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A Brief Description on Ashwagandha

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ABSTRACT*: *As a Rasayana, Withania somnifera (Ashawagandha) is a highly regarded plant in the Indian Ayurvedic medical system (tonic). It's used for a variety of ailments, but most notably as a nervine tonic. Many scientific researches were conducted in light of these facts, and its adaptogenic and anti-stress properties were thoroughly investigated. It increased the stamina of rats during a swimming endurance test and avoided changes in ascorbic acid and cortisol concentration in the adrenal glands caused by swimming stress in experimental animals. Stress-induced stomach ulcers were significantly reduced after pretreatment with Withania somnifera (WS). On Chinese Hamster Ovary (CHO) cell cancer, WS has an anti-tumor impact. It was also shown to be helpful in animals with urethane-induced lung adenoma. Long-term therapy with WS controlled the disease in certain instances of uterine fibroids and dermatosarcoma. It has a Cognition Promoting Effect and has been shown to be beneficial in youngsters with memory problems as well as elderly individuals with memory loss. It has also been shown to be beneficial in the treatment of neurological disorders such as Parkinson's, Huntington's, and Alzheimer's. It has a GABA-mimetic action and has been proven to stimulate dendritic development. It has an anti-anxiety impact and boosts energy and mitochondrial health. It's an anti-inflammatory and anti-arthritic drug that's been shown to be effective in Rheumatoid and Osteoarthritis patients. To establish its therapeutic effectiveness in stress-related illnesses, neurological disorders, and malignancies, large-scale investigations are required.

KEYWORDS: Adaptogen, Anti-Arthritic, Anti-Tumor, Neuroregenerative, Rejuvenator.

1. INTRODUCTION

Ashwagandha (Withania somnifera) is also known as "Indian Ginseng" or "Indian Winter Cherry." It is one of the most significant herbs in Ayurveda (India's ancient medical system), and it has been utilized as a Rasayana for millennia for its wide-ranging health effects. Rasayana is an herbal or metallic concoction that promotes a young physical and mental state of health as well as happiness. These treatments are given to young children as tonics, and they are also used by the middle-aged and old to extend their lives. Ashwagandha is the most well-known of the Rasayana herbs in Ayurveda. The herb is known as "Sattvic Kapha Rasayana." Adaptogens and anti-stress compounds make up the majority of Rasayana herbs[1], [2].

Ashwagandha is sold as a churna, a finely sieved powder that may be combined with water, ghee (clarified butter), or honey. It boosts memory and improves the function of the brain and neurological system. It promotes a healthy sexual and reproductive balance by improving the function of the reproductive system. It boosts the body's stress resistance since it's a strong adaptogen. By boosting cell-mediated immunity, Ashwagandha enhances the body's fight against illness. It also has powerful antioxidant capabilities, which assist to protect cells from free radical damage[3], [4].

1.1 Chemical Composition:

Alkaloids (isopelletierine, anaferine, cuseohygrine, anahygrine, and others), steroidal lactones (withanolides, withaferins), and saponins are among the physiologically active chemical components of Withania somnifera (WS). Ashwagandha contains anti-stress compounds called

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sitoindosides and acylsterylglucosides. Active components of Ashwagandha, such as the sitoindosides VII-X and Withaferin-A, have been found to exhibit substantial anti-stress action in acute stress models. Many of its components have immunomodulatory properties. 5-dehydroxy withanolide-R and withasomniferin-A were isolated from the aerial portions of Withania somnifera. Figure 1 depicts Ashwagandha supplements.

