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A Review of the Need and Availability of the Medication Used to Treat Parkinson's Disease

Teena[1], Mr. Mohit Rana[2], Dr.(Prof). Kshitij Aggarwal[3]

[1]Corresponding author of this article from Hari College of Pharmacy, Saharanpur, (Uttar Pradesh), Pin Code - 24700
[2]Supervisor (Assistant Professor), Hari College of Pharmacy Saharanpur, (Uttar Pradesh), Pin Code – 247001
[3]Director - Hari college of pharmacy, Saharanpur, (Uttar Pradesh), Pin Code – 247001

ABSTRACT

Parkinson's disease (PD) is the most common progressive neurodegenerative movement disorder affecting more than 10 million people worldwide. The characteristic hallmark of PD involves progressive loss of dopaminergic (DA-ergic) neuron in Substantia Nigra pars compacta (SNpc) region of the brain, however, setiology of the disease still remains unclear. Mitochondrial dysfunction and oxidative insult are considered to be the key culprit. The current therapy available for PD primarily relies on Levodopa that offers the potential of slowing down disease progression to some extent but includes lot of side effects. Any potential drug capable of treating or halting the disease still remains to be identified. It is evident that redox stabilization and replenishment of mitochondrial function seem to be an important therapeutic approach against PD as both are required for optimal neuronal functioning Plants such as Olea europaea, Hypericum perforatum, Ginkgo biloba, Mucuna pruriens, Banisteria caapi, Polygonum cuspidatum, Withania somnifera, Gynostemma pentaphyllum, Glycine max, Trifolium pretense, and Scutellaria baicalensis have been reported to possess anti-Pactivities. Recently, natural compounds such as oleuropein, hyperforin, silymarin, melatonin, resveratrol, baicalin, cistanche total and phenylethanoid glycosides, ginsenoside, salvianolic acid B. salvianic acid A. astaxanthin, triptolide, genistein, biochanin A. luteolin, and others, have been evaluated in vivo for anti-PD and neuroprotective activities. Natural compounds exert their anti-PD effects by inhibiting microglial activation to protect inflammation-mediated degeneration of dopaminergic neurons and by inhibiting proinflammatory factors or superoxide generation. In a nutshell, the review deals with the literature covering use of botanical-derived natural products, either as crude extracts or isolated compounds in monoherbal or polyherbal formulations, having anti-PD activity with notes on source plant, active component, experimental methodology, and ethnopharmacological relevance of anti-PD efficacy of the natural compound.

Keywords: Natural products, alpha synuclein, oxidative stress, neurodegeneration, Parkinson's disease, and mitochondrial dysfunction.

INTRODUCTION

Parkinson's disease (PO), which affects 3% of people over 65 globally, is the second most prevalent neurological condition of the central nervous system (CNS) after Alzheimer's disease .

According to estimates, PD affects 0.3% of people in developed nations Parkinson's disease is named for Dr. James Parkinson, an English surgeon who initially referred to it as "shaking palsy"

In Parkinson's disease (PD), Lewy bodies and ubiquinone protein deposits in the neuronal cytoplasm are linked to a significant decrease in dopamine (DA) content in the striatum and elsewhere, as well as specific degeneration of dopaminergic neurons in the substantia nigra.

The present treatment strategy for Parkinson's disease (PD) has been limited to raising the concentration of the DA-precursor Levodopa (L-DOPA) or increasing the quantity of DA by blocking monoamine oxidase (MAO), which is in charge of converting DA into less-active chemicals [7]. China has a wealth of plant resources. Over 22,500 of the more than 146,900 plant species that have been found nationwide are medicinal (5). PD was treated using a number of herbal medications and formulations that were studied in clinical trials or animal tests.

The use of herbal remedies to cure or prevent Parkinson's disease (PD) has gained more attention in recent years. According to recent research, several of the active ingredients found in herbal medications, extracts, and formulations have an impact on Parkinson's disease models both in vitro and in vivo. This review, which comprised 38 herbal medicines and 11 herbal formulations, aims to give future references for basic and clinical research by methodically summarizing and analyzing the herbal medicines studied in PD models.

Herbal medicine in treating PD:

With the discovery of numerous new medicines and therapeutic approaches, the advancement of PD pharmacological treatment was making significant strides. However, current therapies do not slow the progression of the disease; they simply alleviate its symptoms. Therefore, finding chemicals that can act as neuroprotective agents in PD and lessen the consequences of oxidative stress that causes PD is still important. The following herbs contain these chemicals, according to the literature search:

1) **Scutellaria baicalensis Georgi-**

Baicalensis Scutellaria The Chinese herb Georgi, sometimes called Hengqin, is frequently used as an anti-Parkinson's medication. A common herbal remedy for a number of inflammatory and infectious illnesses is Scutellaria baicalensis. This plant's herbal components are utilized in medicine as antipyretics, antihypertensives, and stroke remedies. This plant's roots contain a variety of flavone chemicals, such as wogonin, baicalin, and baicalein (Li et al., 2005).

