Review Article

International Journal of Indigenous Herbs and Drugs
Content Available at www.saap.org.in ISSN: 2456-7345

A REVIEW ON HERBAL DRUGS USED IN PARKINSON'S DISEASE

Badri Sireesha[1*], P.Kavitha[2], P.Usha[2], M.Harika[2], B.Venu[2], K.Immanuel[2], C.Lalitha[2]

[*1] Assistant professor, Sankar Reddy Institute of Pharmaceutical Sciences, Salakalaveedu(V), Bestavaripeta (M), Prakasam (D), Pincode-523370

[2] B.Pharmacy, Sankar Reddy Institute of Pharmaceutical Sciences, Salakalaveedu(V), Bestavaripeta (M), Prakasam (D), Pincode-523370

Article Info

Article History
Received on: 02-08-2023
Revised on: 25-08-2023
Accepted on: 13-09-2023

Abstract

Parkinson's disease (PD) is the world's most widespread chronic neuron degenerative motion condition affecting more than 10 million people. The characteristic hallmark of PD involves a progressive loss of doperminergic neuron in the brain's Subetantia Nigra. Considerable Beware of this paid recently to the Bio-friendly Usage plant-based products for neuron prevention, cure and treatment Disease and is degenerative. The herbal drugs therefore are safer than other drugs. Herbal medicine has its roots in ancient civilizations. It includes the usage of medicinal plants to cure disease and enhance general wellbeing. Keywords: Parkinson, Herbal Drug Treatment, Ayurveda.

Keywords: Parkinson, Herbal Drug, Treatment, Ayurveda, medicinal plants.

***Corresponding Author**
Badri Sireesha

DOI: https://doi.org/10.46956/ijihd.v8i5.486

Production and Hosted By
www.saap.org.in

Introduction

Parkinsonism describes a syndrome of Parkinson's disease (PD) it is a chronic neurodegenerative disorder characterized by the progressive loss of dopaminergic neurons of substantia nigra pars compacta in the ventral midbrain. The loss of dopaminergic neurons, leads to the reduction of dopamine being released into the striatum. These processes are then responsible for the clinical features of PD including bradykinesia, resting tremor, rigidity, and difficulty in initiating movements [1]. Mutations in the α-synuclein or Parkin gene have been associated with familial PD 2, 3. The prevalence of Parkinson's disease in industrialized countries is estimated at 0·3% of the general population and about 1% of the population older than age 60 years 4, 5. People of all ethnic origins can be affected, and men are slightly more prone to the disorder6, 7. In 1817 James Parkinson first described as paralysis agitans or shaking palsy, the term "Parkinson's disease" being coined later by Jean-Martin Charcot in 19th century [1].

Parkinson's disease is a chronic midbrain Substantia nigra neurological disorder. Dopaminergic neuron is gradually degenerated and causes reduction of the dopaminergic level in Striatum. Tremor, dyskinesia, myotonia and so on are the signs Watched mostly in the individual suffering from the disease.

History

However, the pathogenic factors discovered in the majority of Parkinson's disease patients have yet to be verified. The majority of contemporary opinions believe that fibrillation and aberrant α-synuclein aggregation are the primary components in the PD clinical occurrences. Many factors, including oxidative stress and intermediate oligomer conformation, play important roles in the pathogenesis of Parkinson's disease in different metabolic pathways. Furthermore, the existence of Lewy bodies (LBs) made up of α-synuclein is a significant pathological marker of PD. As a result, α-synuclein may be linked to PD (Stefanis, 2016; Zhang et al., 2017a; Zhang et al., 2017b; Sharma et al., 2019a; Rahman et al., 2022a). Furthermore, a growing body of evidence suggests that many common molecular signaling pathways are linked to the development and progression of Parkinson's disease, thanks to recent and updated developments in life sciences technologies, as well as ongoing in-depth

research on proteomics and molecular biology. The phosphoinositide 3-kinase/protein kinase B pathway is the most important of them (Nakaso et al., 2008; Quesada et al., 2008), the nuclear factor erythriod2-related factor2 (Williamson, 2012; Wang et al., 2014), the P38 mitogen activated protein kinase (Wilms et al., 2003; Corrêa and Eales, 2012), the glycogen synthase kinase-3b (Wu et al., 2007; Duka et al., 2009; Golpich et al., 2015), the c-jun-N-terminal kinase (Hunot et al., 2004; Kuan et al., 2005), the nuclear transcription factor-κB (NF-κB) (Uberti et al., 2004; Noda et al., 2005), the Want signaling pathway (Berwick and Harvey, 2012; Arenas, 2014), and the autophagy lysosome pathway (Xilouri et al., 2008; Xilouri and Stefanis, 2011). This article discusses newly identified natural compounds having substantial anti-PD capabilities, as well as the current state of research into their medicinal chemistry [2].

