

# Herbal Drugs In Parkinson's Disease

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**Abstract:** Parkinsonism (Parkinson's Disease) is one of the commonest progressive neurodegenerative disorder characterized by the loss of the nigrostriatal system's pigmented dopaminergic neurons with a subsequent drop in dopamine.

Parkinson's Disease (PD) refers to such motor disorders such as resting tremor, muscle stiffness, and slow motion. Recent studies have shown that there has been an increasing interest in natural products particularly plants, for the treatment of Parkinson's disease.

The anti-PD effects of these natural products are considered to be due to their regulation ability; development of reactive oxygen species, neuroinflammation, production of dopamine, excitotoxicity, metal homeostasis, mitochondrial function, and cellular signaling pathways, all of which are disordered in the PD brain. 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.

## Introduction:-

Parkinson's disease (PD) is the world's most widespread chronic neuron degenerative motion condition affecting more than 10 million people. Parkinson's disease was first described by James Parkinson in 1817. The prevalence of PD is about 1% in people aged over 65 years.

It begins between the ages of 40 and 70 and is very rare under the age of 20. If PD begins under the age of 20 years, it is referred to as young onset PD, which has a different pathology than other types of PD, is usually inherited, and is due to Wilson's disease or Huntington's disease. PD is more prevalent in men than in women by a ratio of 3:2 (Postuma et al. 2015). The prevalence of PD is nearly 160 people per 100,000 population and its incidence is about 20 people per 100,000 population. The prevalence and incidence of the disease increase with age, so that at the age of 70 years, the prevalence is nearly 550 people per 100,000 and the incidence is 120 people per 100,000.

Factors such as trauma, overwork, exposure to coldness, inflexible personality and stress are considered to be the predisposing factors; however, this has not yet been definitively proven (Tysnes and Storstein 2017).