One of the main flavonoid components that was extracted from S. baicalensis roots is baicalein. Numerous investigations have demonstrated that this substance possesses strong antioxidant properties, scavenges free radicals, and has been identified as an inhibitor of 12/15 lipoxygenase and xanthine oxidase. Research on baicalein's anti-inflammatory properties revealed that it inhibits the expression of adhesion molecules that are triggered by tumor necrosis factor (TNF-a) and interleukin-1 (IL-B1). According to recent research, baicalein shields nerve tissue from amnesia brought on by amyloid peptide (25–35) and nerve

injury secondary to ischemia. This study shows that baicalein can be an active compound that is useful in the prevention and treatment of neurodegenerative diseases such as Parkinson's disease. (Mu et al., 2009).

2) **Polygonum cuspidatum Sieb, et Zucca**.

A plant called Polygonum cuspidatum Sieb. et Zuca. has long been used in Asian traditional medicine to treat neuropsychiatric conditions like Parkinson's disease. One ingredient that is effective in treating Parkinson's is resveratrol. Furthermore, these substances play a significant role in preventing cardiovascular, neurological, and cancerous conditions (Liu et al., 2011).

The dried root and rhizome of Polygonum cuspidatum Sieb et Zacc. (Polygonaceous) are known as Polygonia cuspidate Rhizome Et Radix. By altering markers of apoptotic death in dopaminergic neurons, resveratrol has been demonstrated to in vitro induce autophagy to prevent neurotoxicity, thereby protecting against rotenone-induced apoptosis in SHSYSY cells, increasing synuclein-degradation in the PC12 cell line, and offering a protective effect against MPP+-induced oxidative stress. It has been demonstrated that resveratrol works through the SIRTI pathway to reverse the metabolic imbalance and neuronal dysfunction that are the main causes of progressive neurodegenerative illnesses like Parkinson's, Alzheimer's, and Huntington's.

Even at modest dosages, resveratrol has a potent neuroprotective impact and can cross the brain barrier. Resveratrol's scavenging action is the foundation for Parkinson's disease prevention. Resveratrol has recently been shown to be effective against a number of distinct mechanisms and may be helpful in preventing brain damage after cerebral ischemia.

3) **Green Tea**

Sinensis Camellia The leaves of Camellia sinensis L. (Taxaceae) are used to make green tea. According to a recent study, drinking tea from China and Japan can lower your risk of Parkinson's disease. In SH-SYSY cells, green tea extract can reduce the activation of nuclear Factor-kB (NFkB) and subsequent cell death caused by 6-OHDA. Green tea contains catechin polyphenols, which have a protective impact on SH-SYSY cells. (-)-epicatechin gallate and (-)-epiclocatechin-3-gallate (EGCG) are the four primary constituents of the polyphenol catechin. (-)epicatechin and (-)-epigallocatechin (Mandel et al., 2004; Li et al., 2013). According to one study, in MPP+-induced PC12 Colls, (-)-Epigallocatechin-3-gallate may control dopamine transporter internalization via a protein kinase C dependent mechanism.

Green tea is currently widely regarded as a food source filled with various biological and pharmacological activities that are beneficial to human health. In recent human and animal epidemiological data, it has been suggested that tea consumption may protect the brain from aging and recently proved that tea consumption is inversely correlated with the incidence of dementia and Alzheimer's and Parkinson's diseases. The main polyphenolic component, EGCG, demonstrated a protective and repairing effect on neural networks in tests in different cellular and animal models of neurological disorders. More consumption of green tea is related to decreased cognitive impairment. Besides that, sufficient experimental and animal evidence suggests that green tea may have potent neuroprotective, neuro-salvage, and amyloid precursor protein processing activities that may induce cognitive enhancement, no human data available (Sharangi, 2009).

4) **Panax ginseng C. A. Mey.**

Although ginseng has been used for thousands of years to treat a variety of illnesses in traditional Chinese medicine, its pharmacological effects on the central nervous system have only lately come to light. Among these is its impact on altering a number of biochemical indicators believed to be crucial for the development and course of Parkinson's disease. Panax ginseng C.A. Meyer (Araliaceous) roots are widely used in traditional medicine around the world. Saponins, polysaccharides, and alkaloids are its primary components.