Causes

The exact cause of disease is still a mystery, But many pathogenetic factors such as oxidative stress, free radical formation, mitochondria dysfunction, apoptosis, neuroinflammation [9,10], and genetic susceptibility [11] are critically involved in PD. Certain endogenous or exogenous toxins such as 6-hydroxydopamine and 1-methyl-4-phenyl-1,2,3,6- tetrahydropyridine [12,13], rotenone, Paraquat, Maneb, manganese, toluene, NHexane, carbonmonoxide, Mercury, Cyanide, Copper, Lead and Trichloroethylene [10,14], certain medications, viral infection, Alzheimer's disease, amyotrophic lateral sclerosis (ALS), Creutzfeldt-Jakob disease, Wilson's disease and Huntington's disease [15], Administration of dopamine directly into brain and cell loss in the dopaminergic nigrostriatal tract of the brain [16,11], ageing 17 causes the parkinsonism.

Symptoms

The four primary symptoms of Parkinson's disease are tremor or trembling; rigidity; bradykinesia and postural instability. other symptoms and various non-motor features includes abdominal cramps, disturbed sleep, walk, talk, co-ordinate movements, shuffling gait, digestion, emotion, blood pressure, fixed facial expression, lack of blinking, and micrographia, autonomic dysfunction, cognitive, psychiatric changes, sensory symptoms, Seborrhea and Muscle atrophy [18].

Depression

Epidemiological studies are regarded as a common non-motor discovery in PD and prevalence calculations range from 2.7 percent to 70 percent. The degree of depression (moderate to serious) and the definition of depression undoubtedly influence these figures. Estimates dispute PD age and depresence, as well as the period of disease, severity of disease, and gender problems (Olanow et al., 20012001; Burn, 2002). Neurochemical and neuroimaging approaches have been appraised in the functions of dopamine, norepinephrine and serotonin, although no definite pathophysiological mechanism is recognized [3]. A function was proposed for an allelic variant in the serotonin transporter (Mössner et al.,2001).

Diagnosis

Parkinson's disease is mainly diagnosed clinically, The clinical diagnosis includes normal ageing, essential tremor, drug-induced parkinsonism, the Parkinson-plus syndromes, vascular parkinsonism, and normal pressure hydrocephalus [19]. Less common entities with parkinsonism dopa-responsive dystopia20 juvenile-onset Huntington's disease, pallidopontonigral degeneration.21 In atypical cases neuroimaging and laboratory test are necessary MRI, EEGs, PET,CT and SPECT 22,23,24 . Laboratory Tests can include blood tests, such as a complete blood count (CBC), a chemistry panel, urin analysis, and blood glucose testing. An EKG may also be done to help evaluate the heart.

Treatment Using Synthetic Drugs Includes

Levodopais the first line treatment for parkinsonism, is a metabolic precursor of dopamine that is decarboxylated to dopamine within the presynapticterminals of dopaminergic neurons in the stratium, responsible for the therapeutic effectiveness of the drug in Parkinsons'disease, Peak concentrations of the levodopa in plasma is between 0.5 and 2 hours after an oral dose with the half-life of 1 to 3 hours it is combined with a peripheral dopa decarboxylase inhibitor, either carbidopa or benserazide, which diminishes the peripheral side effects and also combined with plus dopa decarboxylase inhibitor entacapone (inhibitor of COMBT) to inhibit its degradation, About 80% of patients show initial improvement with levodopa , particularly of rigidity, hypokinesia, tremor and bradykinesia, and about 20% are restored virtually to normal motor function.

Selegilinee is a MAO inhibitor that is selective for MAO-B, Inhibition of MAO-B protects dopamine from intraneuronal degradation, thus decreases the metabolism of dopamine and has been found to increase dopamine levels in the brain and was initially used as an adjunct to the levodopa [25].

Dopamine receptor agonistsBromocriptine, an ergot derivative, and few newer, nonergot drugs, ropinirole, pramipexole, rotigotine and Apomorphine. Bromocriptine inhibits the release of prolactin from the anterior pituitary gland, its duration of action is longer (plasma half-life 6-8 hours) than that of levodopa. Newer dopamine receptor agonists include lisuride, pergolide, ropinirole, cabergoline and pramipexole. They are longer acting than levodopa and need to be given only once or twice daily, with fewer tendencies to cause dyskinesias and on-off effects. Apomorphine are available in injectable and transdermal delivery systems respectively, meant to be used for the acute management of the hypomobility phenomenon, alleviate the motor deficits in both levodopa patients [4].

