

# **Review on benefits of North Eastern Herb *Eryngium foetidum* on Parkinson disease**

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## **Abstract:**

*Eryngium foetidum* Linn., commonly known as Culantro or cilantro of northeastern biennial herb that is being used predominantly as a medicinal herb/plant particularly in very tropical regions. It is of increasing popularity as a spice cultivated in Asian countries like Vietman, India and other countries also with well established procedures for high yield. Various uses of this plant in ethno-medicine including treatment for stomach ache, worms, fever, constipation, fits, high blood pressure, infertility, malaria, diarrhea and even snake bites. In vitro analysis of *Eryngium foetidum* showed presence of saponin, tanins, flavonoids, & triterpenoids but very little information on alkaloid content. Several pharmacological finding of the aerial part of this plant have well documented anti-helminthic activity due to Eryngial content, anti-inflammatory response, anti-convulsant activity and also antibacterial activity particularly against Salmonella. Previous report suggests various benefits of this herb, warrants further research in this field and needs thorough investigation.

**Keywords:** Neurodegenerative diseases, Parkinson's disease, *Eryngium foetidum*, free radicals.

## **INTRODUCTION**

Today Parkinson's disease (PD) is categorized as one of the major neurodegenerative diseases that affect the physical, psychological and functional status of an individual. It is considered as second largest neurodegenerative disorder worldwide. This disorder is common disease among elderly aged population, 50-65 years. Parkinson's disease (PD) is a condition better known as motor system disorder that exhibits loss of dopamine producing brain cells. The most obvious symptoms of this disorder are shaking, slow movements and difficulty with walking. Dementia and depression also occurs commonly in people suffering from Parkinson's disease [34]. Bradykinesia is another prominent symptom of PD, which is characterized by slow movements.

Current therapies are aimed at symptom management. . There is no permanent cure to PD but there are a few drugs that slow down the progression of this disorder. Dopamine agonists are used for example bromocriptine, pergolide, lisuride etc. that cures dyskinesia [5]. However, there are risks involved in using such drugs. It can cause leg and ankle edema, impulse control disorders like hyper-sexuality [5]. It also causes hallucinations and confusions in elderly patients [5]. Another drug used is Amantadine, but its effects tend to reduce over time and it can also induce hallucinations and ankle edema [5]. Levodopa is also used as a treatment but it also has side effects causing dyskinesias and stiffness of the body.

Combination of several herbs has been used by the traditional Indian medicine system to cure PD like *Bacopa monnieri*, *Cantella asiatica* [19, 37]. It has been studied that reactive oxygen species is a significant reason for the progression of this disease [22] It has also been studied that Flavonoids can reduce the oxidative stress in neurons [12, 13, 18]. It has been found that *Eryngium foetidum* contains flavonoids [34]. *Eryngium foetidum* is a traditional plant and it is widely distributed worldwide. In India it is commonly found in the North Eastern region [35]. In Tripura it is locally called as "Owarphakeitom" by the bishnupriyamanipuris. In Assam it is locally called as "Gongardhunia" [35]. *Eryngium foetidum* is a perennial herb belonging to family Apiaceae. It is commonly called as the Mexican coriander. It has been extensively used as a medicinal plant in most of the tropical regions [26]. It has been traditionally used as antimalarial, curing hypertension, in burns, in cases like infertility, curing headache and fever too. It has been also studied as anthelmintic, anticonvulsant, anti inflammatory, antibacterial etc. [26]. In a recent study by authors found effects of the extract of *Eryngium foetidum* on the locomotory and memory of invertebrate model system i.e. *Drosophila melanogaster* (fruit fly). Cypermethrin has been used as a test chemical to induce neurotoxicity at a dose of 0.02ppm [20, 21].

The extract of *Eryngium foetidum* was used to study the emergence of the flies. *Drosophila melanogaster* has been used as a model organism in various studies because it is time effective, cost effective and it provides easy way to evaluate the efficacy of potential therapeutics [25]. It has gene homology of about 75% with human genome.

### **The northeastern green gold, *Eryngium foetidum***

Culantro (*Eryngium foetidum*) is a tropical biennial herb that grows best in moist environment near open banks. It belongs to the family Apiaceae. Its common names include Mexican coriander, spirit weed, bandhania and shado beni [3]. In Assam it is called as Gongar dhundia [35]. It is used as food and medicine in South America and West Indies [3]. In Northeastern region of India it is used as a food [27]. It is used for garnishing as it has a strong flavor and is also used as a salad in a Northeast India. Its essential oil has great international market value [11]. Traditionally it is used for curing fever, headache, infertility, malaria, diarrhea etc. Despite many traditional uses, only a few studies have been done on this plant.