Ginsenosides, sometimes referred to as ginseng saponin, are the molecular constituents that give ginseng its effects. The root of Panax ginseng CA contains the ginsenosides. Rg1, Rb1, Rhi, and Rg2 are the ginsenosides that compose Meyer. The four substances are used to treat Parkinson's disease.

Acetylcholine secretion, particularly in the hippocampus, can be increased by ginsenosides Rbl and Rgi, leading to better performance on behavioral memory tests. Ginsenosides improve attention, cognitive processing, integrated sensory-motor function, and auditory reaction time in healthy human individuals by raising dopamine and norepinephrine concentrations in the cerebral cortex of rodents.

In addition, the effect of giving ginseng extract has been shown to prevent neuronal death in the forebrain and protect hippocampal neurons from ischemia. In in vitro studies, it was reported that ginsenosides could increase the viability of cultured cells and increase their neurite growth. For example, ginsenosides Rb1 can increase the growth of neurites from chicken dorsal root ganglia and cerebral cortex neurons in cultured cells. Against toxic insults, ginsenosides Rbl and Rgi protect neurons in spinal cord culture from excitotoxicity induced by glutamate and kainic acid, as well as oxidative stress induced by hydrogen peroxide (H2O2) and promote neurite length and neurite number of dopaminergic cells after exposure to MPP+

5) **Cistanche desert cola Y. C.-**

Since 2000 years ago, Ma Cistanche Herba, a stem species of Cistanche (Orobanchaceae), has been used as "Desert Ginseng" in traditional Chinese medicine. Of the various species of Cistanche, only this one is included in the Chinese Pharmacopoeia. According to a recent study, the primary constituents of this plant, phenylethanoids and polysaccharides, have anti-inflammatory, anti-apoptotic, and antioxidant properties. The central nervous system is impacted by the glycoside component of phenylethanoids, including verbascose and ethnocide. Similarly, in a mouse model of Parkinson's disease, ethnocide chemicals have been demonstrated to prevent a behavioral decline.

In a study on PC12 cells, Ver bacoside was shown to have an effect on MPP+ and glutamate-induced neurotoxicity and in vivo increased scopolamine induced memory deficits. In addition, Echinoid exhibited an antiapoptotic effect on SH-SY5Y neurons atter Induction with TNF and exerted a behavioral storage effect in a moise model of Parkinson's disease. In another test, raisin herb extract (CHE) increased the induction of nerve growth in C's cells at a concentration of 250 g/ml and caused neurite growth in PC12 cells. Not only that, CHE also significantly stimulated the release of NGF in the rat cortex and hippocampal brain at a test dose of 5-20 mg/kg per day for 3 days. Furthermore, CHE increased nerve cell differentiation, neurite length, and synapse formation in the nt hippocampus and significantly improved learning and memory,

6) **Panax not ginseng (Burk.)-**

Chen, F. II. Panax, not Burk ginseng In China, F.H. Chen root is referred to as Tiangi or Sanqi. It is a member of the family Araliaceous. For 600 years, Chinese people have utilized thia herbal medicine to treat heart and brain disorders. According to the study, P. notoginseg can enhance brain-derived neurotrophic factor (BDNF) and nesting expression. It can also enhance neuronal plasticity and functional recovery following focal cerebral ischemia. Panax not ginseng saponin (PNS), the active ingredient, is thought to be the primary bioactive substance that is widely utilized in Chinese clinical medicine and is commercially available.

A recent report showed that PTS could protect against focal cerebral ischemia in rat brain through alleviating cerebral edema, up-regulating heat shock protein HSP70 expression and down-regulating transferring. According to a different study, PTS were thioredoxin-1 (Trx-1) inducers and may one day be used as a treatment for Parkinson's disease (PD). The multifunctional protein thioredoxin-1 (TRX-1) has an inhibiting influence on apoptosis and a boosting effect on cell proliferation. This protein has been described as a neurotrophic co-factor that can improve the impact of repair and differentiation factors on nerves. Thioredoxin transgenic mice have been found to have a longer lifespan and to be resistant to environmental toxins, diabetes, and ischemia injury. PTS, a bioactive molecule, functions as a neuroprotective against MPTP-induced neuron loss and behavioral abnormalities.