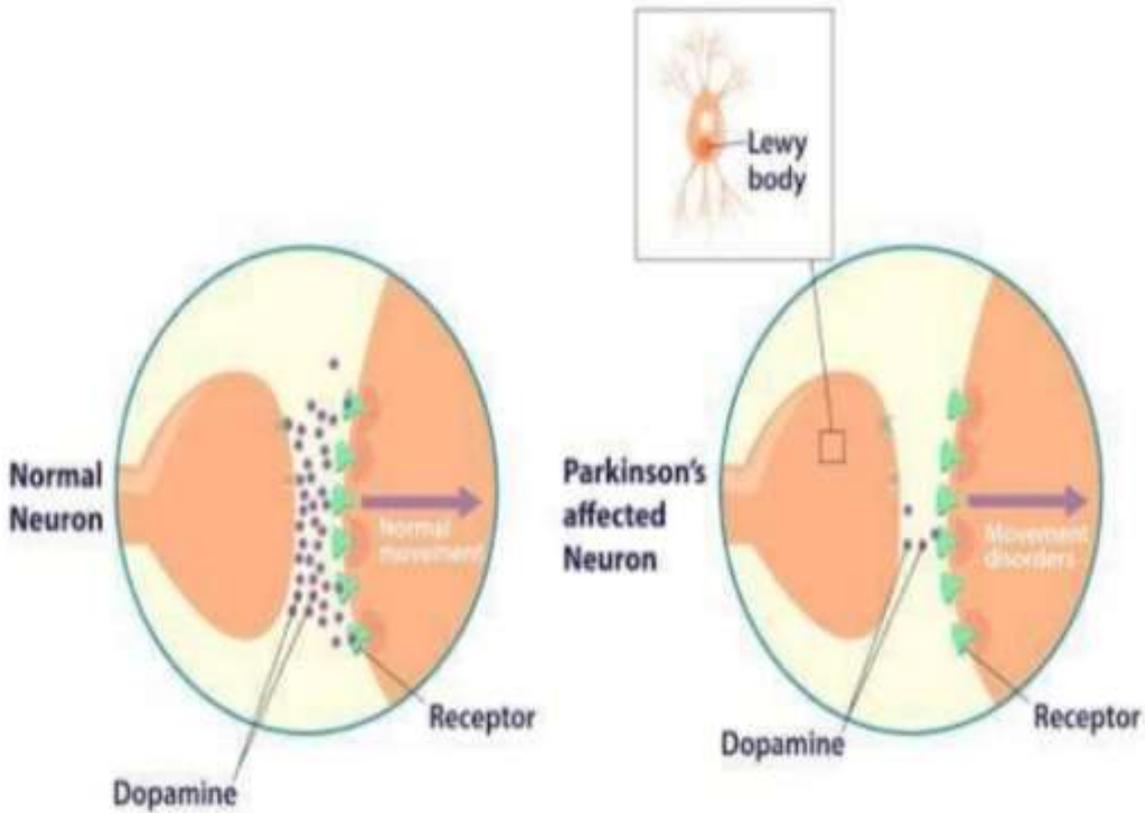
## sParkinson's Disease:-

The second most common neurodegenerative condition and the most common movement disorder is Parkinson's disease (PD). PD is a neurodegenerative and neurological disorder of the central nervous system due to accelerated loss of dopaminergic neurons in the substantia nigra (SN) in the midbrain and this area is accountable for the production of dopamine.

Dopamine connects the substantia nigra and the corpus striatum to regulate muscle activity. PD refers to motor disturbances such as muscle stiffness, resting tremor, and slow movement. PD is termed after Dr. James Parkinson, the surgeon who first defined it as "shaking paralysis" in 1817. The prevalence of PD rises with growing age, and in most countries in Europe, this age specific prevalence is remarkably similar. Variations in occurrence worldwide are likely to indicate variations in life expectancy and case ascertainment.

In the UK, age adjusted prevalence rates are about 150 per 100,000 people, with an age-specific occurrence of 10.8 PD cases and 16.6 Parkinson's cases per 100,000 population per yr. The mean age of onset in the 70s is specified by most research.