Figure 1: Illustrates the supplements of Ashwagandha[5]**.**

1.2 Scientific Studies on Ashwagandha Adaptogenic / Anti-stress effect:

In terms of adaptogenic characteristics, Aswagandha is similar to Eleutherococcus senticosus (Siberian Ginseng) and Panax Ginseng (Chinese / Korean Ginseng), and is thus known as Indian Ginseng. Extensive research on the adaptogenic / anti-stress characteristics of Ashwagandha in biological models of animals has shown that it is beneficial in improving stamina (physical endurance) and avoiding stress-induced stomach ulcer, carbon tetrachloride (CCl4)-induced hepatotoxicity, and death. In rats, ashwagandha has a comparable anti-stress effect. At 100 mg/kg/oral dose, an aqueous solution of Ashwagandha root was utilized. The findings show that rats exposed to cold swimming stress had significantly higher plasma corticosterone levels, phagocytic index, and avidity index. These metrics were near control levels in the rats pretreated with the medication, and an increase in swimming time was noted. These findings suggest that Withania somnifera, in its raw form, is a powerful anti-stress agent. The findings of the above studies support the Ayurvedic hypothesis of tonics, vitalizers, and rejuvenators, which suggest clinical use of Withania somnifera in the prevention and treatment of a variety of stress-related diseases such as arteriosclerosis, premature aging, arthritis, diabetes, hypertension, and cancer[6]–[9].

- *Swimming Skill Affect:*

In comparison to the non-swimmer group, animals exposed to 5 hours of continuous swimming had substantially lower cortisol levels in their adrenals. The cortisol content of the adrenals was not reduced after pretreatment with WS. When compared to the non-swimmer group, the ascorbic acid level was similarly substantially lowered after 5 hours of swimming. Pretreatment with WS prevents the loss of ascorbic acid that happens as a result of swimming stress. As a result, therapy

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with Withania somnifera reduces the drop in adrenal cortisol and ascorbic acid that occurs as a result of swimming stress[10].

- *Anti-Ulcerogenic Action:*

Ashwagandha has been shown to be effective in preventing stress-induced stomach ulcers. It protected mice against 18-hour immobilization, cold + immobilization (4-hour) and aspirin-induced stomach ulcers and reduced the mean ulcer index.

- *Leucocytosis Effect:*

Leucocytosis was reduced in a group of mice administered Ashwagandha with milk injection.

- *Anabolic Properties:*

For a period of three months, rats in the Ashwagandha-treated group gained significantly more weight than those in the control group.

1.3 Acute toxicity Studies:

In albino mice, the LD50 of Withania somnifera was determined to be 1750 mg (p.o.) in acute toxicity tests.

1.4 Anti-tumor activity Carcinoma in Chinese Hamster Ovary (CHO) cells:

Withania roots had a 49 percent inhibitory impact on the ability of CHO cells to form colonies. It hinders cell adhesion and limits cell development. It inhibited CHO cell development for a long time, depending on the cell density and length of Ashwagandha exposure. Oncologists who intend to employ Ashwagandha as a "synergizer" with conventional chemotherapy or radiation treatment will benefit from this information.

1.5 Cognition Promoting Effect on the Central Nervous System:

Ashwagandha is a well-known Ayurvedic Rasayana that belongs to the Medhyarasayana category of Rasayanas. Medhya is a Sanskrit word that means "mind" or "mental/intellectual ability." As a result, Medhya Rasayana, like Ashwagandha, is used to improve memory and intelligence. The impact of Medhya Rasayanas on cognition is most noticeable in youngsters with memory problems, or when memory is impaired due to a brain injury, a lengthy sickness, or old age.

1.6 Influence on neurological disorders like Parkinson's, Huntington's, and Alzheimer's:

According to the findings of neuropathological post-mortem examinations of the brain in individuals with Alzheimer's disease, neuritic atrophy and synaptic loss are the main causes of cognitive impairment. Neurite atrophy has also been found as a major component of the pathogenesis in individuals with various neurodegenerative illnesses such as Parkinson's disease, Huntington's disease, and Creutzfeldt-Jakob disease. Ashwagandha has been shown in scores of studies to reduce, halt, reverse, or eliminate neuritic atrophy and synapse loss. As a result, Ashwagandha may be used to treat Alzheimer's disease, Parkinson's disease, Huntington's disease, and other neurodegenerative illnesses at any stage of the disease, even before a person has been diagnosed and is still experiencing minor forgetfulness. Ibotenic acid-induced cognitive impairments in an Alzheimer's disease model were substantially corrected by glycowithanolides withaferin-A and sitoindosides VII–X isolated from the roots of Ashwagandha.

