabolites, including proteins, carbs, polyphenols, tannins, nutrients, and essential fats. Chamomile is one of the most popular herbal treatments for dysmenorrhea disorders and has sedative effects [49]. The mechanisms of action of chamomile flower extracts for use as complementary or alternative treatments for insomnia and anxiety are still unknown. Findings have occasionally been contentious, but chamomile's antianxiety effects may be attributed to the lignan quercetin, which is a ligand for central BZD receptors [50].

***Melissa officinalis* L.**

Lemon balm [*Melissa officinalis* L.] originally hails from central Europe, the Mediterranean Basin, and Central Asia, but has since spread to other parts of the world [51]. It has white flowers with a double-lipped corolla and ovate, lemon-scented, wrinkled leaves. Its leaves and flowers can be used to make raw salads and flavor meat, and in traditional phytotherapy, lemon balm is used for gynecological abnormalities, digestive aid, sedative, wound healing, blood depurative, and memory boosting [52, 53]. The chemical structure of lemon balm is well researched, and its main constituents include cinnamic acid variants, particularly resveratrol acid, carvacrol, and caffeic acid, catechin, polyphenols [including luteolin, luteolin 7-O-beta-D-glucopyranoside, luteolin 3-O-beta-D-glucuronopyranoside, and apigenin 7-O-beta-D-glucopyranoside], terpenes [including β -caryophyllene and germacrene], terpenoids, and high volatility oils [54].

***Papaver somniferum* L.**

The opium poppy [*Papaver somniferum* L.], an annual herb, is believed to have originated in Asia Minor or the Western Mediterranean region and is now widely grown in many temperate regions of the world [55]. It has glaucous aerial parts, lobed leaves, and an upper stem that clasps the stem. Its fruits are capsules, and its large flowers can be white, pinkish, or violet. When damaged, the plant releases latex from its entire body. The Greeks called the latex "opos," which comes from the word "juice," and later named it opium. The ancient Greeks associated opium with a number of deities, including Enkelepios, Soma, Aurora, and Death instinct [56].

The medicinal and nutritional qualities of the plants various parts, including seeds, fruits, and latex, are exploited. In traditional medicine, the morphine plant is used as a diuretic or to treat toothaches [57]. Opium poppy had used infusions have long been employed as a general and cough sedative in popular phytotherapy in the Campidano Valley of Cagliari and the Urzulei district fruits [58].

***Papaver rhoeas* L.**

The corn poppy [*Papaver rhoeas* L.] is a globally distributed annual herbaceous weed that has been extensively researched in recent decades to

elucidate its potential pharmaceutical applications. Various sections of the plant, including the bases, stems, leaves, and flowers, have been shown to possess numerous biological functions such as depressive, antibacterial, oxidative, antiulcerogenic, and apoptotic activities [59].

Valeriana officinalis L.

Valerian [*Valeriana officinalis* L.] is a perennial herbaceous plant that is native to Europe and Asia. Valerian extract contains several physiologically active chemical components, including cannabinoids, terpenes, free amino acids, phenolic compounds, valepotriates, and flavanols [60]. The primary alkaloids present in Valerian Root [0.01-0.05% of Root Dry Weight] are Actinidine, Chatinine, Valerianine, Valerine, Alpha-methyl Pyryl Ketone, and Naphthyridin Methyl Ketone [61]. Valerian is commonly used to treat anxiety-related sleep disturbances due to its sedative and sleep-inducing effects [62, 63].

Tilia platyphyllos Scop.

The broad-leaved linden or bigleaf linden [*Tilia platyphyllos* Scop.] is a large tree or shrub that is endemic to Europe and southwestern Asia. Flavonoids present in *T. americana*, including quercetin, isoquercitrin, and rutin, have been found to have similar sedative and anxiolytic effects when taken orally through GABAergic and serotonin systems [64].

Rosmarinus officinalis L.

Rosemary [*Rosmarinus officinalis* L.] is an evergreen plant native to the Mediterranean region that has spread naturally throughout much of Europe. It has been traditionally used in folk medicine to treat renal colic, dysmenorrhea, nervous system and mood disorders, physical and mental exhaustion, as well as respiratory issues and hypercholesterolemia [65-67]. Rosemary has numerous biological actions, including antioxidant, anti-inflammatory, antibacterial, and anti-cancer effects, and has been shown to be beneficial for anxiety, stress, and memory [68]. In aromatherapy, rosemary extract is commonly used to reduce anxiety-related symptoms and improve alertness [69].