## Dopamine levels in a normal and a Parkinson's affected neuron

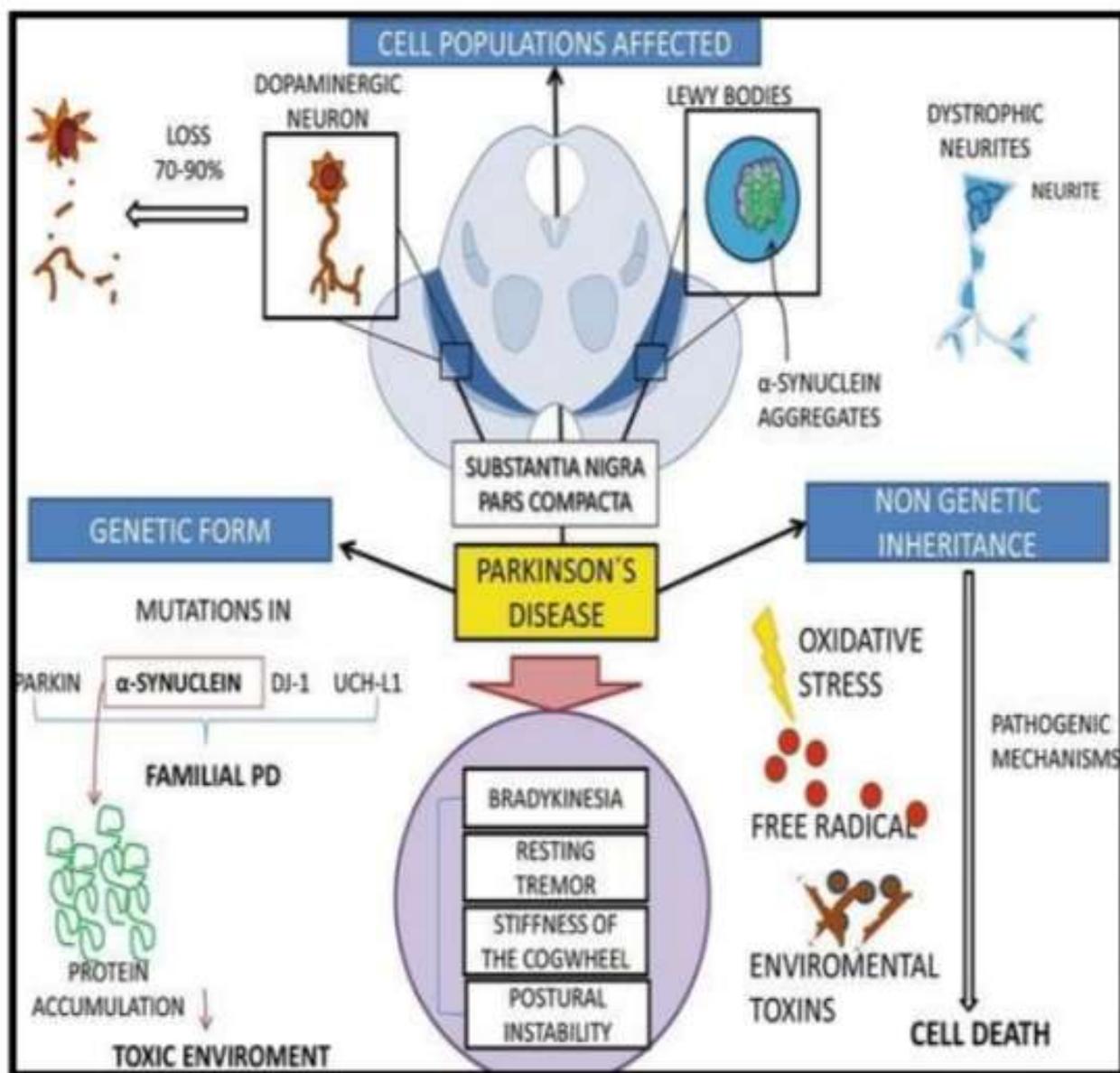


The precise cause of loss of cell is unclear. Both genetic and environmental influences include probable causes. The primary manifestation in persons with PD who will have lost more than 60 percent of the dopamine-producing cells in the brain includes rigidity, tremor, bradykinesia, Parkinsonian gait, and postural instability. Although movement-related manifestations of PD are the main symptoms, gradual muscle function deterioration and continuing brain injury can guide to secondary symptoms viz. dementia, memory loss, confusion, stress, anxiety, constipation, difficulty swallowing, depression, erectile dysfunction.

PD is a condition that is generally based on symptoms and signs. Observation of a prolonged reaction to a dopamine drug trial (levodopa or dopamine agonists) is most widely used for diagnosis. No notable data on magnetic resonance imaging or computed tomography imaging studies are available.

Genetic markers are under review for PD diagnosis. A wide range of experiments has concentrated on the levels of the cerebrospinal fluid proteins beta-amyloid, tau, and alpha-synuclein.