### **PHYTOCHEMISTRY**

The parts of this plant is very rich in Ca, Fe, vitamin A, B, C, carotene and also oils [23, 29]. In the study conducted by Ramcharan [29] in the year 1999 showed that the fresh leaves contains 85% moisture, 3.3% protein, 0.02% iron, 6.5% carbohydrate, 1.7% ash, 0.06% phosphorous. It has been found that the major constituent of the essential oil is E-2 dodecenal also called Eryngial [12]. *Eryngium foetidum* is an alkenal and it was found in various amounts in the extract of the leaves of *Eryngium foetidum* from different countries. In EF from Malaysia it was 59.7% [2], in India it was 45.9% [1], in western Nepal it was 58.1% [36]. Hill J *et al.* [10] in the year 2004 conducted an experiment that showed that Eryngial inhibited human cytochrome P450 2E1. This study suggested that consuming this extract containing Eryngial could inhibit drug metabolism [26].

### **ANTHELMINTIC ACTIVITY**

In a study conducted by Forbes WM [6,7], *Fryngium foetidum* was effective against a parasite *Strongyloides stercoralis*. This parasite is highly infective and it infects via skin penetration. The disease is epidemic in the Caribbean region [6]. Among the 25 Jamaican medicinal plants used, *Eryngium foetidum* was the most effective against the third stage larva of *Strongyloides stercoralis*.

### **ANTICONVULSANT ACTIVITY**

An ethnographic survey was done and 14 plants were collected that claimed to be the traditional cure to malaria. Anti-plasmodium screening showed that the extracts from the leaves of *Eryngium foetidum* was effective against the plasmodium [30]. It has been studied that it was also used as a traditional cure against fits (sudden violent attack of a disease e.g. epilepsy) [30]. Previous study exhibited improved on epilepsy in rat following treated with *Eryngium foetidum*. It was found that the aqueous extract of the leaves and stem of *Eryngium foetidum* when imparted intraperitoneally to the rats, showed equal effectiveness against epilepsy as Phenobarbitone [24]. Epilepsy is a neurological disorder that causes convulsions, muscle spasm and loss of consciousness. It was also found that the extracts inhibited writhings induced by acetic acid in mice [32]. Different component of the *Eryngium foetidum* is documented previously [4].

### **ANTI-BACTERIAL EFFECTS:**

In a study done by Kubo [15], it was found that the Eryngial showed potent activity against *Salmonella choleraesuis* at all growth stages. Weak activity was shown against *Heliobacter* species at a concentration of 1mg/ml methanol. In a study done by Guevara et al. suggests that the extract from EF was the most effective against *Erwinia* genus of Enterobacteriaceae [9].

### **ANTI- INFLAMMATORY AND ANTI CARCINOGENIC EFFECTS:**

*Eryngium foetidum* showed topical anti-inflammatory activity as it inhibited swelling of mouse ear induced by 12-O-tetradecanoylphorbol acetate [32]. The extract of *Eryngium foetidum* also showed inhibition of abdominal writhings induced by acetic acid. Hence, the study showed that extracts of *Eryngium foetidum* contains peripheral and central analgesic properties [32]. A study done by M.D. Garcia [8] *et al.* showed that the stigmasterol and hexane was active in reducing the edema in the ear of the rat induced by 12-O-tetradecanoylphorbol acetate [8]. Stigmasterol showed 41% inhibition at a concentration of 1 mg/ear. In a study conducted by Kamonwan Promtes *et al.*, the effect of the extract of *Eryngium foetidum* was observed [28]. It was also observed that the mice, which were fed by 3.2%, *Eryngium foetidum* had less body weight than the control [28].

### **OTHERS**

There are many ethnomedicinal claims of *Eryngium foetidum*. The paste from the leaves and stem is applied on the forehead as remedy for headache [14]. *Eryngium foetidum* decoction prepared from leaves of the plant is used to cure common cold in babies. The baby is bathed in small amount of decoction and a little amount of the decoction is drunk [31, 33]. To cure fever in child, the leaves and the roots of the *Eryngium foetidum* plant is used. It is mixed with blauwsel and oil of *Cocos nucifera* and the body of the baby is rubbed with it [31]. Ethnomedicinal claims show that *Eryngium foetidum* is used for menstrual pain, remove placenta and shorten labour [16]. However, more data is needed. The detailed ethno medicinal uses of *Eryngium foetidum* are listed in a study done by Paul and his colleague [26].



**Figure 1:** Northeast Cilantro or Cilantro, *Fryngium foetidum* Linn.

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