3. Conclusion

In conclusion, despite the availability of modern healthcare services, rural communities still rely heavily on medicinal herbs for anxiety treatment. However, the loss of traditional knowledge of ethnobotany is a significant concern, and efforts should be made to document and preserve this information. Collaborative efforts by authorities, ethnobotanists, and the health industry are necessary to achieve this goal. Herbal medicine has been extensively researched and found to have few side effects, making it a practical and affordable option in regions with limited access to healthcare services. While only a small number of natural herbs have been proven to be effective anxiolytics in human trials, they have the potential to relieve anxiety with minimal side effects, unlike pharmaceutical drugs. Therefore, the use of natural herbs and herbal blends could be a viable option for anxiety treatment.

References

- [1] Ernst, E. Herbal remedies for anxiety—A systematic review of controlled clinical trials. *Phytomedicine* 2006, 13, 205–208.
- [2] Harvey, A.G. Insomnia: Symptom or diagnosis? *Clin. Psychol. Rev.* 2001, 21, 1037–1059.
- [3] Kucharczyk, E.R.; Morgan, K.; Hall, A.P. The occupational impact of sleep quality and insomnia symptoms. *Sleep Med. Rev.* 2012, 16, 547–559.
- [4] McIntyre, E.; Saliba, A.J.; Wiener, K.K.; Sarris, J. Prevalence and predictors of herbal medicine use in adults experiencing anxiety: A critical review of the literature. *Adv. Integr. Med.* 2015, 2, 38–48.
- [5] Kogadeeva, M.; Zamboni, N. SUMOFLUX: A Generalized Method for Targeted 13C Metabolic Flux Ratio Analysis. *PLoS Comput. Biol.* 2016, 12, e1005109.
- [6] Lydiard, R.B.; Rickels, K.; Herman, B.; Feltner, D.E. Comparative efficacy of pregabalin and benzodiazepines in treating the psychic and somatic symptoms of generalized anxiety disorder. *Int. J. Neuropsychopharmacol.* 2010, 13, 229–241.
- [7] Hoehn-Saric, R. Psychic and somatic anxiety: Worries, somatic symptoms and physiological changes. *Acta Psychiatr. Scand.* 1998, 393, 32–38.

