

## REVIEW ON: PHARMACOLOGICAL ASPECT OF MEDICINAL HERB

### *COLEUS FORSKOHLII*

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#### ABSTRACT

*Coleus forskohlii* is a perennial herb belonging to the family Lamiaceae. It is an important plant used in Ayurvedic medicine for curing various diseases. The tuberous root of *Coleus forskohlii* is found to be a rich source of forskolin, which has pharmacological therapeutic benefits in conditions such as asthma, angina, cancer, psoriasis, overweight, hypertension, polycystic ovarian syndrome (PCOS), antimicrobial, antifertility, antifeedant, anti-oxidant, and anti-stress activity.

**Keywords:** *Moringa Olifera*, Tissue culture, anti-oxidant, Biopesticide

#### INTRODUCTION

*Coleus forskohlii* is a botanical plant that has been used since ancient times in Hindu and Ayurvedic traditional medicine<sup>1</sup>. The existence of traditional medicine depends upon plant diversity and the related knowledge of their use as herbal medicines. India is one of the twelve mega diversity hot spot regions of the world and the fifth of all plants found in India are used for medicinal purposes<sup>2</sup>.

*Coleus forskohlii* Briq is a perennial, branched herb belonging to the botanical family of Lamiaceae (Labiatae). It is called Gandhamulika in Sanskrit, Pashanbhed in Hindi, Makandiberu in Karnataka, Marunthu kookankizhanku in Tamil<sup>3</sup>.

**Taxonomical Description:<sup>4</sup>**

**Table-1 Taxonomical Classification of *Coleus forskohlii***

<b>Kingdom</b>	<b>Plantae</b>
Phylum	Angiospermae
Class	Dicotyledoneae
Order	Tubiflorae
Family	Laminaceae
Genus	Coleus
Species	Forskohlii



**Botanical Description:<sup>5</sup>**

**Table-2 Botanical Description of *Coleus forskohlii***

Height	40-60 cm tall
Stem	It has four angled stems that are branched and nodes are often hairy
Leaves	Leaves are 7.5 to 12.5 cm in length and 3-5 cm in width , usually pubescent ,narrowed into petiol
Inflorescence	Raceme , 15 to 30 cm in length
Flowers	Are sout , 2-2.5 cm in size , usually perfect & calyx hairy inside
Calyx	The upper lip of calyx is broadly ovate
orolla	The blue and lilac corolla is bilabiate Lower lobes are elongated and concave so that it inclose the essential organ.
Ovary	It is four parted & stigma is two lobed & flowers are cross pollinated by insects or wind
Root	The root is typically golden brown, thick, fibrous and radially spreading .Roots are tuberous , fasciculate , 20 cm long & 0.5 to 2.5 cm in diameter , conical fusiform, straight, orangish within an strongly aromatic . <i>Coleus forskohlii</i> is the only species of genus to have fasciculate tuberous root.
Odour	The entire plant is aromatic. The leaves and tubers have quite different odours.

## PHARMACOLOGICAL APPLICATION:

### (1) Metabolic Syndrome in Overweight and Obese Subject <sup>6</sup>:

*C.forskholi* extract in conjunction with a hypocaloric diet significantly improved insulin and insulin resistant and thus may be useful in the management of metabolic risk factor. Which significantly increase the HDL –Cholesterol.

### (2) Hypertension <sup>7</sup>:

*Forskholin* is the extract from the tuber of the *C. forskholi* (wild) Briq plant which has been proven to have blood pressure lowering and antispasmodic effect. It has been described as an activator of adenylate cyclase in rabbit heart membrane. It bypass the  $\beta$  receptor and G protein. Lowering of blood pressure is not mediated by central effect of *C.forskholi* rather it directly vasodilatory action, through its smooth muscle relaxation property.

### (3) Polycystic Ovarian Syndrome <sup>8</sup>:

*C.forskholii* decreased IL-2 and IL-6 in rat with androgen induced Polycystic Ovarian Syndrome. Opioid and immune system were impaired in hyper androgenized rat (Polycystic Ovarian Syndrome model) and the *C. forskholii* treatment could restore most of these functions indicating.