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Ashwagandha is a popular component in Ayurvedic tonics since it is regarded as a nervine tonic in Ayurveda. Ayurvedic tonics, rejuvenators, and vitalizers appear to alleviate illness and promote immunity and lifespan in users. In rats (an animal model of Parkinson's disease), pretreatment with Ashwaganda extract prevented all changes in antioxidant enzyme activities, catecholamine content, dopaminergic D2 receptor binding, and tyrosine hydroxylase expression induced by 6-hydroxydopamine (6-OHDA) in a dose-dependent manner. As a consequence of these findings, Ashwagandha may be beneficial in preventing neuronal damage in Parkinson's disease.

1.7 Anxiolytic Action:

In all three classic Anxiety tests; the elevated plus-maze, social interaction, and feeding latency in an unknown setting, Ashwagandha had a soothing anxiolytic effect similar to the medication Lorazepam. Furthermore, when rat brain levels of tribulin, an endocoid marker of clinical anxiety, were raised after administration of the anxiogenic drug pentylenetetrazole, both Ashwagandha and Lorazepam decreased levels of tribulin, an endocoid marker of clinical anxiety.

In two classic tests, the forced swim-induced ‘behavioral despair' and ‘learned helplessness' tests, ashwagandha showed an antidepressant effect similar to imipramine. The research backs up the usage of Ashwagandha as a mood stabilizer in clinical anxiety and depression cases.

1.8 The Impact on Energy and Mitochondrial Health:

The impact of Ashwagandha on glycosaminoglycan production in carrageenin-induced air pouch granuloma granulation tissue was investigated. Ashwagandha has been found to have a substantial inhibitory impact on ribosome -35S incorporation into granulation tissue. In the mitochondria of granulation tissue, the uncoupling impact on oxidative phosphorylation (ADP/O ratio decrease) was also seen. Ashwagandha was also shown to affect Mg2+ dependent ATPase activity. The activity of the succinate dehydrogenase enzyme in the mitochondria of granulation tissue was similarly decreased by ashwagandha.

1.9 Effect on Arthritis:

Ashwagandha is an analgesic that relieves pain by calming the nerve system. Ashwagandha's strong anti-arthritic effects are now generally recognized and established; it is also proven to be useful as an antipyretic and analgesic.

For a rat suffering from heat analgesia generated by the hot plate technique, ashwagandha (1000 mg/kg/oral) exhibited substantial analgesic efficacy. At the 2nd hour after treatment, Ashwagandha had a peak analgesic effect of 78.03 percent. Pretreatment with paracetamol (100 mg/kg, ip) and cyproheptadine (10 mg/kg, ip) was used to investigate the role of pain mediators such as prostaglandin and 5-hydroxytryptamine in Ashwagandha's analgesic action. Cyproheptadine substantially increased the analgesic action of Ashwagandha, while paracetamol had little effect, indicating that serotonin, not prostaglandins, is involved in Ashwagandha's analgesic effects.

2. DISCUSSION

For over 3000 years, Withania somnifera (WS), also known as ashwagandha, Indian ginseng, and winter cherry, has been a vital herb in Ayurvedic and traditional medicinal systems. The plant's roots are classified as rasayanas, which are believed to promote health and longevity by improving

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disease resistance, slowing the aging process, revitalizing the body in debilitated conditions, increasing the individual's ability to resist adverse environmental factors, and instilling a sense of mental well-being.

It has been used for a long time by people of all ages, both sexes, and even pregnant women without any negative side effects. The plant has been used for centuries as an antioxidant, adaptogen, aphrodisiac, liver tonic, anti-inflammatory agent, astringent, and, more recently, to treat ulcers, bacterial infection, venom poisons, and senile dementia. This study covers Ashwagandha and its applications.

3. CONCLUSION

Due to its numerous pharmacological effects such as anti-stress, neuroprotective, anticancer, anti-arthritic, analgesic, and anti-inflammatory, Ashwagandha is a genuine powerful regeneration tonic (Rasayana of Ayurveda). It is beneficial for a variety of illnesses, including Parkinson's disease, dementia, memory loss, stress-related diseases, malignoma, and others. Indians utilize ashwagandha as a home medicine, believing it to be the greatest tonic for elderly people and children, as well as an aphrodisiac for young people. It is one of Ayurveda's finest nervine tonics. Ayurveda is the world's oldest medical system. Our clinical experience has shown that, in addition to the aforementioned neurological disorders, brain strokes resulting in paralysis and neuronal deficiency improve with long-term Ashwagandha therapy.

