



Short Communication



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## Natural Alternatives to Antibiotic Agents

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### Abstract

Medicinal plants have played a very important role in the rejuvenation of worse situation created by the infection of microorganisms. In addition, many new structures of Antibiotic agents are developed using medicinal plants as the resource. Plants are oldest source of pharmacologically active compounds. In the field of Ethnopharmacology, the search for new anti-infection agents has occupied many research groups in the past few decades. According to estimation more than two thirds of the world's population relays on plant derived drugs. There are no of plant products like garlic, Aloe Vera, Croton Latex, Eucalyptus Essential Oil, Grapefruit seed extract (GSE), Usnea and etc., used as a natural antibiotics in the treatment of burns, respiratory tract infections, stimulates immune system, lowers blood pressure, severe diarrhea and etc.

**Keywords:** Antibiotics, Herbal Medicine, Medicinal Plants, Resistance.

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## 1. INTRODUCTION

Medicinal plants are part and package of human society to fighting against diseases from the dawn of civilization. Medicinal plants are rich sources of antimicrobial agents. Plants are used medicinally throughout the world and are the source of potential and powerful drugs.<sup>1</sup> A wide range of medicinal parts The herbal products today indicate safety in distinction to the synthetics that are regarded as dangerous to human and environment.<sup>2</sup>

Due to the overuse of prescription antibiotics which can lead to the development of antibiotic-resistant strains of bacteria, many medical experts are taking a new look at natural, safe antibiotic alternatives. There are a number of natural herbal antibiotics that should be studied and keep on hand repeatedly. To battle against any kind of infection or illness, medicines prepared from the natural herbs can be used which are relatively inexpensive, and can be stored for a year or more at room temperature.

The conventional medical establishment has recently warmed up to the immense potential of using herbal medicines for fighting infections. The number of natural substances that fight infection is surprising, and the research for discovering new such substances still continues. These natural substances either contain antibiotic properties in themselves, or provide to spur the production of the body's own protection mechanisms.

Human beings have been using herbal medicines for more than 60,000 years! And those herbal medicines are still used by 80% of the world's population as their primary health care (statistic from the World Health Organisation). It has been estimated that in the developed countries like United States, herbal drugs constitute 25% of the total drugs, while in fast developing countries like China and India, the contribution is as much as 80%.<sup>3</sup>

Herbal antibiotics have very complex nature. These antibiotics are used for killing bacteria, cleanse the blood, strengthen the immune system, increase the mucous membrane tone and increase the functions of particular organ systems. Thus, instead of simply killing bacteria by using 'antibiotic' plants, they treat the imbalances of the whole body.

## 2. EFFICACY OF CONVENTIONALLY USED MEDICINAL PLANTS:

The use of natural products to cure diseases represents an area of great interest in today's research. The use of plants is a widespread practice in India and the persistence in the use of medicinal plants among the people of urban and rural Indian communities could be considered as evidence of their efficacy.<sup>4</sup> Although a very few experimental studies have been conducted

for validating the therapeutic properties of the herbs in India but there exists an important local ethnobotanical bibliography describing the most frequently used plants in the treatment of conditions consistent with diseases.

### Description of plants:

**Aloe Vera:** Aloe vera is a powerful medicinal plant used for treating and preventing infection of external wounds, especially burns. It is having a characteristic feature like stimulating cell regeneration so that they heal faster. It is effective against *Staphylococcus aureus* and *E.coli*.

**Berries:** A number of berry plants are known to provide antibiotic benefits. In 1990's Cranberries have been used by women to prevent and cure urinary tract infections. Cranberry and blueberry contains monosaccharide fructose, which inhibits the growth of bacteria. Likewise, raspberry juice has been used as an extract; which significantly reduces the growth of several species of bacteria, including *Shigella*, *E. coli* and *Salmonella*.

**Croton Latex:** This tree sap from the Amazonian tree, *Sangre de Drago*, works like a supernatural on herpes, tropical ulcers and infected wounds. It also creates a film over wounds that help to shield and seal.

**Echinacea:** It is also known as "local bandage" A very well known herb; echinacea tincture applied directly and frequently to the back of the throat is most effective in case of throat infections, particularly caused by *Streptococcus sp.*

**Eucalyptus Essential Oil:** Eucalyptus oil having effective activity against number of microorganisms, mainly used for external application to wounds. It is having antibacterial effects on pathogenic bacteria in the respiratory track.<sup>5</sup>

**Garlic:** Garlic is a common and most powerful herb for the antibiotic-resistant disease treatment. It has been used since the middle ages as protection against the plague. Louis Pasteur described its antibacterial action as early as 1858. Garlic contains a natural compound known as Allicin, which is more powerful than standard Penicillin. Garlic is used for lowering blood pressure, stimulating immune system, lung and digestive system infections. During first and second World Wars garlic was used as an antiseptic to prevent gangrene.<sup>6</sup> In a recent clinical trial it was found that 2.5% of fresh garlic used as a mouth wash, it shows good antimicrobial activity, even though the majority of the participants reported a halitosis (Bad breath) and unpleasant taste.<sup>7</sup>

**Goldenseal:** (*Hydrastis canadensis*), also called orangerooot or yellow puccoon. It is a very potent antimicrobial herb that should be used with caution in

people who are thin and dry. It is useful for many infections including pneumonia, giardia, diarrhea, salmonella, and vaginosis.