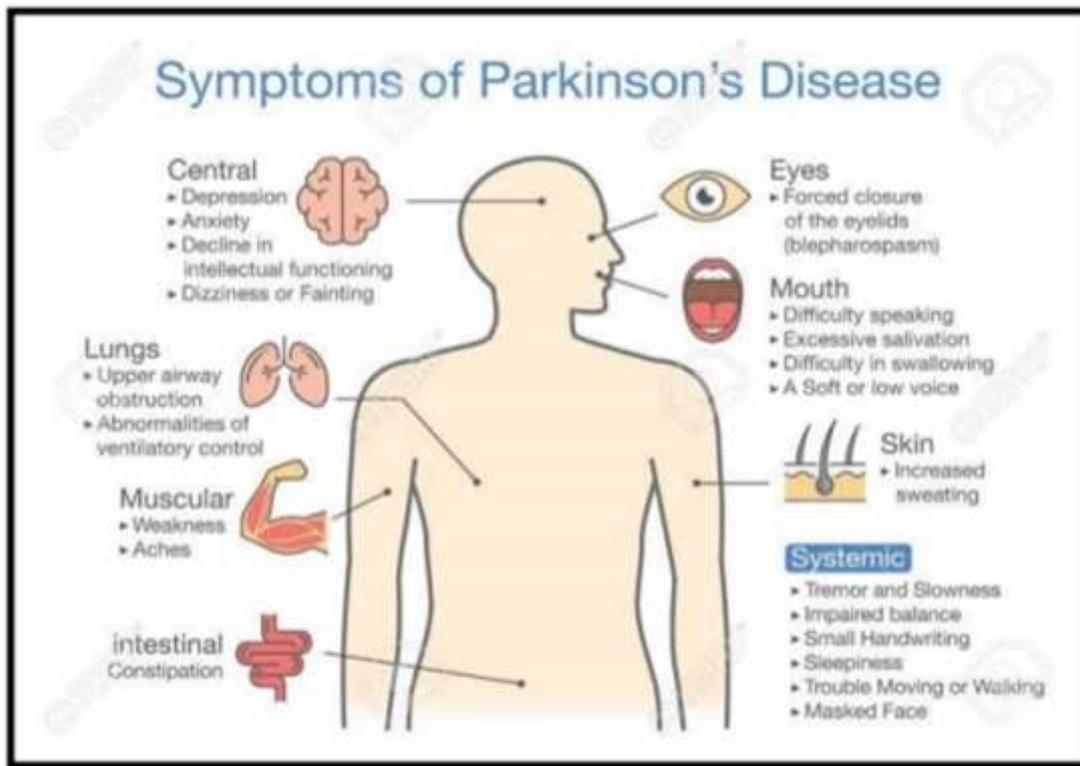
**Pathology :-**



**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. Less common entities with parkinsonism dopa-responsive dystopia juvenile-onset Huntington's disease, degeneration. In atypical neuroimaging and laboratory test are necessary

MRI, EEGs, PET,CT and SPECT.Laboratory.



### Role of Extract Isolated from Herbs In Treatment Of Parkinson Disease :

#### 1] *Bacopa monnieri*

- Common name :-Brahmi or waterhyssop
- Significant Constituents:-Bacopaside and bacoside
- Activity:-Redox stabilization improves mitochondrial function attenuate a-synuclein aggregation, attenuate apoptosis improves cognition

#### 2) *Camellia sinensis*

- Common name:-Green tea
- Significant Constituents:- Polyphenols, catechins [epicatechin (EC), epicatechin gallate (ECG), epigallocatechin(GC) and epigallocatechin gallate (EGCG)]
- Activity:-

Redox stabilization, inhibit ROS-NO pathway, metal chelation  
Protects DA neurons in a nigral region

#### 3) *Cassia obtusifol*

- Common name:-ava bean or Sicklepod
- Significant constituents :-CSE supplementation,MPP+, MPTP's neurotoxic metabolite
- Activity:-

Reduce cell damage and attenuate ROS generation and mitochondrial membrane depolarization in 6-OHDA mediated pc12

cells.dopaminergic neuronal loss by inhibiting respiratory complex 1 activity in dopaminergic neuronal mitochondria.

#### 4) *Coffea Arabica* and *Coffea canephora*

- Common name:-Arabica and Robusta coffee
- Significant constituents:-Caffeine

➤ Activity:-  
exerts neuroprotective effects against dopaminergic neuronal failure induces motor deficiency reversal in models of PD mice

#### 5) *Curcuma Longa*

- Common name:-Turmeric
- Significant constituents:-Curcumin

➤ Activity:-  
Improves striatal dopamine level, mitochondrial Complex I activity, Reduces oxidative stress, up-regulate SOD and GPx activity, acetylcholine level, replenish mitochondria membrane potential and ATP production, inhibit  $\alpha$ -synuclein fibrillization

#### 6) *Delphinium denudatum*

- Common name:-Jadwar
- Significant constituents:-  
A diterpenoid alkaloid, vilmorrianone, denudatine, panicutine, condelphine, and isotalatizidine.

