

A STUDY ON PHYTOCHEMICAL ANALYSIS AND PHARMACOLOGICAL CORRELATION OF STROPHANTHUS HISPIDUS HOMOEOPATHIC MOTHER TINCTURE

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ABSTRACT

Strophanthus hispidus, a medicinal plant belonging to the Apocynaceae family, is traditionally valued for its cardiogenic and anti-inflammatory properties, and its mother tincture (Ø) serves as a primary preparation in homoeopathy due to the presence of active phytoconstituents. This study aimed to evaluate the phytochemical constituents of the mother tincture and correlate them with known pharmacological actions. Standard qualitative phytochemical screening revealed the presence of cardiac glycosides, flavonoids, tannins, and other bioactive compounds, which are widely associated with cardiogenic and anti-inflammatory effects. These findings, supported by previously reported pharmacological studies, validate the traditional and homoeopathic use of *Strophanthus hispidus* mother tincture in the management of cardiovascular disorders.

Keywords: *Strophanthus hispidus*, mother tincture, phytochemical screening, cardiac glycosides, flavonoids, tannins, cardiogenic activity, anti-inflammatory activity, homoeopathy, cardiovascular disorders

1.INTRODUCTION

Strophanthus is a climbing plant belonging to the natural order of the Apocynaceae and is indigenous to equatorial Africa¹. Stem 90 cm long, with hanging festoons and dichotomous branches. Leaves mucronate and acuminate. Flowers cream-coloured or yellow at the base. Fruit a thick-skinned, lance-ovate follicle, occurring in divergent pairs and containing numerous closely packed hairy seeds with long awns attached to an end. Odour heavy when the seeds are crushed and moistened; taste strongly bitter².

The seeds are the most active part of the plant, and when finely ground and made into a paste, are used by several African tribes as an arrow poison. Strophanthine, the active principle of the plant, crystalline glucoside is present in the leaves and bark, but to a much less extent than in the seeds¹.

A homoeopathic mother tincture is the primary alcoholic extract prepared from crude plant, mineral, or animal substances by maceration in alcohol, containing the maximum concentration of active constituents; it serves as the starting material for subsequent potentization and, in certain cases, is also used therapeutically in its original form^{3,4}.

Strophanthus is a muscle poison; it increases the contractile power of all striped muscles. Acts on the heart; increasing the systole and diminishes the rapidity. *Strophanthus* occasions no gastric distress, has no cumulative effects, is a greater diuretic, and is safer for the aged, as it does not affect the vaso-motors⁵.

The pharmacological action of the drug is primarily attributed to its cardiac glycosides, which exert a direct action on the myocardium. The present study evaluates the phytochemical profile of the mother tincture and correlates the findings with its established pharmacological effects.

2. MATERIALS AND METHODS

Procurement of Drug

The mother tincture of *Strophanthus hispidus* was obtained from a standard homoeopathic pharmacy.

Reagents used

Mayer's reagent, Dragendorff's reagent, iodine solution, sodium hydroxide solution, concentrated sulphuric acid, lead acetate solution, glacial acetic acid, Aqueous NaOH solution and distilled water