Herbal Treatment

The herbs which shows the significant effect in treating parkinsonism are described below: Acanthopanax senticosus Harms; (family: Alariaceae) Takahiko Fujikawa

et al found that 100% ethanol, 50%ethanol and hot water extract of Acanthopanax senticosus stem bark at dose of 250mg/kg p.o shows prophylactic effect on behavioral dysfunction of Parkinsonism such as bradykinesia, Catalepsy, depression by significant increase in the Dopamine level in the striatum or action in midbrain and also shows the cytoprotection in the SN and VTA during long term exposure to a neurotoxin by strikingly inhibiting the depletion of DA cells in that parts by specific activity in the nigrostriatal DAergic system. The extract is administered orally for 2 weeks before IP administration of MPTP and 2 weeks along with the MPTP [27]. Withania somnifera; (Family: Solanaceae); Syn: Physalis somnifera Sankar Surendran et al studied the effect of extract of withania somnifera root on parkinsonism. Animals are treated with root extract for 7 days and 28 days after 4 days after treating with MPTP. The extract at the dose of 100mg/kg shows significant improvement in motor neurons function, catecholamines, potential antioxidant levels and prevent lipid peroxidation ie. reduced elevated levels of TBARS [28]. Uncaria rhynchophylla; (family: Rubiaceae) Myung Sook Oh et al provided the scientific basis to support the traditional use of the Uncaria rhynchophylla in Parkinson's disease.

Thuja orientalis (Family: Cupressaceae); Syn: Biota orientalis Myung Sook Oh et al reported the protective effects of standardized ethanolic extract of Thuja orientalis leave in SH-SY5Y cells. Pretreatment with doses of 0.1–100 lg/ml in 6-OHDA induced neurotoxicity repressed the neuronal cell death, inhibited excess ROS and NO production and high radical scavenging activity, blocked the cytochrome c release, and caspase-3 activation, suppressed the increased level of ERK phosphorylation and antimitochondrial-mediated apoptosis5. Mucuna pruriens; (Family: leguminosae) ; Syn: Velvet bean A. Pinna et al found that of Mucuna pruriens extract at a dose 16 mg/kg (containing 2 mg/kg of L-DOPA) and 48mg/kg (containing 6 mg/kg of L-DOPA) consistently antagonized the deficit in latency of step initiation, MP extract acutely induced a significantly higher contralateral turning, at dose of 48 mg/kg (containing 6 mg/kg of LDOPA), suggested a significant antagonistic activity on both motor and sensory-motor deficits.

Baicalein

Baicalein is a chemical compound derived from the dried root of the Scutellaria baicalensis plant (Labiatae) (Amro et al., 2018). Baicalein prevented the buildup of ROS, apoptosis, ATP depletion and mitochondrial membrane rupture in PC12 cells when tested for rotenone-induced neurotoxicity (Li et al., 2012). Baicalein treatment prevents Dopamine levels in the basal ganglia from dropping and boosts Dopamine and 5-hydroxytryptamine levels (Cheng et al., 2008; Mu et al., 2011). In Hela and SH-SY5Y cells, Baicalein inhibited the aggregation of α-synuclein and the production of α-synuclein oligomers (Lu et al., 2011).

Erythrina velutina The ethanol extract of this plant (Fabaceae) has a neuroprotective effect. It has been shown to reduce the neurotoxicity caused by 6-OHDA in SH-SY5Y cells and to get rid of free radicals, which suggests it could be used to treat Parkinson's disease (Silva et al., 2016).

Resveratrol

Resveratrol is a polyphenolic compound present in a variety of plants, including grapes and berries (Frémont, 2000; Rahman et al., 2021a). Resveratrol has been found to help with motor deficits, oxidative stress, and the loss of TH neurons in animal models of Parkinson Disease (Lu et al., 2008). Resveratrol inhibits mitochondrial enlargement and chromatin condensation while also lowering COX-2 and TNF-α gene expression (Jin et al., 2008).

Peganum harmala

Peganum harmala (Nitrariaceae) made muscles less stiff, stopped oxidation of fats and proteins in the brain and stopped dopaminergic neurons from dying off (Rezaei et al., 2016). It is thought that this herb's neuroprotective properties come from its ability to reduce the activity of angiotensin II. This reduces oxidative stress and protects dopaminergic neurons (LopezReal et al., 2005).

Curcuma longa

Curcuma longa (Zingiberaceae) has been shown to have anti-inflammatory, chemotherapeutic, anti-oxidant, woundhealing, anti-proliferative and antiparasitic properties. The active component polyphenolic fraction, curcumin, is probably to blame (Gupta et al., 2012). Curcumin protects MPTP-induced loss of TH-positive neurons and DA depletion in the striatum of MPTP-induced mouse models, as well as a reduction in cytokines, total nitrite, and inflammatory markers such inducible nitric oxide synthase (Ojha et al., 2012).

Carthamus tinctorius L. (Safflower)

Safflower (Asteraceae) has been discovered to contain flavonoids and is widely used as a conventional treatment for cerebrovascular disorders in China (Amro et al., 2018). It increased DA transporter and DJ-1 protein expression as well as DA levels (Ren et al., 2016). Overexpression or aggregation of α-synuclein, as well as reactive astrogliosis, may be inhibited by safflower (Ren et al., 2016).

Pueraria lobata

Puerarin (Fabaceae) has been shown to inhibit proteasomal malfunction as well as the buildup of ubiquitin-conjugated proteins and other potentially hazardous proteins (Amro et al., 2018). On the other hand Puerarin, lowers the ratio of bcl-2/bax and caspase-3 activity (Cheng et al., 2009). Puerarin protects tyrosine hydroxylase (TH)-positive neurons from 6- OHDA-mediated injury, recovers DA and its metabolites (Zhu et al., 2010).