We also use it in various types of cancer, including prostate and lung tumors, particularly in their latter stages, providing patients with many health advantages. We have a few instances of lung cancer patients who have rejected conventional treatment and have healed clinically and radiologically with Ashwagandha medication. It was projected as one of the six essential medicinal herbs at a recent conference on the essential medicine idea. As a result of the aforementioned results, it is evident that Ashwagandha's traditional usage has a logical and scientific foundation. To establish the therapeutic effectiveness of this herb, large-scale clinical trials are required, particularly in stress-related illnesses, neurological disorders, and malignancies.

REFERENCES:

[1] A. K. Sharma, I. Basu, and S. Singh, "Efficacy and Safety of Ashwagandha Root Extract in Subclinical Hypothyroid Patients: A Double-Blind, Randomized Placebo-Controlled Trial," *J. Altern. Complement. Med.*, 2018, doi: 10.1089/acm.2017.0183.

[2] W. Ahmed, D. Mofed, A. R. Zekri, N. El-Sayed, M. Rahouma, and S. Sabet, "Antioxidant activity and apoptotic induction as mechanisms of action of Withania somnifera (Ashwagandha) against a hepatocellular carcinoma cell line," *J. Int. Med. Res.*, 2018, doi: 10.1177/0300060517752022.

[3] D. Choudhary, S. Bhattacharyya, and K. Joshi, "Body Weight Management in Adults Under Chronic Stress Through Treatment With Ashwagandha Root Extract: A Double-Blind, Randomized, Placebo-Controlled Trial," *J. Evidence-Based Complement. Altern. Med.*, 2017, doi: 10.1177/2156587216641830.

[4] S. Wankhede, D. Langade, K. Joshi, S. R. Sinha, and S. Bhattacharyya, "Examining the effect of Withania somnifera supplementation on muscle strength and recovery: A randomized controlled trial," *J. Int. Soc. Sports Nutr.*, 2015, doi: 10.1186/s12970-015-0104-9.

[5] "ashwagandha-superfood-powder-and-root-royalty-free-image-1041090420-1567611386." https://www.runnersworld.com/nutrition-weight-loss/a28912982/what-is-ashwagandha/ (accessed Aug. 01, 2018).

[6] M. Elhadidy, H. Sawie, N. Meguid, and Y. Khadrawy, "Protective effect of ashwagandha (Withania somnifera) against neurotoxicity induced by aluminum chloride in rats," *Asian Pac. J. Trop. Biomed.*, 2018, doi: 10.4103/2221-1691.221139.

[7] S. Kushwaha, A. Betsy, and P. Chawla, "Effect of Ashwagandha (Withania somnifera) root powder supplementation in treatment of hypertension," *Stud. Ethno-Medicine*, 2012, doi: 10.1080/09735070.2012.11886427.

[8] S. Shenoy, U. Chaskar, J. S. Sandhu, and M. M. Paadhi, "Effects of eight-week supplementation of Ashwagandha on cardiorespiratory endurance in elite Indian cyclists," *J. Ayurveda Integr. Med.*, 2012, doi: 10.4103/0975-9476.104444.

[9] M. Ziauddin, N. Phansalkar, P. Patki, S. Diwanay, and B. Patwardhan, "Studies on the immunomodulatory effects of Ashwagandha," *J. Ethnopharmacol.*, 1996, doi: 10.1016/0378-8741(95)01318-0.

[10] V. R. Ambiye, D. Langade, S. Dongre, P. Aptikar, M. Kulkarni, and A. Dongre, "Clinical evaluation of the spermatogenic activity of the root extract of Ashwagandha (Withania somnifera) in oligospermic males: A pilot study," *Evidence-based Complement. Altern. Med.*, 2013, doi: 10.1155/2013/571420.