**GSE:** Grapefruit seed extract (GSE), also known as citrus seed extract possess the most similar action to medical antibiotics. Although it works extremely well, it also kills off all friendly gut bacteria. Thus it should be used with caution. GSE is mainly used in throat infections and diarrhoea.<sup>8</sup>

**Propolis:** Propolis is a resinous mixture obtained from honey bees. Propolis is a powerhouse of antibacterial alkaloids. It is one of the most effective natural substances for direct application to wounds, and when squirted into the throat can stop the development of colds and tonsillitis.

**Sage:** *Salvia officinalis* (common sage), a small evergreen subshrub used as a culinary herb for infections in the upper respiratory tract (nose, throat, sinuses) and for dysentery.

**Usnea:** Usnea is the scientific and common name for a numerous species of lichen. It has been used medicinally for at least 1600 years. It is slow-growing but productive lichen especially effective for pneumonia, throat infection and staphylococcus sp. It is also very effective as an immune stimulant.<sup>9</sup> Usnea was effectively used in the treatment of surface wounds when sterile gauze and new antibiotics were unavailable. In modern American herbal medicine, *Usnea barbata* is used as an antibiotic, primarily used in lung, urinary tract and upper respiratory tract infections. Usnea has been used as an antibiotic for gram-positive bacteria, and as an antifungal against *Candida albicans*.<sup>10</sup> Along with those treatments some other plants were also used in the treatment of different bacterial illnesses (Table 1).

DISEASE/USES	MICROORGANISM (Disease Caused By)	PLANT SOURCE
Bacteremia	<i>Pseudomonas aeruginosa</i>	Large doses of echinacea, Garlic, Boneset
Blood poisoning	<i>Enterococcus</i> spp	Large internal doses of Echinacea, Garlic, Usnea
Diarrhea (severe)	<i>Shigella dysenteriae</i>	Goldenseal, Garlic, GSE, sage
Food poisoning	<i>Salmonella</i> spp	Garlic, Eucalyptus, Wormwood, Juniper, Goldenseal, Sage, Ginger, GSE, Acacia.
	<i>E. coli</i>	Goldenseal, Garlic, Eucalyptus, Juniper, Ginger, Sage, GSE.
Gonorrhoea	<i>Neisseria gonorrhoeae</i>	Garlic, Acacia spp, Large spotted spurge
Infected wounds	Normal wounds	Croton latex, Propolis, Goldenseal, Garlic, Aloe Vera
Malaria	<i>Plasmodium</i> spp	Cinchona, Wormwood, sweet Annie, <i>Cryptolepis</i>
Pneumonia	<i>Staphylococcus aureus</i>	Usnea, Garlic, Goldenseal, Eucalyptus, Boneset, Wormwood, Essential oils of Thyme and Oregano
	<i>Pseudomonas aeruginosa</i>	Aloe, Eucalyptus, Juniper, Garlic, GSE, Essential oils of Thyme and Oregano
Surgical infections	<i>Enterococcus</i> spp.	External applications of Usnea, Echinacea, Garlic, Eucalyptus
Tonsillitis	<i>Staphylococcus aureus</i>	Propolis, Usnea
Tuberculosis	<i>Mycobacterium tuberculosis</i>	Garlic, Usnea, Boneset, Goldenseal, Red clover, Shizandra, Elecampane
Urinary tract infections	<i>E. coli</i>	Juniper, Uva ursi, Eucalyptus, GSE, Goldenseal, Cranberry

**Table No 1: List of Bacterial Illnesses and Corresponding Herbal Remedies:**

### 3. CONCLUSION:

Development of resistance to antibiotic agents shown by the microorganisms appears to be a continuous process. So every antibiotic has certain life span regarding its efficacy. Scientists have realized an immense potential in natural products from medicinal plants to serve as an alternate source of combating infections in human beings which may also be of lower cost and lesser toxicity. Further work on isolation and characterization of active principles from medicinal

plants and their pharmacodynamics study using latest techniques would be highly beneficial to human beings. Scientists from divergent fields are investigating plants with an eye to their antimicrobial usefulness.

### 4. ACKNOWLEDGEMENTS

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