



# Material Goods of Aloe Vera using Antimicrobial

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**Abstract:** *The purpose of this study was to establish Aloe Vera's antibacterial efficacy and effectiveness. The disc diffusion method was employed to test the antibacterial activity of a concentrated Aloe Vera extract. The presence of zone of inhibition was discovered against Bacteria's like Escherichia coli & Klebsiella. To assess the zone of inhibition, fresh samples of E. coli and Klebsiella were swabbed on the plates and subjected to concentrated Aloe Vera. The zone of inhibition on the agar plates were measured as 10mm and 11mm in diameter. The results obtained in this experiment give credence to the effectiveness & antimicrobial properties of Aloe Vera.*

**Keywords:** Aloe Vera, Effectiveness, Antimicrobial properties, *E.coli*, *Klebsiella*

## I. INTRODUCTION

Plants are acknowledged as the primary medicinal source in some underdeveloped nations for the treatment of numerous infectious diseases. Plant extracts are the result of a never-ending search for new antimicrobial compounds. Approximately 20% of all plants discovered on the planet have been subjected to pharmacological or biological testing and a significant percentage of novel antibiotics are derived from natural or semisynthetic sources (Mothana and Linclequist, 2005). Aloe Vera (*Aloe barbadensis miller*) is a succulent plant that belongs to the Liliaceae family. It has a whorl of elongated, pointy leaves (Strickland *et al.*, 2004; Beckford and Badrie, 2000). The term Aloe Vera comes from the Arabic word 'Alloeh,' which meaning 'bitter,' and refers to the bitter flavor of the liquid contained in the leaves. Aloe Vera thrives in arid environments and is found in India, and other arid regions. Herbal medicine is widely indicated as an application for the species.

Aloe Vera is a drought-resistant, perennial succulent plant. It features stiff green lance-shaped leaves with a core mucilaginous pulp containing clear gel. Its large leaves provide the plant with enough water to endure lengthy periods of drought (Foster, 1999). When the green epidermis of a leaf is peeled, a clear mucilaginous substance appears that comprises fibers, water, and the chemical that keeps the water in the leaf from evaporating. The gel is 99.3% water, while the remaining 0.7 percent is made up of solids, with carbohydrates accounting for the majority of the components, proteins (Glycoprotein), amino acid (7 essential amino acids and 20 amino acid found naturally), enzymes (cellulase, carboxypeptidase, catalase, bradykinase, oxidase, amylase etc.), vitamins (B1, B2, B6, niacin, ascorbic acid, carotenoids, folic acid, etc.), minerals (copper, iron, zinc, magnesium, etc.), other constituents such as phenolic compounds, organic acids (mallic acid, succinic acid etc.) and phytosterol (campesterol,  $\beta$ -sitosterol, etc).

Aloe contains compounds that are antibacterial, antiviral, and antifungal. Above all, the presence of two organic acids, cinnamic and chrysophanic acid, also known as chrysophanol, allows Aloe Vera to inhibit the growth of bacteria and fungi. Aloin, oleic acid, and aloe-emodin are all anthraquinone compounds with anti-inflammatory and antibacterial properties.



## II. MATERIALS AND METHODS

### 2.1 Test Organism

Fresh strains of *Escherichia coli*(*E.coli*) and *Klebsiella* were obtained from the laboratory of the Microbiology department.

### 2.2 Preparation of Extract

Leaves of Aloe Vera were washed and cut opened, the skin was removed and fresh gel was collected. The aloe juice was extracted by pounding the aloe vera gel in mortar by using pestle. The aloe juice was then filtered by filter paper and fresh aloe juice was collected in a test tube.

### Media

Sterile Mueller–Hinton agar:

Ingredients grams/ liter

HM infusion B 300

Acicase 17.5

Starch 1.50

Agar 17.0

Final pH 7.3±0.1

### 2.3 Miscellaneous

Test tubes, Mortar and Pestle, sterile petri plates, sterile cotton swab, sterile disc.