Journal of Coastal Life Medicine

- [8] Lakhani, S.E.; Vieira, K.F. Nutritional and herbal supplements for anxiety and anxiety-related disorders: Systematic review. *Nutr. J.* 2010, 9, 42.
- [9] Ohayon, M.M. Epidemiology of insomnia: What we know and what we still need to learn. *Sleep Med. Rev.* 2002, 6, 97–111.
- [10] Lydiard, R.B. The role of GABA in anxiety disorders. *J. Clin. Psychiatry* 2003, 64 [Suppl. 3], 21–27.
- [11] Kalueff, A.V.; Nutt, D.J. Role of GABA in anxiety and depression. *Depress. Anxiety* 2007, 24, 495–517.
- [12] Garakani, A.; Murrough, J.W.; Freire, R.C.; Thom, R.P.; Larkin, K.; Buono, F.D.; Iosifescu, D.V. Pharmacotherapy of Anxiety Disorders: Current and Emerging Treatment Options. *Front. Psychiatry* 2020, 11, 595584.
- [13] Koen, N.; Stein, D.J. Pharmacotherapy of anxiety disorders: A critical review. *Dialogues Clin. Neurosci.* 2011, 13, 423–437.
- [14] Stewart, S.A. The effects of benzodiazepines on cognition. *J. Clin. Psychiatry* 2005, 66 [Suppl. 2], 9–13.
- [15] Uzun, S.; Kozumplik, O.; Jakovljevic, M.; Sedic, B. Side effects of treatment with benzodiazepines. *Psychiatr. Danub.* 2010, 22, 90–93.
- [16] Ji, X.; Ivers, H.; Beaulieu-Bonneau, S.; Morin, C.M. Complementary and alternative treatments for insomnia/insomnia-depression anxiety symptom cluster: Meta-analysis of English and Chinese literature. *Sleep Med. Rev.* 2021, 58, 101445.
- [17] Tilburt, J.C.; Kaptchuk, T.J. Herbal medicine research and global health: An ethical analysis. *Bull. World Health Organ.* 2008, 86, 594–599.
- [18] Gasparini, M.; Aurilia, C.; Lubian, D.; Testa, M. Herbal remedies and the self-treatment of stress: An Italian survey. *Eur. J. Integr. Med.* 2016, 8, 465–470.
- [19] Kinrys, G.; Coleman, E.; Rothstein, E. Natural remedies for anxiety disorders: Potential use and clinical applications. *Depress. Anxiety* 2009, 26, 259–265.
- [20] Leach, M.J.; Page, A.T. Herbal medicine for insomnia: A systematic review and meta-analysis. *Sleep Med. Rev.* 2015, 24, 1–12.
- [21] Pollack, M. H., Otto, M. W., Roy-Byrne, P. P., Coplan, J. D., Rothbaum, B. O., Simon, N. M., et al. [2008]. Novel treatment approaches for refractory anxiety disorders. *Focus*, 6, 486–495.
- [22] Ravindran, L. N., & Stein, M. B. [2010]. The pharmacologic treatment of anxiety disorders. *Journal of Clinical Psychiatry*, 71, 839–854.
- [23] Bakish, D., Hooper, C. L., West, D. L., Miller, C., Blanchard, A., & Bashir, F. [1995]. Moclobemide and specific serotonin re-uptake inhibitor combination treatment of resistant anxiety and depressive disorders. *Human Psychopharmacology: Clinical and Experimental*, 10, 105–109.
- [24] Goddard, A. W., Brouette, T., Almai, A., Jetty, P., Woods, S. W., & Charney, D. [2001]. Early coadministration of clonazepam with sertraline for panic disorder. *Archives of General Psychiatry*, 58, 681–686.
- [25] Otto, M. W., McHugh, R. K., Simon, N. M., Farach, F. J., Worthington, J. J., & Pollack, M. H. [2010]. Efficacy of CBT for benzodiazepine discontinuation in patients with panic disorder: further evaluation. *Behaviour Research and Therapy*, 48, 720–727
- [26] Feltner, D. E., Wittchen, H.-U., Kavoussi, R., Brock, J., Baldinetti, F., & Pande, A. C. [2008]. Long-term efficacy of pregabalin in generalized anxiety disorder. *International Clinical Psychopharmacology*, 23, 18–28.
- [27] Urschel, H. C., Hanselka, L. L., & Baron, M. [2011]. A controlled trial of flumazenil and gabapentin for initial treatment of methylamphetamine dependence. *Journal of Psychopharmacology*, 25, 254–2.
- [28] Davidson, J. R. T., DuPont, R. L., Hedges, D., & Haskins, J. T. [1999]. Efficacy, safety, and tolerability of venlafaxine extended release and buspirone in outpatients with generalized anxiety disorder. *Journal of Clinical Psychiatry*, 60, 528–535.
- [29] Loi, M.C.; Maxia, L.; Maxia, A. Ethnobotanical Comparison Between the Villages of Escolca and Lotzorai [Sardinia, Italy]. *J. Herbs Spices Med. Plants* 2005, 2005, 67–84.
- [30] Foddìs, C.; Maxia, A. Le piante utilizzate nella medicina popolare dell'Ogliastra [Sardegna centro-orientale] per la cura delle patologie del sistema muscolo-scheletrico. *Rend. Semin. Fac. Sci. Univ. Cagliari* 2006, 76, 17–28.
- [31] Sanna, C.; Ballero, M.; Maxia, A. Le piante medicinali utilizzate contro le patologie epidermiche in Ogliastra [Sardegna