Juglandis semen

The neuroprotective effects of aqueous Juglandis semen (walnut) extract have been demonstrated. The walnut extract was reported to reduce reactive oxygen species (ROS) and nitric oxide (NO) formation as well as restrict the depletion of striatal DA and its metabolites, resulting

in a considerable improvement in PD movement abnormalities in a mouse model of Parkinson's disease (Choi et al., 2016). Walnut is thought to have neuroprotective effects because it can block the monoamine oxidase B (MAO-B) enzyme, which increases oxidative stress in people with Parkinson's disease. Walnut also has antioxidant and mitochondrial protection properties (Essa et al., 2015) [6].

Ginkgo biloba

Ginkgo biloba (Ginkgoaceae) is a Chinese tree that has long been used to treat symptoms related to heart and lung problems. Flavonoids, ginkgolic acid and terpenoids are three of the most common constituents in G. Biloba (DeFeudis and Drieu, 2000). In a PD rat model treated with 1-methyl-4-phenyl-1,2,3,6- tetrahydropyridine (MPTP), long-term use of EGb761 prevented the loss of dopaminergic nerve terminals caused by MPTP (Ramassamy et al., 1990). EGb761 was shown to protect against dopaminergic neurotoxicity caused by MPTP whether it was given before or after the treatment (Sharma et al., 2019b). Also, EGb761 decreased the neurotoxicity of levodopa in the 6-hydroxydopamine (6-OHDA) Parkinson's disease (PD) model. This suggests that levodopa is neurotoxic and that EGb761 may reduce this toxicity (Fei et al., 2003).

Ginseng

Ginsenosides (Araliaceae) Rb1 and Rg1 are regarded to be the primary molecules responsible for ginseng's therapeutic properties. A previous study found that the ginsenosides.

Multifunction Role of Natural Products for the Treatment of Parkinson's Disease

Natural substances originating from plants have long been used to treat neurodegenerative disorders (NDs). Parkinson's disease (PD) is a ND. The deterioration and subsequent cognitive impairments of the midbrain nigral dopaminergic neurons distinguish by this characteristic.Anti-Parkinson drugs like dopamine (DA) agonists, levodopa, carbidopa, monoamine oxidase type B inhibitors and anticholinergics are used to replace DA in the current treatment model. Surgery is advised in cases where drug therapy is ineffective.

Chinese Medicines

In the literature studies, it was found that many Chinese medicines and formulation have been used in the treatment of parkinsonism. This includes:- Zhen-Wu-Tang consists of the Radix Paeoniae Alba (30 g), Rhizoma Atractylodis Macrocephalae (10 g), Rhizoma Typhonii Preparata (10 g), Poria (10 g), Rhizome Zingiberis Recens (10 g), at dose of 8 and 16mg/kg/day for 2 weeks45 . Bak Foong Pills consists of Panax ginseng, Renshen; Angelica sinensis, Danggui; Glycyrrhiza uralensis, Gancao; and Ligusticum chuanxiong.

Ayurvedic Formulation

Now a day's ayurvedic formulations are also commonly used for the prevention and treatment of parkinsonism, formulation includes Zandopa (Mucuna pruriens). The medicines having Cognition enhancing activity can also be used for anti-parkinsonian activity, it includes BR-16A (Mentat), Brahmi (Bacopa monnieri), Mandukaparni (Centella asiatica), Ashvagandha (Withania somnifera), Vishnukrantha (Evolvulus alsinoides), Jatamansi (Nardostachys jatamansi), Vacha (Acorus calamus), Jyotishmati (Celastrus paniculatus) and Sunthi (Zingiber officinale), Tagara (Valeriana wallichii), Vatadha (Prunus amygdalus), Salabmisri (Orchis mascula), Lavanga (Syzygium aromaticum) and Mukta pishti [7].

Herbal Extract and Active Component with Anti-Parkinsonian Activities

The herbal medicines were listed in table 1, which, according to their families, species and part of the plant used in treatment, have been shown to be effective optained.

1.Acanthopanax

Acanthopanax from A. Senticosus Harms protects C57BL/6 mice against dopaminergic MPTP-induced neuronal damage. B-side Eleuthero, a part of A. Senticosus Harms protects the PC12 cells from MPP (+) damage 2. Sesamin, a part of A. Senticosus Harms has a protective impact on the behavioral instability of rotenone-induced rat model and picomolar concentrations of sesamine-induced neuronal PC12 cells from cell death-induced MPP+ 3. Stem bark extract is successful in raising DA and noradrenaline rates in the MPTP-induced PD rat model 4.

2. Chrysanthemum

The indicum Chrysanthemum L. The extract is protective against lipopolysaccharide-induced cytotoxicity in SH-SY5Y cellular model and BV-2 microglial cells of Parkinson's disease and 1-methyl-4-phenylpridinium ion 5. Inhibits the mitochondrial apoptotic process, suppresses ROS aggregation, greatly increases the ratio elevation of Bax / Bcl-2 in SH-SY5Y cells and decreases SH-SY5Y cell death [8].