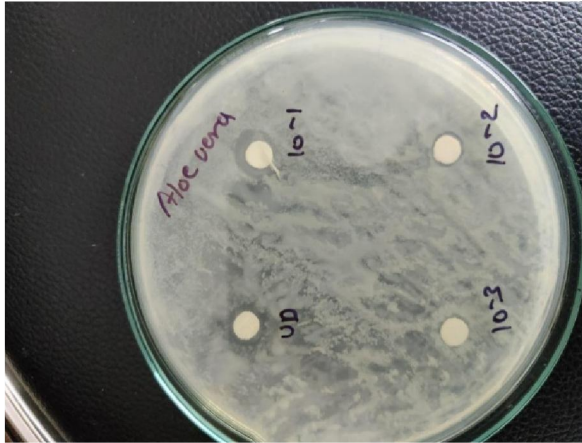
#### A. Antimicrobial Activity of Aloe Vera

First the aloe vera leaves were washed carefully, the leaves were cut opened and the skin was removed gently by using a blade. Then the aloe vera gel was collected and was transferred in mortar. The aloe juice was extracted by pounding the aloe vera gel continuously in mortar by using pestle. The fresh aloe juice was collected and filtered by using a filter paper. This fresh aloe juice was collected in a sterile test tube. A series of dilution ranging from  $10^{-1}$ ,  $10^{-2}$ ,  $10^{-3}$  was made, using water as diluent. Sterile Mueller–Hinton agar media was prepared and poured into sterile petri plates. These plates were allowed to cool and solidify at room temperature.

After solidifying, the Mueller–Hinton agar plates were swabbed with strains of *Escherichia coli* and *Klebsiella* by using a sterile cotton swab on their respective plates. In the meantime, the sterile discs were aseptically immersed in their respective dilutions of aloe vera juice for 1 hour. After the immersion these discs were then transferred in their quadrants respectively. The plates were transferred in an incubator, for the incubation at 37°C for 24 hours.

### III. RESULT

The purpose of this study on Aloe vera was to determine the antibacterial activity Aloe Vera extracts. It showed a larger zone of inhibition at higher concentrations and a smaller zone of inhibition as concentrations are reduced.



Escherichia coli



Klebsiella

The undiluted aloe vera extract showed the zone of inhibition in *Escherichia coli* (12mm), *Klebsiella* (11mm). The aloe vera extract at dilution  $10^{-1}$  showed the zone of inhibition in *Escherichia coli* (8mm), *Klebsiella* (7mm). Aloe Vera extract at dilution  $10^{-2}$  and  $10^{-3}$  showed no zone of inhibition was observed.

Sample		Zone of inhibition in diameter	
Aloe Vera extract	Dilutions	Escherichia coli	Klebsiella
	Undiluted	12mm	11mm
	$10^{-1}$	8mm	7mm
	$10^{-2}$	-	-
	$10^{-3}$	-	-

**Table 1:** Antimicrobial activity of Aloe Vera

### IV. DISCUSSION

Many medicinal plants, the most notable of which is Aloe Vera, are widely utilized in India to treat wounds as possible sources of new antibacterial chemicals. These findings on antibacterial activity are consistent with those of Antonisamy *et al.*, who discovered that DMSO gel extracts of Aloe Vera had varying antibacterial and antifungal activity against five bacterial cultures of *Bacillus subtilis*, *Salmonella typhi*, *Escherichia coli*, and *Staphylococcus aureus*, as well as three fungal cultures of *Aspergillus fumigatus*, *Candida albicans*, and *Penicillium*.

Aloe Vera demonstrated the highest level of action against the pathogens tested, and the level of inhibition varied depending on the extract concentration. The elements of gel and leaf have been confirmed to be separate by scientific data. Some researchers feel the gel is more active than the leaf, but there is no doubt that the gel and leaf may complement each other in terms of therapeutic properties. Although the recognized chemicals in Aloe Vera leaf gel are present in little amounts



(approximately 1%), they can be connected to operate together and provide a synergistic effect, resulting in a complete effect that is bigger than the sum of its parts.

## V. CONCLUSION

This study demonstrated the usefulness of natural products in reducing antibiotic-resistant bacteria, which has posed a threat to human health. As a result, it's vital that medicinal plants with unknown properties become a top priority for senior management in developing countries where residents can't always afford expensive orthodox medicine. In this study, several secondary metabolites were identified in the leaves of Aloe Vera. Plant extracts can also be used to treat a number of ailments, including skin-transmitted infections, according to research. The findings back up the traditional use of Aloe Vera for microbial infection treatment and suggest that it could be exploited to produce novel antibacterial drugs.

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