

## A Review on Effect of Methanolic Extract of *Vitex Negundo* (L.) on Haloperidol Induced Catalepsy in Albino Mice

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### ABSTRACT

Decreases in brain dopamine (DA) lead to catalepsy, quantified by the time a rat remains with its forepaws resting on a suspended horizontal bar. Low doses of the DA D<sub>2</sub> receptor-preferring antagonist haloperidol repeatedly injected in a particular environment led to gradual day-to-day increases in catalepsy (catalepsy sensitization) and subsequent testing following an injection of saline reveal conditioned catalepsy.

*Vitex negundo* Linn., belong to family: *Verbenaceae*. The plant is traditionally reported for its use for the treatment of cough, fever, eye disease, intestinal worms, skin diseases, nervous disorders, leprosy and rheumatism. Roots are tonic, anodyne, febrifuge, expectorant and diuretic. The vitex negundo plant has aromatic, vermifuge, antiasthmatic, antiandrogenic, hepatoprotective, antiradical, analgesic and antiinflammatory properties. The leaves of vitex negundo reported to possess dopaminergic activity.

There are plenty of synthetic drugs used to treat psychosis but not enough blissful for patients, moreover, these synthetic drugs have potential side effects. After decades of serious obsession with the modern medicinal system, people have started looking at the ancient healing systems like Ayurveda, Siddha, and Unani. Many scientists are researching over plant-based medicines and new phytoconstituents for treating these kinds of disorders and there are lots of publications on plants. Available medicines are not sufficient to treat psychosis and other neurological disorders; further outcome should come into light that's the purpose of our review.

**Keywords:** *Vitex negundo* Linn, Catalepsy, Dopaminergic activity, Dopamine

### INTRODUCTION

Catalepsy is a condition in which the animal maintains imposed posture for long time before regaining normal posture. A normal animal will correct its position within seconds and explore its environment but a cataleptic animal will maintain this externally imposed posture for a prolonged period of time [1]. Catalepsy is thought to share similarities with symptoms of human neuropsychiatric diseases such as Parkinson's disease (PD) and damage involving parts of the basal ganglia [2]. Decreased dopamine (DA) transmission at postsynaptic D<sub>2</sub> receptors has been implicated in catalepsy produced by antipsychotic drugs. Mice lacking post-synaptic D<sub>2</sub> receptors exhibit profound Parkinson-like motor deficits [3]. Disrupting DA transmission with low doses of a potent D<sub>2</sub> receptor- antagonist such as haloperidol or with partial bilateral 6-hydroxydopamine lesions of the striatum or the medial forebrain bundle leads to the development of catalepsy sensitization in rats [4]. This sensitization is context-dependent; testing the animal in a different context

abolishes catalepsy. When rats are given saline in the context previously associated with haloperidol, they exhibit conditioned catalepsy [5].

*Vitex negundo* (L.) (Verbenaceae); locally known as 'Nirgundi' an important medicinal plant with woody, aromatic deciduous shrub growing to a small tree [6] (**Figure 1**). It thrives in humid places or along water courses in wastelands and mixed open forests and has been reported to occur in Afghanistan, India, Pakistan, Sri Lanka, Thailand,

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Malaysia, eastern Africa and Madagascar [7]. The leaves contain major constituents; caryophyllene oxide,  $\beta$ -caryophyllene oxide, viridifloral, globulol, sabinene, and gamma-terpinene. The leaves comprised with aromatic, vermifuge, antiasthmatic, antiandrogenic, hepatoprotective, antiradical, antilipoperoxidase, analgesic and anti-inflammatory, cough suppressant, anti-ulcers, and antitumor activities, and are used in the treatment of rheumatic disease, headache, catarrhal fever, cervical spondylitis, and convulsions. The *Vitex agnus* is reported to possess dopaminergic activity [8,9].



**Figure 1.** *Vitex negundo*.

Neuroleptic-induced catalepsy in rodents has long been used as an animal model for screening drugs for Parkinsonism and it is a robust behavioral method for studying nigrostriatal function and its modulation by cholinergic, GABAergic, serotonergic and nitrergic systems [10]. Evidence indicates that drugs which potentiate or attenuate neuroleptic induced catalepsy in rodents might aggravate or reduce the extrapyramidal side effects respectively [11].

Haloperidol-induced catalepsy in rodents is a typical narcoleptic procedure is equal to human extrapyramidal side effects generated by antipsychotic drugs [12,13]. Haloperidol, (A non-selective  $D_2$  dopamine antagonist) and metoclopramide (a potent dopaminergic blocking agent) induced catalepsy is predominantly involved in blockade of dopamine receptors in the striatum also inhibit the dopamine transmission [3,14].

*Vitex negundo* (L.) increases dopamine transmission and inhibits neuroleptic-induced catalepsy. According to Kamlekar and Gupta [15] showed polyherbal formulation of *Vitex negundo* decreases haloperidol induced catalepsy in comparison with scopolamine in mice significantly. Moreover, the test drug was shown quicker onset of action as compared to scopolamine. The mechanism behind the anticataleptic activity of *vitex negundo* (L.) in rodent models carries antidopaminergic activity.

## RESULTS AND DISCUSSION

Since ancient times, people have been using plants in various ways as a source of medicine. We believe that plants having

the potential anticataleptic activity like *Vitex negundo* (L.) can be added as adjuvant therapy in psychosis and other mood disorders along with respective medication like antipsychotic drugs. We can conclude that herbal plants are very rich source of phytochemicals involve in anticataleptic activity. However, further studies are required to find out the exact mechanism behind anticataleptic effect and isolating the active compounds involved for making newer medicinal product.

## CONCLUSION

Allopathic medications like Antipsychotics are majorly associated with extra pyramidal side effects induced catalepsy with other minor side effects such as dry mouth, blurring of vision, constipation, urinary hesitancy in elderly males, drowsiness, lethargy, mental confusion, postural hypotension, palpitation, inhibition ejaculation, hyperprolactinemia, amenorrhea, infertility, galactorrhea and gynecomastia. To overcome this, natural medicines after evaluation can be included in treatment procedure of psychosis due to less side effect profile. The aim of our study is to find out new and innovative treatment for psychosis having fewer side effects (sedation and anti-cholinergic effect), with lower toxicity in higher dose, rapid onset of action, greater efficacy, effective in patients non-responsive to Phenothiazine and Atypical Antipsychotics.

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