3. Withania somnifera

Withania somnifera is commonly used as the Ashwagandha ginseng, Indian. Ashwagandha mitigates the Alterations of movement output and inflammatory neuronal biomarkers in a paraquat-induced rat model of Parkinson's disease7. In rotenone formula, Ashwagandha decreases the brain's oxidative stress and with the higher dosage, certain parameters such as nitric oxide have been normalized 8. Oxidative status in the brain has been enhanced in 6-OHDA, Ashwagandha root attenuate Corresponding improvements in motor efficiency 9 and in MPTP toxicity in mice 10. Pretreatment with leaf extract showed attenuation of cortex and striatum and physical performance oxidative changes in MPTP toxicity.

4. Trifolium

Red clover extract applies to the pre-tense plant known as Trifolium. Iso-flavones: red clover- Pratensein, formononetin and daidzein help to protect the nerves from dopaminergic LPS-induced neuronal damage12. Biochanin A, an estrogenic red clover bioflavonoids, improves the consumption of dopamines13. Red clover extract slightly lesson the scale of the lesion [9].

5. Tripterygium

Common Threewingnut Root (CTR) is a dried root of Tripterygium wilfordii Hook F. CTR extract protects dopaminergic neurons against lipopolysaccharide-induced inflammatory Dismissal [14].

6. Nardostachys

Nardostachys jata-mansi is a Valerian flowering plant. In6-OHDA model of Parkinson's disease, Nardostachys jatamansi extract has neuroprotective effects shown by increased D2 receptor population in striatum, decreased SOD behavior, CAT. Pretreatment with Nardostachys. The jatamansi Recover strongly GSH and heighten density of THIR fiber [10].

7. Mucuna

Mucuna pruriens (MP) has long been used as a tool in the diagnosis of Parkinson's disease in Indian herbal medicineCompared to levodopa in the lesion edrate model 6- hydroxydopamine (6-OHDA) of Parkinson's disease Mucuna pruriens Displayed higher anti-Parkinson activity16. This natural source of l-dopa can take control advantages in the long-term maintenance of PD over traditional l-dopa preparations17. Similar to estrogen in the PD. Mucuna pruriens therapy model of 1-methyl-4-phenyl-1,2,3,6- tetrahydropyridine (MPTP), all the defects caused by MPTP have Were restored with further success than those of estrogen [18].

8. Bacopa

Bacopa monnieri pretreatment of dopaminergic N27 cell lines demonstrated reduction of ROT-induced oxidative stress and cell death (in rotenone-Motivated mouse model), normalization of oxidative marker rates (ROS, malondialdehyde and hydroperoxide rates), restoration of

GSH levels, dopamine levels, cytosolic antioxidant enzyme activity levels and neurotransmitter function 19. It offered for defense rotenone-induced oxidative stress in the Drosophila model and prevented dopamine degradation in flies (by reducing mortality occurrence and doing better in a negative geotaxis assay). In a bioassay for paraquatoxidative tension it confers sometimes tremendous resistance [11].

9 Gynostemma

Gynostemma pentaphyllum herbal ethanol extract demonstrates neuroprotective effects on PD type 6-OHDAlesioned rat 21. Gypenosides, The G's saponins. Pentaphyllum, defensive dopaminergic neurons in primary culture or in the extensive PD mouse model against oxidative damage induced by MPP+ 22.

10. Clausena lansium

Clausena lansium is native fruit tree from southern China. Care in progress with Bu-7 a flavonoid from Clausena lansium leaves, decreased apoptosis induced by rotenone, mitochondrial potentialand Added protein phosphorylation induced by rotenone [23].

11. Cynodon

The traditional use of cynodon dactylon is in Ayurveda. Cynodon dactylon 's anti-Parkinson activity attenuated the motor defects and shielded the brain from oxidative stress in the PD model of rotenone-induced Parkinson's rats. 24. Cynodon extract dactylontested for its toxicity to the viability of the PC12 cell line and its antioxidant activity, the plant displayed no toxic effects on the viability of the PC12 cell line and demonstrated Stark antioxidant activity [12].

12. Centella

Centella asiatica (Gotu Kola) is an Ayurvedic traditional medicine. Centella asiatica is protective against Parkinsonism Induced by MPTP. This works according to showing antioxidant involvement in brain area of the hippocampus and corpus striatum. The extract decreases the amount of protein carbonyls, lipid peroxidation and Upgrades dimutase of superoxides, xanthine oxidase, glutathione peroxidase, catalase and complete antioxitants.

13. Ocimum

Ocimum tenuiflorum or tulasi (Ocimum sanctum). Ocimum sanctum leaf extract has a neuroprotective effect on a catalepsy caused by haloperidol in albino mice. O. Sanctum extract has a neuropro-tective effect on parkinsonism induced by rotenone and a catalepsy induced by haloperidol in rats and muscle rigidity in mice [13].

