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Withania somnifera (ashwagandha) is a beneficial herb: A review

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Abstract
The main aim of this review paper is to the review the literature regarding *withania somnifera* (ashwagandha). A commonly used herb in ayurvedic system. In this review updated information on it's pharmacological activities, such as antioxidant, antiparkinsonian, anti-inflammatory properties. Different other activities like antibacterial, cardiovascular protection have also been studied. Ashwaghandha is very beneficial herb of this indian ayurvedic system of medicine as a tonic (Rasayana). It is used for various kinds of disease process such as anxiolytic effects, cvs etc. In this review more informative information regarding to various diseases.

Keywords: *Withania somnifera*, ashwagandha, a review

Introduction
Ashwagandha [*Withania Somnifera* Linn.] belongs to family Solanaceae or nightshade, Commonly known as the "Indian Ginseng " or "winter cherry "is one of the most beneficial herb used in Ayurveda, Indian System of traditional medicine over 3000 years. It is Steroidal Alkaloid drug grows as short shrub (30-35 cm).
Ashwagandha plant is used in more than 100 formulations in Ayurveda, Unani, Siddha. The Latin species name Somnifera means 'Sleep Inducing '. The name ashwagandha is a combination of _Sanskrit_ words 'ashav' meaning horse & 'gandha' meaning smell reflecting that the root has strong horse-like odour. Ashwagandha is known for its rasayana (tonic) property. It Contains chemicals that might beneficial to calm the brain, reduce inflammation, lower blood pressure, change the immune system. More than 50 chemical constituents have been isolated from different part of the ashwagandha plant. Ashwagandha is Considered an adaptogen because it helps your better manage stress, it has been shown to have various benefits especially for womens like improve the hormonal imbalance, help to deal with vaginal infections. Ashwagandha possesses potent antioxidants properties that help against cellular damage caused by radicals.
Ashwagandha can be unsafe for people with hypothyroidism, taking sleeping pills, with hypotention, taking immunosuppressant medication, pregnant & breast feeding women [1, 2]

Fig 1

Chemical composition [2]:
The main chemical constituent of w.somnifera are alkaloids and steroids. Among the various alkaloids Withanine is the main chemical constituent forms 38% total weight of alkaloids. the other alkaloids are somniferine, somnine, tropine, pseudo tropine,3alpha gloyloxytropane choline, cuscohygrine, isopelletierine, anaferine, anahydrine. Saponins containing additional Two acyl steryl glucosides *viz* sitoindoside VII & VIII have been isolated from root and withanolides with glucose at carbon 27 (sitoindoside XI & X). The principle withanolides extracted from w. somnifera in India were withanolides D and withaferin A which exhibited Antitumour & Cytotoxic properties.The drug also contains two monohydric alcohols called somnitol & somnirol; withanic acid; a phytosterol & ipuranol; a mixture of fatty acid containing cerotic acid,oleic acid, palmitic acid & stearic acid.

Pharmacological activity
Antioxidant Effect [3, 4]
The brain and nervous system are more susceptible to free radical damage than tissue. Because they are rich in iron and lipid. Brain and nervous system important in generating reactive oxygen species. In normal aging and neurodegenerative diseases, free radical damage of nervous tissue involved. Ex., Parkinson's, Alzheimer's, Epilepsy, Schizophrenia and other diseases.
The active principle of sitoindosides VII-X, WS and withaferin A (glycowithanolides) are tested for antioxidant activity. Major enzymes used are free-radical scavenging enzymes, superoxide, glutathione peroxidase (GPX) catalase (CAT), and dismutase (SOD) level in rat brain frontal cortex and striatum. Result of degenerative effect is due to, decreased activity of above enzymes leads to accumulation of toxic oxidative free radicals. Increased enzymes represent increased antioxidant activity and protective effect on neuronal tissue.
Active glycowithanolides of WS are given once a daily for 21 days, dose increased in all enzymes were observed. Increases comparable to with daprenyl (antioxidant) administration. This show, WS have an antioxidant effect in

the brain, which is responsible for its diverse pharmacological properties.

An aqueous suspension of WS root extract is evaluated for its effect on stress-induced lipid peroxidation (LPO) in mice and rabbits. Lipid peroxidation blood levels are increased by peptidoglycans (PGN) from staphylococcus aureus and lipopolysaccharides (LPS) from klebsiella pneumoniae. Oral administration of WS extract is prevented by an increase in lipid peroxidation.

Apart from hepatic lipid peroxidation (LPO), aspartate aminotransferase, lactate dehydrogenase, serum enzymes and alanine aminotransferase, are assessed as indices of hepatotoxicity. For comparison, silymarin (20mg/kg,p.o.) is used. Iron induced marked increase in hepatic lipid peroxidation. Serum level of enzymes are attenuated by glycowithanolides (WSG) in dose-related manner and by silymarin.