Journal of Coastal Life Medicine

- centroorientale]. *Atti Soc. Toscana Sci. Nat. Mem. Ser. B* 2006, 113, 73–82.
- [32] Vitalini, S.; Iriti, M.; Puricelli, C.; Ciuchi, D.; Segale, A.; Fico, G. Traditional knowledge on medicinal and food plants used in Val San Giacomo [Sondrio, Italy]—An alpine ethnobotanical study. *J. Ethnopharmacol.* 2013, 145, 517–529.63
- [33] Mattalia, G.; Söukand, R.; Corvo, P.; Pieroni, A. Dissymmetry at the Border: Wild Food and Medicinal Ethnobotany of Slovenes and Friulians in NE Italy. *Econ. Bot.* 2020, 74, 1–14.
- [34] Motti, R.; Bonanomi, G.; Emrick, S.; Lanzotti, V. Traditional Herbal Remedies Used in women's Health Care in Italy: A Review. *Hum. Ecol.* 2019, 47, 941–972
- [35] Vitalini, S.; Puricelli, C.; Mikerezi, I.; Iriti, M. Plants, people and traditions: Ethnobotanical survey in the Lombard Stelvio National Park and neighbouring areas [Central Alps, Italy]. *J. Ethnopharmacol.* 2015, 173, 435–458.
- [36] Abourashed, E.A.; Koetter, U.; Brattstrom, A. In vitro binding experiments with a Valerian, hops and their fixed combination extract to selected central nervous system receptors. *Phytomedicine* 2004, 11, 633–638.
- [37] Aoshima, H.; Takeda, K.; Okita, Y.; Hossain, S.J.; Koda, H.; Kiso, Y. Effects of beer and hop on ionotropic gamma-aminobutyric acid receptors. *J. Agric. Food Chem.* 2006, 54, 2514–2519.
- [38] Mautone, M.; De Martino, L.; De Feo, V. Ethnobotanical research in Cava de' Tirreni area, Southern Italy. *J. Ethnobiol. Ethnomed.* 2019, 15, 50.
- [39] Guarrera, P.M.; Forti, G.; Marignoli, S. Ethnobotanical and ethnomedicinal uses of plants in the district of Acquapendente. *J. Ethnopharmacol.* 2005, 96, 429–444.
- [40] Menale, B.; De Castro, O.; Cascone, C.; Muoio, R. Ethnobotanical investigation on medicinal plants in the Vesuvio National Park. *J. Ethnopharmacol.* 2016, 192, 320–349.
- [41] Buchbauer, G.; Jirovetz, L.; Jager, W.; Dietrich, H.; Plank, C. Aromatherapy: Evidence for sedative effects of the essential oil of lavender after inhalation. *Z. Nat. C* 1991, 46, 1067–1072.
- [42] Bradley, B.F.; Starkey, N.J.; Brown, S.L.; Lea, R.W. Anxiolytic effects of *Lavandula angustifolia* odour on the Mongolian gerbil elevated plus maze. *J. Ethnopharmacol.* 2007, 111, 517–525.
- [43] Shaw, D.; Annett, J.M.; Doherty, B.; Leslie, J.C. Anxiolytic effects of lavender oil inhalation on open-field behaviour in rats. *Phytomedicine* 2007, 14, 613–620.
- [44] Gasparetto, J.C.; Martins, C.A.; Hayashi, S.S.; Otuky, M.F.; Pontarolo, R. Ethnobotanical and scientific aspects of *Malva sylvestris* L.: A millennial herbal medicine. *J. Pharm. Pharmacol.* 2012, 64, 172–189.
- [45] Geraci, A.; Amato, F.; Di Noto, G.; Bazan, G.; Schicchi, R. The wild taxa utilized as vegetables in Sicily [Italy]: A traditional component of the Mediterranean diet. *J. Ethnobiol. Ethnomed.* 2018, 14, 14
- [46] Savo, V.; Giulia, C.; Maria, G.P.; David, R. Folk phytotherapy of the Amalfi Coast. *J. Ethnopharmacol.* 2011, 135, 376–392.
- [47] Lucchetti, L.; Zitti, S.; Taffetani, F. Ethnobotanical uses in the Ancona district. *J. Ethnobiol. Ethnomed.* 2019, 15, 9.
- [48] Yang, B.; Liu, P. Composition and health effects of phenolic compounds in hawthorn [*Crataegus* spp.] of different origins. *J. Sci. Food Agric.* 2012, 92, 1578–1590.
- [49] Mann, C.; Staba, E.J. The chemistry, pharmacology, and commercial formulations of Chamomile. *J. Herbs Spices Med. Plants* 1986, 1, 235–280.
- [50] Medina, J.H.; Viola, H.; Wolfman, C.; Marder, M.; Wasowski, C.; Calvo, D.; Paladini, A.C. Neuroactive flavonoids: New ligands for the Benzodiazepine receptors. *Phytomedicine* 1998, 5, 235–243.
- [51] WCSP World Checklist of Selected Plant Families. Facilitated by the Royal Botanic Gardens. Available online: <http://wcsp.science.kew.org/> [accessed on 21 April 2021]s.
- [52] Guarrera, P.M. Food medicine and minor nourishment in the folk traditions of Central Italy [Marche, Abruzzo and Latium]. *Fitoterapia* 2003, 74, 515–544.
- [53] Vitalini, S.; Tome, F.; Fico, G. Traditional uses of medicinal plants in Valvestino [Italy]. *J. Ethnopharmacol.* 2009, 121, 106–116.
- [54] Miraj, S.; Azizi, N.; Kiani, S. A review of chemical components and pharmacological effects of *Melissa officinalis* L. *Der Pharm. Lett.* 2016, 8, 229–237.