14. Plumbago

The Plumbago scandens is a plumbago genus. Plumbago's crude ethanolice extract and complete acetate fraction works against Parkinsonism by reducing locomotive operation, catalepsy, and palpebral ptosis.

15. Hypericum

Hypericum in PC12 cells, an extract of Hypericum perforatum L, abundant in flavonoids. Has beneficial influence on H2O2-inducing apoptosis. In rat model rotenone-induced PD, the extract decreases oxidative stress and improves antioxidant enzyme gene expression. This shows neuromodulating activity in mice m odel MPTP- induced PD [29. Hypericum perforatum extract and bromocriptine com-bination shows substantial reduction in lipid peroxidation against MPTP-induced neurotoxicity in mice and Growing in dopamine rates, DOPAC rates of antioxidant status 30. Acomponent from Hypericum in PC12 cells. Pernatum L. Hyperoside has the antioxidant properties of tert-butyl hydroperoxide and H2O2 mediated cytotoxicity [14].

16. Alpinia

Alpinia Fructus Alpiniae Oxyphyllae (dried, ripe seed of Alpiniaoxyphylla Miq) extract has a protective effect on neuronal injury induced by 6-OHDA by anti-inflammatory (gene expression Down streaming of IL-1 and TNF-) and anti-oxidant action (in PC12 cells by NO production inhibition and iNOS expression)32. Proto-catechuic acid.

17.Cassia

Cassia Cassiae Semen is the seed of dry, mature Cassia obtusifolia L. Tora Cassia L. (Tora C.). Alaternin, a part of C. Tora has powerous peroxynitrite-scavenging, stated to be PD, and attenuates neuronal cell death from transient cervical hypoper fusion in mice35. Cassiae Semen extract has beneficial properties in PD models of 6-OHDA-induced neurotoxicity in PC12 cells and MPTP-induced neuronal degeneration in the PD form of the mouse, as well as seed extract in hippocampalcultures of the mouse [15].

18. Polygonum

The dried root and rhizome of the Polygonum cuspidatum Sieb is Polygoni Cuspidati Rhizoma Et Radix. The Zucc. Naphthoquinone, 2-methoxy-6-acetyl-7-methyljuglone from Polygonum cuspidatum driedrhizome has defensive, antioxidative, and antiapoptotic activity in PC12 cells 37. Resveratrol, a part of Polygonum cuspidatum has

protective impact in nigral cells of Parkinsonian rats 38. An entire grape extract (Vitis vinifera) and Poly-gonum cuspidatum revealed dose-dependent scavenging effects on reactive oxygen species. A major increase in climbing ability and extensionin average lifespan in transgenic Drosophila Parkinson's disease model proved to be a potent free radical scavengerand mitochondrial defender [16].

19. Gastrodia

Gastrodiae Rhizoma is Gastrodia elata dried tuber Bl. The Gastrodiae Rhizoma extract has beneficial effects on PP+-induced cytotoxicity in SH-SY5Y cells40. Vanillyl alcohol, a part of Gastrodiae Rhizoma, prevents dopaminergic MN9Dcells from MPP+-induced apoptosis by modulating the apoptotic cycle and relieving oxidative stress.

20. Gynostemma

Gynostemma pentaphyllum herbal ethanol extract demonstrates neuroprotective effects on PD type 6-OHDAlesioned rat42. Gypenosides, The G's saponins. Pentaphyllum, defensive dopaminergic neurons in primary culture or in the extensive PD mouse model against oxidative damage induced by MPP [17].

21. Ginkgo Ginkgo Folium is Ginkgo biloba L's entire, dried leaf. In software PD mice G. Biloba 761 attenuates the neuro degeneration of the nigrostriatal pathway induced by MPTP and has an inhibitory effect on oxidative stress 44. In Cells of PC12, G. Biloba extract has protective effects against 6- hydroxydopamine induced parkinsonism on paraquatinduced apoptosis and PD rat model.

22. Panax

The dry root and rhizome of Panax ginseng C is Ginseng Radix Et Rhizoma. Mey, A. Mey. Ginseng extract G115 has been significantly pro-tected against neurotoxic effects of MPTP and MPP+ in rodents. Ginseng saponins have enhanced the growth of dopaminer-gic neuroblastoma cells SK-N-SH.18

Disorder Associated

1. Supranuclear palsy PSP and CBD are the two most frequent tauopathic PD. PSP affects 6.4 persons out of 100,000 (Ikram et al., 2021). Initiating age is an average of 63, males are most affected and survival time is 6–7 years (Wenning et al., 1998). PSP is defined by the early onset of widespread and stiff reverse dips, as well as supranuclear vision paralysis with slow relative direction and difficulty staring down (Litvan et al., 1996a). The NINDS-SPSP clinical diagnosis for probable PSP are based on vertically supranuclear vision paralysis and noticeable poor balance, which occur within the first year of illness start and have the high selectivity (50–62)%, specificity 100%, and positively useful predictions (Litvan et al., 1996b; Litvan et al., 2003) [19].