➤ Activity:-  
reduced 3,4-Methylenedioxyamphetamine(MDA) levels, increased glutathione (GSH) content, Superoxide dismutase (SOD), catalase(CAT) activities and increased dopamine levels

#### 7) *Fructus Alpinia oxyphylla*

- Common name:-Black cardamom
- Significant constituents:-Essential oils, Terpenes, Diary 1 heptanoids, Flavones, Nucleobases and nucleosides, Steroids

➤ Activity:-Restores dopaminergic (DA) neuron degeneration

#### 8) *Ginkgo Biloba*

- Common name:-Maidenhair tree
- Significant constituents:-EGb 761, GinkgolideB

➤ Activity:-Improve DA level, behavior function, and muscle coordination, redox stabilization, uplift mitochondria Function and ATP production

#### 9) *Juglandis semen*

- Common name:-Walnut
- Significant constituents:-Caffeic acid, a phenethyl ester derivative

➤ Activity:-  
Inhibits the MAO-B activity protect against 6 hydroxydopamine-induced degeneration

#### 10) *Mucuna pruriens*

- Common name:-Velvet bean
- Significant constituents:-  
Glycoside, gallic acid, glutathione, Levodopa

- Activity:-  
Improves locomotor & behavior function, alleviate oxidative stress, metal chelation, and Synaptic function, TH expression

#### 11) *Polygala*

- Common name:- Milkworts or snakeroots
- Significant constituents:-  
xanthones, saponins, and esters of oligosaccharides

- Activity:-  
Neuroprotective effect on dopaminergic neurons.

#### 12) *Polygonum cuspidatum*

- Common name:- Japanese knotweed
- Significant constituents:- Resveratrol (RES)
- Activity:- Neuroprotective, antioxidant reduction and antiapoptotic capabilities are exerted

#### 13) *Panax ginseng*

- Common name:- Asian ginseng
- Significant constituents:- ginsenosides
- Activity:-  
Rescuing dopaminergic neurons from degeneration increase antioxidant defenses and shields against neurotoxicity.

#### 14) *Uncaria rhynchophylla*

- Common name:- Hooked
- Significant constituents:- Uncaria
- Activity:- Rhynchophylline, corynoxene, corynantheine, And Hirsutine Cytoprotective effect

#### 15) *Withania somnifera*

- Common name:- Ashwagandha Or Indian ginseng
- Significant constituents:- Withaferin, Withanolide
- Activity:-  
Alleviate oxidative stress, improve dopamine level, motor function, glutathione level, TH expression, inhibition of iNOS,

### Compounds Isolated From Herbs in treatment of Parkinsons Disease

#### 1] *Tangeretin*

Increase of TH<sup>+</sup> cell number and dopamine level, good bioavailability

#### 2] *Rutin*

Antioxidant property, increase of dopamine and its metabolite level, improvement of behavioral problem

#### 3] *Curcumin*

Antioxidant and antiapoptotic activities . Inhibition of MAO-B activity.

#### 4] Quercetin

Conformation of neuroprotective effect and antioxidant property, increase of dopamine level.  
To have neuroprotective and antioxidant effects, improvement of behavior deficit. Antioxidant and neuroprotective properties  
Enhancement of cognitive problem and oxidant-antioxidant Imbalance

#### 5] Ellagic acid

Reduction of hyperalgesic responses, enhancement of memory and learning dysfunction in MFB's rats

#### 6]Caffeic acid

To have potent neuroprotective and antioxidant effects.

