



PHYTOCHEMICAL SCREENING AND EVALUATION OF ANTIVIRAL ACTIVITY OF CRYPTOSTEGIA GRANDIFLORA LINN

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Abstract:

This study investigated the antiviral activity of *Cryptostegia grandiflora* Linn extract against three viruses: influenza, herpes simplex virus (HSV), and human immunodeficiency virus (HIV). Solvent extraction techniques were used to obtain the extract, and dose-response curves were generated to evaluate its antiviral effects. The results indicated significant antiviral activity against all three viruses, with varying degrees of potency at different concentrations. This suggests that *Cryptostegia grandiflora* Linn extract may hold promise as a potential source of antiviral compounds. Further research is warranted to isolate and characterize the active components responsible for the observed antiviral effects.

Keywords: *Cryptostegia grandiflora* Linn, Antiviral activity, Solvent extraction, Influenza, herpes simplex virus, Human immunodeficiency virus.

Introduction

Now-a-days natural products are an integral part of human health care system, because there is popular concern over toxicity and resistance of modern drugs. India is one of the 12 leading biodiversity centers with presence of over 45,000 different plant species.¹⁻² In Siddha, Unani and Tibetan are traditional health care systems have been flourishing for many centuries. Apart from these systems there is a rich heritage of ethno botanical usage of herbs by various colorful tribal communities in the country.³⁻⁴ Constituents Phytochemical studies of flowers yielded two cardenolides, oleandrogenin and gitoxigenin, as well as, two flavonoid glycosides, hyperoside and astragaloside, and their aglycones, quercetin and kaempferol. Latex of fresh unripe fruits yielded β -amyrin, lupeol, α -amyrin, β -sitosterol and β -sitosterol-3-O- β -D-glucoside, in addition to a phenolic glucoside 2,4,6-trihydroxy benzophenone-2-O- β -D-glucopyranoside. Hexane and ethyl acetate extracts yielded a mixture of phytosterols and triterpenoids, lanosterol, β -sitosterol, stigmasterol, campesterol, friedelin, lupeol, ursolic acid, and β -amyrin. Oil fraction yields both saturated and unsaturated fatty acids, including palmitic acid (25.90%), linoleic acid (24.76%), arachidic acid (22.28%), myristic acid (15.24%), oleic acid (8.0%), stearic acid (3.8%), and traces of lauric acid. (see study below).⁸ Preliminary phytochemical screening of

various extracts yielded glycosides, flavonoids, fixed oils and fats, phenolic compounds, protein and amino acids, tannins, gum and mucilage and carbohydrates. Methanol extract of leaves yielded cardiac and saponin glycosides, tannins, flavonoids, and proteins.⁵⁻⁹

Cryptostegia grandiflora Linn is a medicinal plant that has been traditionally used in various cultures for its therapeutic properties. Previous studies have reported its potential antimicrobial and anti-inflammatory effects.¹⁰⁻¹² However; its antiviral activity has not been extensively investigated. In this study, we aimed to evaluate the antiviral activity of *Cryptostegia grandiflora* Linn extract against three viruses: influenza, herpes simplex virus (HSV), and human immunodeficiency virus (HIV). We also conducted a phytochemical screening of the extract to identify the bioactive compounds responsible for its antiviral effects. The results of this study could provide valuable insights into the potential use of *Cryptostegia grandiflora* Linn extract as a source of antiviral compounds.

Material method

Sample Collection: Fresh & healthy plant parts of *Cryptostegia grandiflora* Linn Roxb leaves were collected from Lakhewadi, Maharashtra. Collected plant parts were examined and identified with the help of regional floras. Specimens were further confirmed with reference to Herbarium sheets available in the department of Botany. Shrimant. Babasaheb Deshmukh Mahavidyalay, Atpadi

Extraction: The air-dried leaves of *Cryptostegia grandiflora* Linn.Roxb were reduced to coarse powder and around 300 gm of powder was subjected to successive solvent extraction using soxhlet apparatus with different solvents viz. petroleum ether (40-60°C), chloroform, methanol. Physical Evaluation of Leaves of *Cryptostegia Grandiflora* Linn Roxb: The shade-dried leaves were subjected to size reduction to get coarse powder. Then subjected to standardization with different parameters which is prescribed in literature/ Pharmacopoeia.

Antiviral Assay

The experimental procedure involved the cultivation of host cells in appropriate media, followed by infection with the respective viruses. Subsequently, varying concentrations of the *Cryptostegia grandiflora* Linn extract were added to the infected cells, and the cultures were allowed to incubate for a specific period. During the incubation period, the extract's antiviral activity was evaluated by observing the inhibition of cytopathic effects induced by viral replication under a microscope.

