

IMMUNOMODULATORY EFFICIENCY OF *TINOSPORA CORDIFOLIA* AGAINST  
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## ABSTRACT

Most of the cases, viral infected patients are suffering from secondary infections. Apart from that, due to the exhausted immune system patients more vulnerable to secondary infections and various diseases. Dysfunction of the immune system is responsible for multiple illnesses, such as arthritis, ulcerative colitis, asthma, allergies, parasites, cancer, and infectious diseases. So, medicinal plants and their active components are becoming increasingly relevant as a source of immunomodulatory agents. *T. cordifolia* stem extracts or the isolated compounds of the plant exhibits amazing immune stimulatory effects in various ways. Isolated compounds of *T. cordifolia* such as N-methyl-2-pyrrolidone and 11-hydroxymustakone, Magnoflorine and Tinocordiside shows immunomodulatory effects by enhancing Reactive Oxygen Species (ROS) generation which causes to augment the immune response. *T. cordifolia* extract exhibits a considerable effect of the immunostimulation in HIV positive patients and, increases the phagocytosis and intercellular killing capacity by increasing the survival rate and polymorphonuclear leucocyte function. In addition to that, a novel (1,4)- $\alpha$ -D-glucan from *T. Cordifolia* activates the immune system by activating macrophages via of TLR6 signaling and NF- $\kappa$ B activation mechanism, leading to cytokine and chemokine production. Immunoductatory protein (ImP) obtained from the dry stem powder of *Tinospora cordifolia* is significant for augmenting the various immunological activities in the human body. Hence, more attention should be focused on the phytochemistry and their applications of the *Tinospora cordifolia* for immune enhancements as well as reduce secondary infections risks along with the viral infections.

**KEYWORDS:** *Tinospora cordifolia*, Immunomodulatory, Viral infections, Phytochemistry.

## 1. INTRODUCTION

Plants are used in both structured (Ayurveda, Unani) & Unorganized (folk, tribal, native) ways as therapeutic agents since time immemorial. In both the developing and developed countries, the demand for medicinal plants is increasing. Medicinal plant science is one of the leading research areas globally. Any of these medicines are believed to promote good health and preserve organic resistance against infection by restoring body balance and conditioning the body tissues. Meanwhile, a valuable plant was found as a perfect immune-stimulatory herb called *Tinospora cordifolia*. Apart from the normal anti-bacterial, anti-viral, anti-cancer, properties, and various health benefits, *T. cordifolia* exhibits immune-stimulatory efficiency by augmenting macrophage chemotaxis, phagocytosis and promotes interaction with other immune-regulatory lymphoid cells.<sup>[1]</sup>

A summary of morphological features of the *Tinospora cordifolia* can be described as Flowers are unisexual, axillary, leaflet branches 2–9 cm long and greenish-yellow in color, male flowers are clustered, the female is usually solitary. The fruits are single-seeded, the winter fruits and the summer flowers. The root is thread-like, aerial, often constantly extending the touch of the ground. And aerial roots are characterized by tetra to the primary structure of the pent arch. The seeds are in a curved form and the endocarp is ornamented in various ways.<sup>[2,3]</sup> *T. cordifolia* (synonym: *Tinospora sinensis*) is also known as Guduchi/Amrita in India and its names in Latin: *Tinospora cordifolia* (Wild), English: *Tinospora* /Indian *Tinospora*, Hindi: Giloya, Sanskrit: Amritha, and Sinhala: Rasakinda. It belongs to the family of Menispermaceae and is found in Myanmar, Sri Lanka, and China.<sup>[4]</sup>