#### 7]Gallic acid

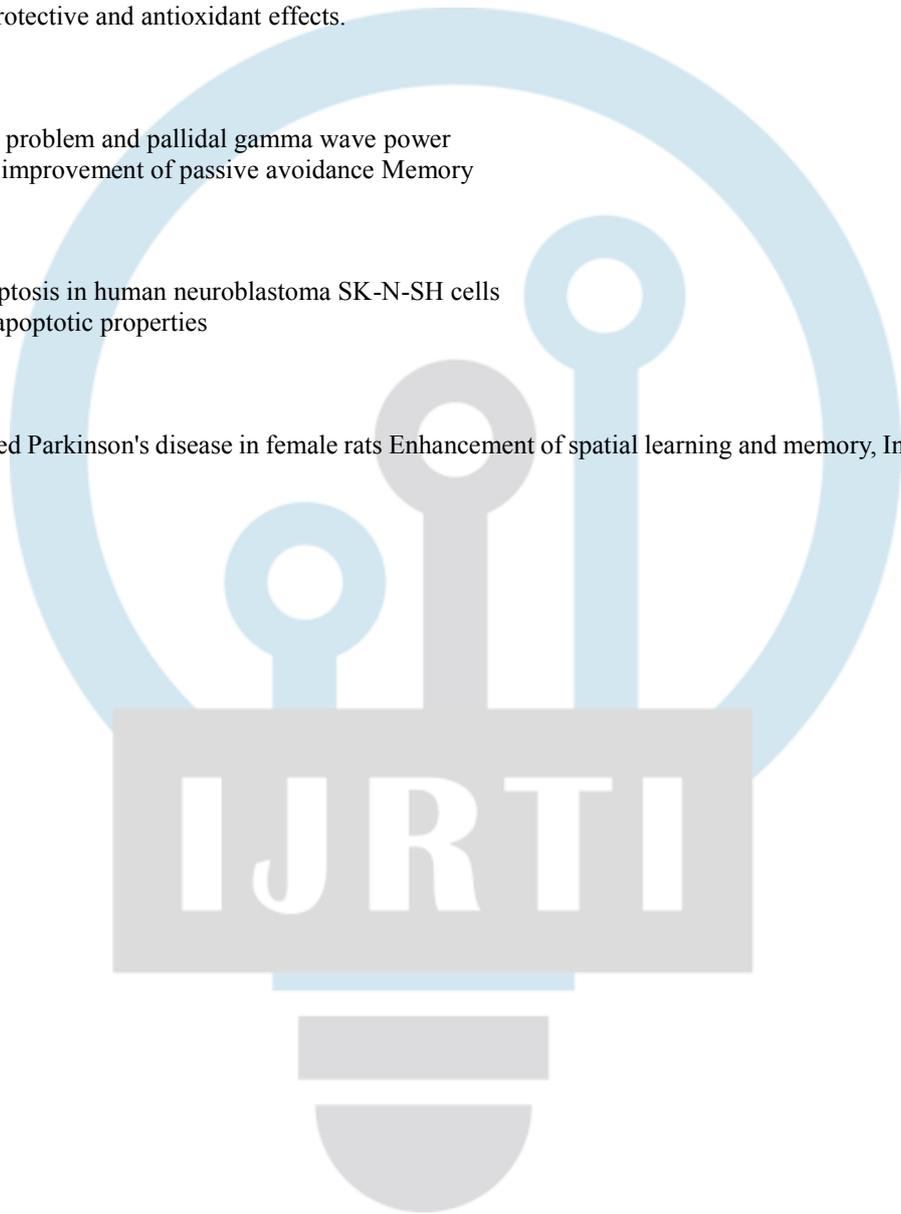
Improvement of motor problem and pallidal gamma wave power  
Anti-oxidant property, improvement of passive avoidance Memory