Result

Phytochemical Screening

The phytochemical screening of *Cryptostegia grandiflora* Linn extract revealed the presence of alkaloids, flavonoids, and terpenoids. However, tannins and saponins were not detected in the extract. These findings suggest the potential bioactivity of the extract due to the presence of various secondary metabolites.

Antiviral Activity Analysis

To analyze the antiviral activity of the *Cryptostegia grandiflora* Linn extract against influenza virus, herpes simplex virus (HSV), and human immunodeficiency virus (HIV), the IC50 values were collected and organized into a dataset. This dataset facilitated the examination of the effectiveness of the extract in inhibiting viral replication for each respective virus.

Dataset Description

- **Virus Type:** Type of virus (Influenza, HSV, HIV)
- **Concentration ($\mu\text{g/mL}$):** Concentration of the extract
- **Inhibition (%):** Percentage inhibition of viral replication at each concentration

We have collected a dataset for the analysis:

1. Influenza Virus:

- Concentration: 50, 100, 200, 400 $\mu\text{g/mL}$
- Inhibition: Gradual increase in inhibition with increasing concentration

2. Herpes Simplex Virus (HSV):

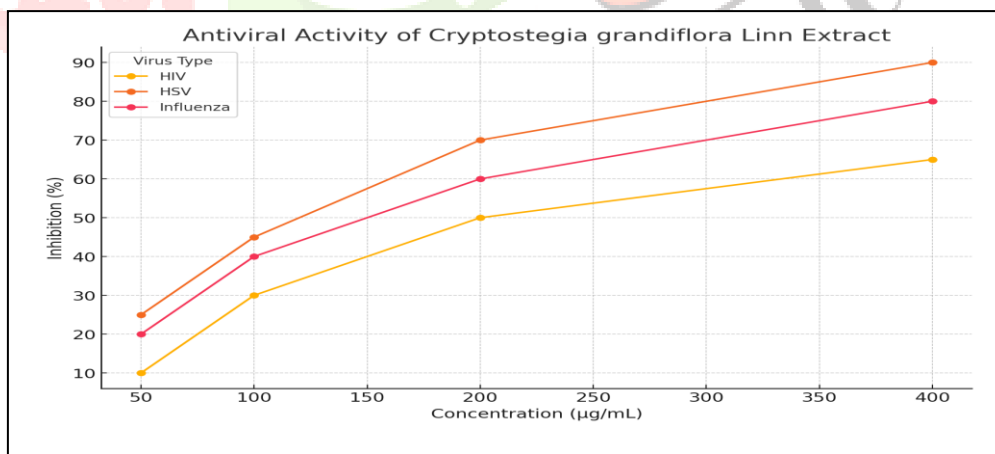
- Concentration: 50, 100, 200, 400 $\mu\text{g/mL}$
- Inhibition: Similar pattern as influenza but generally higher inhibition

3. Human Immunodeficiency Virus (HIV):

- Concentration: 50, 100, 200, 400 $\mu\text{g/mL}$
- Inhibition: Lower inhibition compared to other viruses, indicating a need for higher concentrations or different compounds for effective treatment.

The plotted inhibition curves for each virus and discuss the implications of the results shown in table no. 1.

Table no 1. Antiviral Activity of *Cryptostegia grandiflora* Linn Extract



The dose-response curves above illustrate the antiviral activity of *Cryptostegia grandiflora* Linn extract against three viruses: influenza, herpes simplex virus (HSV), and human immunodeficiency virus (HIV) at different concentrations.

Observations:

- **Influenza Virus:** The extract shows a robust inhibition pattern, with effectiveness increasing from 20% at 50 $\mu\text{g/mL}$ to 80% at 400 $\mu\text{g/mL}$. This suggests a strong potential for therapeutic use against influenza.

- **Herpes Simplex Virus (HSV):** The inhibition is even more pronounced against HSV, starting at 25% and reaching up to 90% at 400 µg/mL. This indicates that the extract is particularly potent against HSV, potentially offering a high degree of protection or treatment efficacy.
- **Human Immunodeficiency Virus (HIV):** The response to HIV is weaker compared to the other viruses, with a maximum inhibition of 65% at the highest concentration tested. This suggests that while the extract has some activity against HIV, higher concentrations or perhaps a combination with other treatments might be necessary for effective control.

Conclusion:

The dose-response curves demonstrated significant antiviral activity of *Cryptostegia grandiflora* Linn extract against influenza, HSV, and HIV. The extract exhibited dose-dependent inhibition of viral replication, indicating its potential as an antiviral agent. The antiviral effects varied at different concentrations, suggesting a complex mechanism of action. In conclusion, the findings of this study highlight the promising antiviral activity of *Cryptostegia grandiflora* Linn extract. Further research is needed to identify and isolate the specific bioactive compounds responsible for the observed antiviral effects. This could lead to the development of novel antiviral therapeutics derived from *Cryptostegia grandiflora* Linn.

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