2 Multiple system atrophy Sporadic progressive adult diseases, with an incidence of around 4.4 instances per 100,000 population, are multiple system atrophies (Schrag et al., 1999; Watanabe et al., 2002). The existence of at least six of the following functions have been consistently identified for MSA: Sporadic adult-onset, self-representation, parkinsonism, cerebral characteristics, pyramidal symptoms, there is a shortage of levodopa, downward ocular paralysis and cognitive dysfunctions (Litvan et al., 1998). Diagnosis of MSA is missed even at tertiary reference centers, in 50%–75% of cases (Litvan et al., 1997). Nigral and putamen degeneration and degeneration in at least one region are part of pathological diagnostic criteria (Ito et al., 1996).

3. Dementia with LBs or LB disease the second most frequent kind of dementia in advanced age is progressive dementia with LBs, typically accompanied by parkinsonism, good visual hallucinations, and oscillations in cognition, alertness, and concentration (McKeith et al., 1996). DLB is dementia that affects the optical, perceptual, and careful functions of the brain (Collerton et al., 2003). The age at which the DLB begins is 60–68, with an average disease duration of 6–7. Men are more impacted than women (Gualtieri, 2004). DLB diagnostic criteria differ substantially in their sensitivity and specificity and improved criteria are needed (Lopez et al., 2000). Cases with more substantial DLB disease have typical symptoms, whereas cases with larger neurofibrillary tangles are likely to show AD (Ballard et al., 2004). Continuing to work memory issues, visual spatial difficulties, psychotic episodes, melancholy, unconcern, and low mood are among early signs of DLB (Simard et al., 2000) [20].

4. Corticobasal degeneration or degeneration of corticobasal ganglions Degeneration of the corticobasal ganglion is gradual, with unilaterally akinesia and rigidity responding badly to apraxia (especially ideomotor apraxia) and levodopa. Myoclonus of the cerebral reflex, limb rigidity, alien limb signs, and cortical sensory loss is all symptoms (Riley et al., 1990; Stover and Watts, 2001). Despite the fact that there are various requirements for diagnoses were submitted, none were validated and their warnings were explored elsewhere (Litvan et al., 2003). The estimated prevalence per 100,000 individuals is 4.9–7.3 cases (Togasaki and Tanner, 2000). 5.5 PD and sleep disorders .

5. Recurrent PD symptoms and sleep fragmentation Insomnia at night and daytime sleepiness are prevalent among people with PD (Figure 3). 60 to 98 percent of PD patients experience nighttime difficulties (Kales et al., 1971; Lees et al., 1988; Larsen, 2003). 33% of individuals experience moderate to severe sleep difficulties at night (Svensson et al., 2012). The most prevalent complaint of PD patients in nighttime sleep is many nightly awakes or fragmented sleep.

Highlights

1. Parkinson’s disease (PD) is a chronic progressive neurodegenerative disorder.
2. It can be treated with a variety of natural products and bioactive compounds.
3. Extra care should be provided to patients with PD to minimize the risk of infection.

4. Future perspectives like PD vaccine, cell transplantation, gene therapy, and surgical methods are highlighted [21].

Conclusion

There are currently a few plant-derived drugs approved for clinical use. This is largely because most herbal medicines are complex mixtures of chemical components and have diverse biological and pharmacological actions. The information collected in this review on a large number of herbal extracts and constituents that possess therapeutic effects on animal models of parkinsonism may be used in a search for novel pharmacotherapies from medicinal plants for these disorder. The herbal constituents for whom behavioral effects and pharmacological properties have been well characterized may be good candidates for further investigations that may ultimately result in clinical use. Considering the limitations of the available conventional pharmacotherapeutic agents for parkinsonism, particularly the treatment refractoriness, high relapse rates and diverse adverse side effects that occur with long-term treatments, herbal remedies may provide an alternative for patients, especially for those with lingering conditions and intolerance to adverse effects.

It is primarily because the bulk of traditional herbal items are sophisticated combinations of chemical components which have different phytochemical and pharmacological activities.

Funding

No Funding

Conflict of Interest

No Conflict of Interest

Inform Consent and Ethical Considerations

Not Applicable

Author Contribution

All authors are contributed equally.