### (4) Antimicrobial activity <sup>9,10</sup>:

Antimicrobial activity of root extract (Petroleum ether, diethyl ether, chloroform, methanol) against some bacteria *Staphylococcus aureus*, *Pseudomonas fluorescens*, *Sericea*, *Klebsiella pneumoniae* and *Bacillus pumilus*. Plant extract in polar and less polar organic solvent against some fungi *Aspergillus flavus*, *Aspergillus parasiticus*, *Trichoderma rubrum*, *Microsporium gypseum* causing skin disease. The leaf extract of *C.forskholii* have a potential broad spectrum antibacterial against *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Salmonella typhi* and *Klebsiella pneumoniae*.

### (5) Antifeedant Activity <sup>11</sup>:

The plant extract of *forskolin* *C.forskholi* was found to have significant antifeedant effect on the fourth instar larva of *Papilio demoleus*. The present plant extract of *forskolin* had both suppressant and deterrent properties.

**(6) Lipid lowering action <sup>12</sup>:**

*C. forskohlii* interfere with pancreatic lipase which results in inhibition of absorption of dietary fat and the weight loss effect, due to this specific mechanism of action, the undigested fat may result in gastrointestinal side effect and poor absorption of fat soluble nutrient e.g Vitamin A, D, E and K.

**(7) Female sexual disorder <sup>13</sup>:**

*Coleus forskohlii* contains *forskolin* as a main active moiety. Activation of adenylate cyclase by *forskolin* results in marked increases in levels of intracellular cyclic AMP in a variety of eukaryotic cells. In turn Cyclic AMP reduces the calcium level which causes relaxation of smooth muscles and increase in the vaginal secretion

**(8) Skin Eruption and Acne <sup>14</sup>:**

*Coleus forskohlii* oil effectively inhibit the growth of skin pathogen including *propionbacterium acne* micro-organism associated with acne and other skin infections. Staphylococcus aureus a bacterial strain found in infected wound and skin eruption including acne. Bornyl acetate is responsible for this activity.

**(9) Anti-Stress Activity <sup>15</sup>:**

Forskolin isolated from hydroalcoholic extract of rhizome *Coleus forskohlii* using column chromatography and TLC purification. The potent compound forskolin reveal that compound used in the treatment of Neurological disorder(Stress).

**(10) Anti-Oxidant <sup>16</sup>:**

*Coleus forskohlii* is responsible for free radical scavenging activity. The leaf and callus extract of *Coleus forskohlii* acts free radical inhibitors and thus as primary anti-oxidant that react with radical due to the addition of sugar, phosphate, nitrate and calcium. *Coleus forskohlii* producing rosmarinic acid in larger quantities produces anti-oxidant activity.

**(11) Hyperglycemia <sup>17,18,19,20,21,22</sup>:**

*Coleus forskohlii* predominant decreased basal glucose in healthy rats and attenuated the severity of hyperglycemia in diabetic rats. The level of 8-OHdG also tends to decrease in diabetic rats. *Coleus forskohlii* stimulated insulin release via elevation of intracellular cAMP on pancreatic  $\beta$  cells. It is conferred cytoprotective by decreasing and that it increased the expression of insulin gene.

**(12) Abortive Action** <sup>23</sup>:

Extract of *Coleus forskohlii* have been used in folk medicine to interrupt pregnancy. A study on pregnant rat showed that treatment with the highest dose of *Coleus forskohlii* extract (880 mg/Kg per day) an anti-implantation effect. These finding justify the use of *Coleus forskohlii* extracts for abortive purpose<sup>23</sup>.

**(13) Anti-cancer** <sup>24</sup>:

Ethanollic extract exploits this possess by selectively inducing cell death through ROS dependent apoptotic pathway in Hep G2 cells, which possess anticancer properties.

**CONCLUSION:**

*Coleus forskohlii* natural source of *diterpenoid forskolin* having various pharmacological treatment in various disease. *Coleus forskohlii* is an ornamental plant have been medicinal diversity used in cosmetic like cream, perfume because of presence of volatile oil is an indigenous. Indian medicinal plant having a lot of pharmacological activities because of stimulation of adenylate cyclase by increasing cAMP by which it inhibits platelet aggregation, vasodilation, bronchodilation, etc. In this review article we focus on various aspect of pharmacological activity of plant.

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