Antiparkinsonian Property [1, 2, 3]

Parkinson's disease is a neurodegenerative disease. Parkinson's disease characterised by selective loss of dopamine (DA) neurons of substantia nigra pars compacta. Neuroleptic-induced catalepsy is longer used as animal model for screening drugs for parkinsonism. Induced catalepsy in mice by administration of reserpine and haloperidol. WS inhibited reserpine or haloperidol induced catalepsy and provide hope for treatment of Parkinson's disease.

6-Hydroxydopamine (6-OHDA) is used rat models for Parkinson's disease. 6 Hydroxydopamine elicits its toxic manifestations through oxidant stress. Antiparkinsonian effect of WS extract are reported due to antiperoxidative, potent antioxidant and free radical quenching properties.

Tardive dyskinesia is side effect of long term neuroleptic treatment. Pathophysiology of irreversible movement disorder is still obscure. In rats, vacuous chewing movements are widely accepted as animal model for tardive dyskinesia. In pathophysiology of tardive dyskinesia, product of lipid peroxidation and oxidative stress are implicated. Oxidative stress play important role in pathophysiology of reserpine-induced abnormal oral movements.

WS glycowithanolides (WSG) administered with haloperidol for 28 days, inhibited induction of neuroleptic TD. Haloperidol-induced TD was attenuated by vitamin E, antioxidant but remained unaffected by GABA-mimetic antiepileptic agent, sodium valproate, both agents administered for 28 days like WSG. Antioxidant effect of WSG is reported for prevention of haloperidol-induced TD. WS reversed tardive dyskinesia, catalepsy and 6-Hydroxydopamine elicited toxic manifestations and offer therapeutic approach to treatment of Parkinson's disease.

CNS Effects [1, 2, 3, 4]

1. Deep sleep and enhanced memory: Extracts of the plant have shown ability to induce sleep, restful sleep without drowsiness. Ashwagandha has been seen to increase actycholine levels in the brain, which are correlated with improved memory brain function and intelligence.it even increases nitric oxide production by regulating the blood flow and pressure of the arterial system which elevates oxygen level in brain.
2. Regeneration of Nerve Cells: Research studies at University of Japan shows that, Ashwagandha regenerate dendrite growth throughout the brain & body. This makes ashwagandha frontline treatment for neurodegenerative diseases like Alzheimer's and Parkinson's disease. It improves communication between nerve cells and stimulates body's capacity to heal any nervous system damage.
3. Positive effects on Mood & Stress relief: Multiple studies of the plant have shown that potent extracts of Ashwagandha produce anti- anxiety relieving effects that are as powerful as many commonly used antidepressants without any side effects.
4. Rejuvenation and Longivity: This herb has natural properties to calm you down, boost your stamina, also restores balance in your body. this is why the herb is called Rasayana in the Ayurveda, which translates to a " herb" which rejuvenates.it also has antioxidant properties.

Antibacterial [1, 2]

The plant possesses various pharmacological activity. The methanolic extract was further sub fraction was possed maximum inhibitory activity against a spectrum of bacteria including salmonella typhimarium. Many bacterial species have been used as a test microorganism for the assessment of the antimicrobial activity of extracts and purified compounds of W. somnifera. These bacterial stra FCins were Acinetobacter baylyi, Agerobacterium tumefaciens, Bacillus cereus, Bacillus subtilis, Bacillus thuringiensis, Chlamydophila pneumonia, Citrobacter freundii, Corynebacterium diphtheriae, Enterobacter aerogens, Enterococcus feacalis, Escherichia coli, Klebsiella pnemoniae, Lactic acid bacterial (LAB) strains, Methicillin Resistance Staphylococcus aureus, Micrococcus luteus, Neisseria gonorrhea, Proteus mirabilis, Proteus solanacearum, Proteus vulgaris, Pseudomonas aeruginosa, Pseudomonas fluorescens, Raoultella planticola, Salmonella typhi, Salmonella typhimurium, Serratia marcescens, Staphylococcus aureus, Staphylococcus epidermis, Streptococcus pyogenes, Xanthomonas axonopodis pv. malvacearum, Yersinia enterocolitica and few others.

Anti-inflammatory

Ashwagandha (*Withania somnifera*) is an important medicinal plant in Indian traditional system of medicine and traditionally has been used for several medicinal purposes in India. The present study was conducted to evaluate the anti-inflammatory effect of hydroalcoholic extract of ashwagandha against denaturation of protein *in vitro*. Methods: The test extract at different concentrations was incubated with egg albumin in controlled experimental conditions and subjected to determination of absorbance and viscosity to assess the anti-inflammatory property. Diclofenac sodium was used as the reference drug. Results: The present results exhibited a concentration dependent inhibition of protein (albumin) denaturation.

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Conclusion

The extensive review of literature on the topic *Withania somnifera* (Ashwaghandha) is an beneficial herb: a review Is an very important sources of many medicinally active substance like sitoindosides and another alkaloids. The plant has also been widely studied for their various pharmacological activities like antioxidant, anti-inflammatory, cvs protection etc.

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