**Evolvulus alsinoides**: An Emerging Antibacterial Medicinal Herb

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**Abstract**

Nowadays, antibiotic resistance, a global problem is growing rapidly. Many existing antibiotics are associated with multidrug-resistant pathogens. Antibiotic resistance may lead to higher medical costs, and increased mortality. Many infectious diseases have been treated with several herbal drugs since ancient times. In previous studies, several medicinal plants showed promising antimicrobial activities. In this short commentary, we reviewed the antibacterial activity of *Evolvulus alsinoides*.

**Keywords:** Antibiotics; Infectious diseases; Anti-diabetics; Epilepsy

**Introduction**

Despite the recent advancements in antibiotics development still, infections are the primary cause of death worldwide, especially in developing countries. In a previous report it has been reported that worldwide approximately 700,000 people die due to infections that are resistant to current antibiotics, and by 2050, the number will be increased to 10 million per year [1]. In previous studies, it is well documented that efficiency of antibiotics is gradually more challenged by the emergence of pathogenic strains exhibiting high levels of resistance and several mechanisms are involved in antibiotic resistance [2-13]. Nowadays, scientists are trying to find some novel antimicrobial drugs which have broad-spectrum activity (including gram-negative and gram-positive bacteria) with or without minimal side effects. The researchers are exploring the variety of medicinal plants which are described in alternative system of medicines such as Ayurveda, an Indian system of medicine, a Chinese system of medicine for antibacterial activity. Therefore, there is an urgent need of compounds/drugs to treat bacterial infections and prevent or delay the emergence of antibiotic resistance.

Out of several medicinal herbs (*Clitoria ternatea, Allium sativum, Allium cepa, Aloe vera*) with the antibacterial activity mentioned in Ayurveda, *Evolvulus alsinoides* is also well-known for the antibacterial activity. *Evolvulus alsinoides* (L), belonging to the family Convolvulaceae, is a small, hairy, procumbent, diffuse perennial herb with a small woody and branched rootstock [14]. Traditionally, this plant is being used for the treatment of fever, cough, cold, venereal diseases, bronchitis, biliousness, epilepsy, leucoderma, azoospermia, adenitis, dementia and used to promote to hair growth, improves the complexion and appetite [15-17]. Besides the traditional uses, this medicinal herb is also well-known for various pharmacological activities such as an antioxidant, anti-convulsant, anti-diabetic, nootropic and anxiolytic [18-21]. Additionally, hydroalcoholic extract of *Evolvulus alsinoides* ameliorated the streptozotocin-induced cognitive impairment in rats [22].

**Antibacterial activity of Evolvulus alsinoides**

The methanolic extract of *Evolvulus alsinoides* (150 µl/disc) leaf showed the broad-spectrum antibacterial activity against pathogenic bacterial strains (*Escherichia coli*, *Klebsiella pneumoniae*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*) responsible for various common infectious diseases [23]. In another *in vitro* study, the ethanolic extract of the whole plant of *Evolvulus alsinoides* demonstrated the broad-spectrum antimicrobial activity against various pathogens including *Salmonella typhi*, *Klebsiella pneumoniae*, *Bacillus cereus* and *Staphylococcus aureus*, *Pseudomonas*, *Proteus*, *Streptococcus*, *Escherichia* [24,25].

Additionally, the ethanolic extract of the whole plant of *Evolvulus alsinoides* also showed the bactericidal activity against various clinical pathogens including *Staphylococcus aureus*, *Vibrio cholera*, *Salmonella para A, Salmonella para B* [26]. However, in another study, it was found that the ethanolic extract of *Evolvulus alsinoides* (whole plant) exhibited the antibacterial activity against *Pseudomonas aeruginosa* and *Escherichia coli* but found ineffective against *Staphylococcus aureus* and *Candida albicans* [27]. Furthermore, the methanolic extract of *Evolvulus alsinoides* leaf was found effective against gram-positive and gram-negative bacteria [27]. Furthermore, Saranya et al. investigated the antimicrobial activity of the methanolic extract of leaves, stem, root, and flowers of *Evolvulus alsinoides* using agar well diffusion method [29]. They found that root extract of *Evolvulus alsinoides* showed maximum antibacterial activity indicating the potential of this herb as an alternative treatment option against various resistant strains of bacteria [29]. Moreover, the aqueous and methanolic extract of the whole plant of *Evolvulus alsinoides* displayed strong antimicrobial activity against *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Klebsiella pneumoniae* and *Vibrio cholera* [30,31].

The flavonoid and alkaloids present in *Evolvulus alsinoides* may be responsible for the antimicrobial activity. The ethanolic and ethyl acetate of *Evolvulus alsinoides* leaves also showed the bactericidal activity in the previous study [32]. The ethanolic extract showed maximum bactericidal action against *Escherichia coli*, *Bacillus subtilis*, and *Pseudomonas aeruginosa* while the ethyl acetate extract indicated excellent growth inhibition against the *Bacillus subtilis* only [32]. Nonetheless, the aqueous extract of the whole plant of *Evolvulus alsinoides*...
alsinoides showed promising bactericidal activity against *Helicobacter pylori* which may be responsible for the gastroprotective effect of this medicinal herb [33].

**Conclusion**

The reports from earlier studies show the efficacy of *Evolvulus alsinoides* against both gram-positive and gram-negative bacteria. The broad-spectrum antimicrobial activity of *Evolvulus alsinoides* indicates the therapeutic potential for the treatment of various infectious diseases and supports the traditional use of this medicinal herb. Further clinical studies are required to validate the efficacy of this medicinal plant against various pathogens and various resistant strains of bacteria.

**References**