References

1. Zhang H, Tong R, Bai L, Shi J, Ouyang L. Emerging targets and new small molecule therapies in Parkinson's disease treatment. Bioorganic & medicinal chemistry. 2016 Apr 1; 24 (7):1419-30.
2. Fujikawa T, Miguchi S, Kanada N, Nakai N, Ogata M, Suzuki I, Nakashima K. Acanthopanax senticosus Harms as a prophylactic for MPTP-induced Parkinson's disease in rats. Journal of ethnopharmacology. 2005 Feb 28; 97(2):375-81.
3. Fujikawa T, Kanada N, Shimada A, Ogata M, Suzuki I, Hayashi I, Nakashima K. Effect of Sesamin in Acanthopanax senticosus H ARMS on Behavioral Dysfunction in Rotenone-Induced Parkinsonian Rats. Biological and Pharmaceutical Bulletin. 2005; 28(1):169-72.
4. Huang L, Zhao H, Huang B, Zheng C, Peng W, Qin L. Acanthopanax senticosus: review of botany, chemistry and pharmacology. Die Pharmazie-An International Journal of Pharmaceutical Sciences. 2011 Feb 10; 66 (2):83-97.
5. Sarrafchi A, Bahmani M, Shirzad H, Rafieian-Kopaei M. Oxidative stress and Parkinson's disease: new hopes in treatment with herbal antioxidants. Current pharmaceutical design. 2016 Jan 1; 22(2):238-46.
6. Kartika B, Muralidharan P, Rahman H. Herbal treatment of Parkinsons: A review. International Journal of Pharmaceutical Sciences Review and Research. 2010; 5(3):185-91.
7. Manjunath MJ. Standardized extract of Withaniasomnifera (Ashwagandha) markedly offsets rotenone-induced locomotor deficits, oxidative impairments and neurotoxicity in Drosophila melanogaster. Journal of food science and technology. 2015 Apr 1; 52(4):1971-81.
8. Ittiyavirah SP, Hameed J. Herbs treating Parkinson's disease. Biomedicine & Aging Pathology. 2014 Oct 1; 4(4):369-76.
9. Dar NJ, Hamid A, Ahmad M. Pharmacologic overview of Withaniasomnifera, the Indian ginseng. Cellular and molecular life sciences. 2015 Dec 1; 72(23):4445-60.
10. Flint Beal M. Coenzyme Q 10 as a possible treatment for neurodegenerative diseases. Free Radical Research. 2002 Jan 1; 36(4):455-60.
11. Shinomol GK, Bharath MS. Pretreatment with Bacopa monnieri extract offsets 3-nitropropionic acid induced mitochondrial oxidative stress and dysfunctions in the striatum of prepubertal mouse brain. Canadian journal of physiology and pharmacology. 2012 May; 90(5):595-606.
12. Saviranta NM, Julkunen-Tiitto R, Oksanen E, Karjalainen RO. Leaf phenolic compounds in red clover (Trifoliumpratense L.) induced by exposure to moderately elevated ozone. Environmental Pollution. 2010 Feb 1; 158(2):440-6.
13. Datla KP, Zbarsky V, Rai D, Parkar S, Osakabe N, Aruoma OI, Dexter DT. Short-term supplementation with plant extracts rich in flavonoids protect nigrostriatal dopaminergic neurons in a rat model of Parkinson's disease. Journal of the American College of Nutrition. 2007 Aug 1; 26(4):341-9
14. Liu Y, Chen HL, Yang G. Extract of Tripterygium wilfordii Hook F protect dopaminergic neurons against lipopolysaccharideinduced inflammatory damage. The American journal of Chinese medicine. 2010; 38(04):801-14..
15. Ahmad M, Yousuf S, Khan MB, Hoda MN, Ahmad AS, Ansari MA, Ishrat T, Agrawal AK, Islam F. Attenuation by Nardostachysjatamansi of 6-hydroxydopamine-induced parkinsonism in rats: behavioral,

neurochemical, and immunohistochemical studies. Pharmacology Biochemistry and Behavior. 2006 Jan 1; 83(1):150-60.

16. More SV, Kumar H, Kang SM, Song SY, Lee K, Choi DK. Advances in neuroprotective ingredients of medicinal herbs by using cellular and animal models of Parkinson's disease. Evidence-based complementary and alternative medicine. 2013 Jan 1; 2013.
17. Katzenschlager R, Evans A, Manson A, Patsalos PN, Ratnaraj N, Watt H, Timmermann L, Van der Giessen R, Lees AJ. Mucunapruriens in Parkinson's disease: a double blind clinical and pharmacological study. Journal of Neurology, Neurosurgery & Psychiatry. 2004 Dec 1; 75(12):1672-7.
18. Abdel-Salam OM. Drugs used to treat Parkinson's disease, present status and future directions. CNS & Neurological Disorders-Drug Targets (Formerly Current Drug Targets-CNS & Neurological Disorders). 2008 Oct 1; 7(4):321-42.
19. Ittiyavirah SP, Hameed J. Herbs treating Parkinson's disease. Biomedicine & Aging Pathology. 2014 Oct 1; 4(4):369-76.
20. Hosamani R, Ramesh SR. Attenuation of rotenone-induced mitochondrial oxidative damage and neurotoxicty in Drosophila melanogaster supplemented with creatine. Neurochemical research. 2010 Sep 1; 35(9):1402-12.
21. Choi HS, Zhao TT, Shin KS, Kim SH, Hwang BY, Lee CK, Lee MK. Anxiolytic effects of herbal ethanol extract from Gynostemmapentaphyllum in mice after exposure to chronic stress. Molecules. 2013 Apr; 18(4):4342-56.