7) Gastonia elate Blume-

Gastonia elate Blume (GE) is a member of the Orchidaceous family. In the oriental nation, GE is a traditional plant. It is well renowned for its tremendous effects in treating fatigue, headaches, vertigo, and dizziness. Anti-seizure, anti-oxidative, anti-fungal, antifatigue, anti-angiogenic, anti-inflammatory, anti-epileptic, anti-obesity, anxiolytic, and memory-improving properties have also been found for GE. The dried tuber of Gastonia elate Blume, known as Gastonia Rhizome, protects human dopaminergic SH-SY5Y cells from MPP+-induced cytotoxicity. The generation of inflammatory cytokines produced by lipopolysaccharide (LPS) was reduced by GE extract. 4-Hydroxybenzyl alcohol (4-HBA), one of the bioactive ingredients of GE, reduced NO and INOS in BV-2 cells activated by LPS. The blouctive components 4-HBA and GE extract may be utilized to lower microglial activation and create novel therapeutic medications to treat a range of neuroinflammatory illnesses, including Parkinson's disease. In addition to 4-HBA, other bioactive GE components were studied for their ability to suppress the release of NO and INOS in BV-2 cells triggered by LPS, hence bolstering GE's anti-inflammatory properties. The remaining bioactive ingredients include 4-hydroxybenzaldyde, vanillyl alcohol, and gastrin. Neuroinflammation mediates GE extract's significant contribution to the reduction of numerous CNS diseases. Vanillyl alcohol was found to provide protection in a study.

8) Polygala tenuifolia Willi Polygalas radix

(PRE) is the root of the Polygonaceous plant Polygala tenuifolia Willd. Traditional medicine frequently uses it to treat anxiety and amnesia. One of the most often given herbal remedies for a range of aging-related cognitive problems, dementia, and Parkinson's disease is PRE. PRE is made up of several oligosaccharide esters, saponins, and xanthones. Water extraction from the PRE may prevent MPP+-induced toxin-induced neuronal death in PC12 cells. PRE was used to create oligosaccharides that bind to the norepinephrine transporter protein and prevent the effects of depression in cells. and PRE's active ingredient, 3, 4, 5-trimethoxycinnamic acid (TMCA). By suppressing norepinephrine, it provides antistress properties. Tenogenic, another compound found in P. tenuifolia, shows neuroprotective properties against 6-OHDA-induced damage in SH-SYSY cells and shielded dopaminergic neurons from LPS-induced inflammation-mediated damage. PRE may considerably shield PC12 cells from 6-OHDA-induced neurotoxicity by preventing the generation of ROS and NO as well as the activation of caspase-3. It implied that PRE might offer a potential avenue for PD treatment or prevention.

PLAN OF WORK

Parts of your brain degrade with Parkinson's disease, an age-related degenerative brain disorder. It is most famous for producing tremors, delayed movements, issues with balance, and more. While some cases are hereditary, the majority occur for unexplained reasons. Although there is no cure for the illness, there are numerous treatment alternatives.

OBJECTIVES

to achieve a 20% rise in sales of our recently created Parkinson's disease drag in the upcoming month. to examine the incidence ratio and current prevalence of Parkinson's disease in our city during the last 12 months. According to a survey, the prevalence in the North Indian population was 67.71 per 100,000. to raise the Parkinson's disease drug's monthly sales by 15% over the course of the following three months.

SELECTION OF THE SURVEY AREA/REGION

The abnormal misfolding and aggregation of proteins that are inherently disordered is a common feature of neurodegenerative disorders. The pathophysiology and course of several neurodegenerative disorders can be influenced by pathological forms in diverse ways. Among the most debilitating age-related neurodegenerative diseases are synucleinopathies, of which Parkinson's disease (PD) is the most common.

SELECTION OF AREA/REGION

The following pharmacies in different Saharanpur locales were examined in order to compare various cancer immunotherapy.

Distribution and Sales of Anti-Parkinson Drug Products in Saharanpur 1. Swati medical store Saharanpur, 2. Choudhary medical store Saharanpur 3. Saharanpur's Pooja Medical Store 4. Saharanpur's Janta Medical Store 5. Saharanpur's Ananta Medical Store 6. Saharanpur's Shifa Medical Store 7. Saharanpur's Saifi Medical Store

1. 1.Swati Medical store Saharanpur
2. 2.Choudhary Medical store Saharanpur
3. 3.Pooja Medical store Saharanpur
4. Janta Medical store Saharanpur
5. Ananta Medical Store Saharanpur
6. Shifa Medical Store Saharanpur
7. 7.Saifi Medical store Saharanpur

SURVEY DETAIL

Analysis of the Market The percentage of Parkinson's medication goods sold in Saharanpur

Are antiparkinsonian medications, which are utilized in Saharanpur, anything you sell.