Journal of Coastal Life Medicine

- [55] Pignatti, S. Flora D'italia; Edagricole: Bologna, Italy, 1982; Volume II.
- [56] Masihuddin, M.; Jafri, M.A.; Siddiqui, A.; Chaudhary, S. Traditional uses, phytochemistry and pharmacological activities of papaver somniferum with special reference of unani medicine an updated review. *J. Drug Deliv. Ther.* 2018, 8, 110–114.
- [57] Bruni, A.; Ballero, M.; Poli, F. Quantitative ethnopharmacological study of the Campidano Valley and Urzulei district, Sardinia, Italy. *J. Ethnopharmacol.* 1997, 57, 97–124.
- [58] Pieroni, A.; Quave, C.L. Traditional pharmacopoeias and medicines among Albanians and Italians in southern Italy: A comparison. *J. Ethnopharmacol.* 2005, 101, 258–270.
- [59] Grauso, L.; de Falco, B.; Motti, R.; Lanzotti, V. Corn poppy, *Papaver rhoeas* L.: A critical review of its botany, phytochemistry and pharmacology. *Phytochem. Rev.* 2020, 20, 227–248.
- [60] Jiang, X.; Zhang, J.C.; Liu, Y.W.; Fang, Y. Studies on chemical constituents of *Valeriana officinalis*. *J. Chin. Med. Mater.* 2007, 30, 1391–1393.
- [61] Janot, M.M.; Guilhem, J.; Contz, O.; Venera, G.; Cionga, E. Contribution to the study of valerian alkaloids [*Valeriana officinalis*, L.]: Actinidine and naphthyridylmethylketone, a new alkaloid [author's transl]. *Ann. Pharm. Fr.* 1979, 37, 413–420.
- [62] Torssell, K.; Wahlberg, K. Isolation, structure and synthesis of alkaloids from *Valeriana officinalis* L. *Acta Chem. Scand.* 1967, 21, 53–62.
- [63] Nandhini, S.; Narayanan, K.B.; Ilango, K. *Valeriana Officinalis*: A review of its traditional uses, phytochemistry and pharmacology. *Asian J. Pharm. Clin. Res.* 2018, 11, 36–41.
- [64] Aguirre-Hernández, E.; González-Trujano, M.; Terrazas, T.; Herrera Santoyo, J.; Guevara-Fefer, P. Anxiolytic and sedative-like effects of flavonoids from *Tilia americana* var. *mexicana*: GABAergic and serotonergic participation. *Salud Ment.* 2016, 39, 37–46.
- [65] Heinrich, M.; Kufer, J.; Leonti, M.; Pardo-de-Santayana, M. Ethnobotany and ethnopharmacology—Interdisciplinary links with the historical sciences. *J. Ethnopharmacol.* 2006, 107, 157–160.
- [66] Motti, R.; Motti, P. An Ethnobotanical Survey of Useful Plants in the Agro Nocerino Sarnese [Campania, Southern Italy]. *Hum. Ecol.* 2017, 45, 865–878.
- [67] Palmese, M.T.; Uncini Manganelli, R.E.; Tomei, P.E. An ethno-pharmacobotanical survey in the Sarrabus district [south-east Sardinia]. *Fitoterapia* 2001, 72, 619–643.
- [68] Diego, M.A.; Jones, N.A.; Field, T.; Hernandez-Reif, M.; Schanberg, S.; Kuhn, C.; McAdam, V.; Galamaga, R.; Galamaga, M. Aromatherapy positively affects mood, EEG patterns of alertness and math computations. *Int. J. Neurosci.* 1998, 96, 217–224.
- [69] Park, M.K.; Lee, E.S. The effect of aroma inhalation method on stress responses of nursing students. *J. Korean Acad. Nurs.* 2004, 34, 344–351.