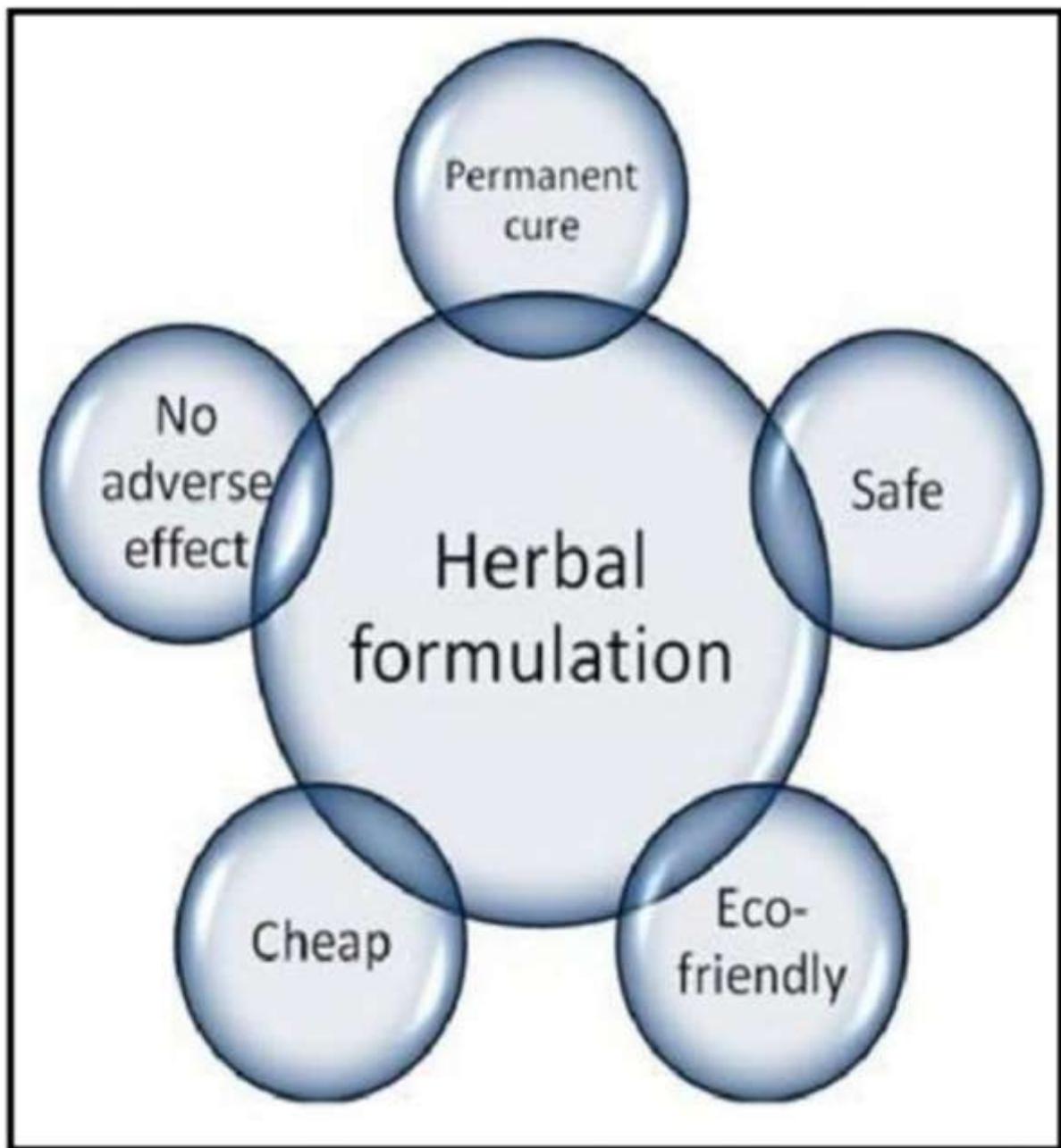
#### 8] Hesperidin

Rotenone-induced apoptosis in human neuroblastoma SK-N-SH cells  
Anti-oxidant and anti-apoptotic properties

#### 9] Isoflavone

OVX- 6-OHDA-induced Parkinson's disease in female rats Enhancement of spatial learning and memory, Inhibition of body weight increasing





#### Discussion:-

A huge number of herbal medicine ie herbs, formulations have been reported for their effective action in prevention and treatment of parkinsonism. Most literatures have been focused on the antioxidant, neuroprotective, anti-inflammatory and anti-apoptosis herbs such as Thuja orientalis, Mucuna pruriens, Ginkgo biloba, Plumbago scandens and various other ayurvedic, Chinese plant

The many constituents presents in these plants used against parkinsonism are Dopamine, flavonoids, alkaloids, other polyphenols. One should have closer look towards pharmacological and phytochemical constituents of this herbs, which can be useful for preparation of formulation.

#### Ayurvedic Formulations:-

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.

**Conclusion :-**

We sought to present a summary of current experimental evidence on anti-Parkinsonian activities of medicinal plants and their active ingredients. We found that different natural compounds and herbal extracts exhibit various anti-Parkinsonian activities. Taken together, various PD neurotoxic models are a good basis for discovering anti-Parkinsonian drugs, and herbal drugs can be used to develop new drugs for PD. Because of their protection and efficacy, the study addressed medicinal plants as a promising source of compounds against them.

In future scientific research, the effectiveness of plant extracts and their active ingredients in PD models should be further investigated.

Furthermore, the active ingredients and mechanisms of action of herbal extracts remain to be adequately clarified. A minimal number of plants have been tested for anti-Parkinsonian activity considering the wide range of plants in the world and thus there are many perspectives in this area for future research on plants and their bioactive compounds.

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