Antiparkinsonian drug products sale graph

According to the survey, 49% of antiparkinsonian medication items used in therapy are sold, which is a greater percentage in the areas where we conducted the poll.

Highly recommended Anti-Parkinson drug product in Saharanpur

S. No.	Hospital survey pharmacy	Brand name	Generic name	Sale per month strip
1	Swati Medical store Saharanpur	*PRAMIROL *ENTACOM	Pramipexole Entacapone	4 strips 6 strips
2	Choudhary Medical store Saharanpur	*RASALECT	Rasagiline	3 strips
3	Pooja Medical store Saharanpur	*ROPARK *PRAMIROL	Ropinirole Pramipexole	4 strips 10 strips

4	Janta Medical store Saharanpur	*ENTACOM *ROPARK	Entacapone Ropinirole	4 strips 8 strips
5	Ananta Medical Store Saharanpur	*PRAMIROL	Pramipexole	8 strips
6	Shifa Medical Store Saharanpur	*RASALECT	Rasagiline	6 strips
7	Saifi Medical store Saharanpur	*ENTACOM *RASALECT	Entacapone Rasagiline	7 strips 5 strips

Table : 1

COMPARISON

1. A comparison of the medications sold at Swati Medical Store and a plot of the weekly sales of the strips that are available for the treatment of Parkinson's disease.

Drug sales at Swati Medical Store.

S. No	Brand name	Sale of strips per month	Strength in mg
1.	Pramirol	4	0.25 mg
2.	Entacom	6	200 mg

Table : 2

2. A comparison of the medications offered at Choudhary Medical Store Saharanpur comparison data and weekly sales plot of the Parkinson disease therapy strips sold at Choudhary Medical Store.

Drug sales at the Choudhary Medical Store

S. No	Brand name	Sale of strips per month	Strength in mg
1	RASALECT	3	0.5 mg

Table : 3

3 comparison data and plot of sale of strips per week available on Pooja medical store for the treatment of Parkinson disease.

Sale of Drug in Pooja medical store

Table 4

4.

S. No	Brand name	Sale of strips per month	Strength in mg
1	ROPARK	4	0.25 mg
2	PRAMIROL	10	0.25 mg

Comparison between drugs sale in Janta medical store comparison data and plot of sale of strips per week available on Janta medical store, for the treatment of Parkinson disease.

Sale of Drug in Janta medical store.

S. No	Brand name	Sale of strips per month	Strength in mg
1	ENTACOM	8	200 mg
2	ROPARK	4	0.25 mg

Table 5

5.Comparison between drugs sale in Ananta Medical Store comparison data and plot of sale of strips per week available on Ananta Medical Store for the treatment of Parkinson disease.

Sale of Drug in Ananta Medical Store.

S. No	Brand name	Sale of strips per month	Strength in mg
1	PRAMIROL	8	0.25 mg

Table : 5

RESULT AND DISCUSSION

Examining the Use of Levodopa and Its Antiparkinsonian Effects.

The purpose of this survey is to find out how many patients used the medication LEVODOPA and whether they experienced any side effects.

How we did it: We examined the Parbha nursing home's January–December data from last month to determine how frequently doctors administered medications and whether there were any adverse responses.

We discovered that the majority of patients had stiffness and difficulty walking.

Sales: In April 2025, Prabha Nursing Home sold more medications.

Patients: Women made up 55% of those who received the drug levodopa, and the majority were between the ages of 45 and 65.

Problems: Headaches (10%), nausea (20%), and vertigo (15%) were among the side effects experienced by some patients.

CONCULSION

According to survey data, levodopa is a medication that is frequently prescribed to patients at Parbha nursing home in order to manage bradykinetic symptoms that are indicative of Parkinson's disease [27]. Due to its strong demand, the drug's sales peaked in the late summer. Levodopa users were mostly between the ages of 45 and 65, with a greater proportion of female patients. Although levodopa was usually well tolerated, a few patients had moderate side effects as headaches, nausea, and dizziness. Usually temporary, these adverse effects did not cause the patient to stop taking the medication with tolerable side effect.

levodopa seems to be a generally good therapy option for the symptoms of Bradykinetic condition. To guarantee long-term safety and efficacy, more research and ongoing monitoring are advised. [28] Parkinson's disease has been treated with a variety of contemporary medications, each with varying degrees of efficacy and adverse effects. Parkinson's patients may benefit from the use of traditional herbal plants, which are thought to be a means of overcoming the illness. To improve the effectiveness of treatment, additional research is required on the use of this herbal remedy in order to supply precise information regarding dosage and patient usage.

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