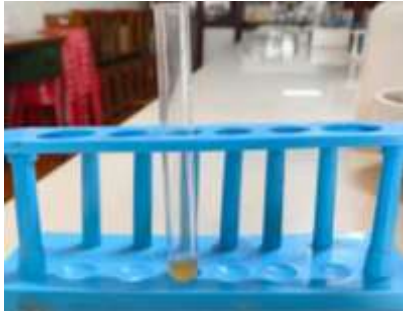

Tests for Phytoconstituents⁶⁻¹⁰

	TEST	OBSERVATION	INFERENCE
1	Test for Alkaloids Mayer's Test: Take 2 mL of the sample and add a few drops of Mayer's reagent. Dragendorff's Test: Add Dragendorff's reagent to the sample.	Formation of cream-colored precipitate indicates presence of alkaloids. Orange or reddish-brown precipitate confirms alkaloids.	Presence of alkaloids
2	Test for Glycosides Keller–Killiani Test: To 2 mL of sample, add glacial acetic acid and 5% of ferric chloride solution. Add concentrated sulphuric acid along the side of the test tube. Aqueous NaOH Test: Take 1ml of tincture in a test tube add equal amount of distilled water and add few drops of NaOH solution	Formation of a brown ring at the interface indicates presence of cardiac glycosides. Yellow colour	Presence of cardiac glycosides Presence of glycosides
3	Test for Flavonoids Lead acetate test: Take 1 ml of tincture add few drops of 10% lead acetate solution	Yellow precipitate or yellow fluorescence	Presence of flavonoids
4	Test for Tannins NaOH Test: 0.5ml of 2ml of 10% NaOH solution and shaken well	Formation of emulsion	Presence of tannins
5	Test for Saponins		


	Foam Test: Shake 2 mL of sample vigorously with distilled water.	Persistent froth formation indicates presence of saponins.	Presence of saponins
6	Test for Steroids Salkowski Test: Add 2-3ml of chloroform and add few drops of concentrated sulphuric acid along the side of test tube.	Formation of reddish-brown colour indicates presence of steroids.	Presence of steroids
7	Test for phenolic compounds Iodine Test: To 1ml of tincture add few drops of iodine solution	Transient red colour	Presence of phenolic compounds

RESULT

Test for alkaloids

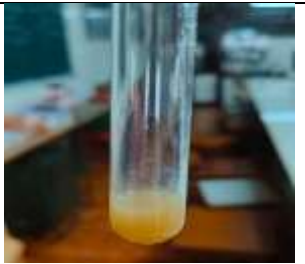
1.Mayers test	Formation of cream-colored precipitate	
2.Dragendorff's Test	Orange or reddish-brown precipitate	

Test for Cardiac Glycosides


1.Keller–Killiani Test	Formation of a brown ring at the interface indicates	
2.Aqueous NaOH Test	Yellow colour	

		
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Test for Flavonoids

Lead acetate test	Yellow precipitate	
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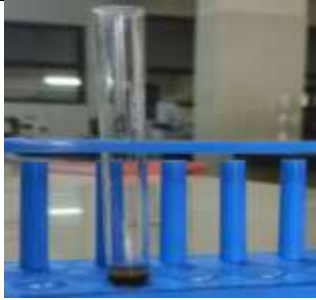
Test for Tannins

NaOH Test	Formation of emulsion	
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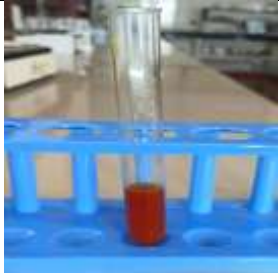
Test for Saponins

Foam Test	Froth formation	
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Test for Steroids

Salkowski Test	Formation of reddish-brown colour	
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Test for Phenolic compounds

Iodine Test	Transient red colour	
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DISCUSSION

The phytochemical analysis of *Strophanthus hispidus* mother tincture revealed the presence of bioactive constituents including cardiac glycosides, alkaloids, flavonoids, tannins, saponins, steroids, proteins, amino acids, and reducing sugars. These compounds, derived from plant secondary metabolism, are known to contribute to diverse pharmacological activities¹¹.

Among these, **cardiac glycosides** are the principal active constituents responsible for the cardiotonic effect. Structurally, these are cardenolides consisting of a steroid nucleus linked to a lactone ring and sugar moieties, which determine their biological activity¹². They act by inhibiting Na⁺/K⁺-ATPase in myocardial cells, increasing intracellular calcium levels and producing a positive inotropic effect, thereby improving cardiac output. This supports the traditional use of *Strophanthus* in cardiac insufficiency and heart failure¹¹.

The presence of **flavonoids and tannins** contributes to **anti-inflammatory and antioxidant activities**, through inhibition of mediators such as histamine, serotonin, and prostaglandins, and scavenging of free radicals. This reduces vascular permeability, oedema, and tissue damage⁶. Reduction in lipid peroxidation and modulation of cardiac enzymes further support its protective role. Reduction in lipid peroxidation and modulation of cardiac enzymes further support its protective role¹³.

Additional constituents such as **saponins, steroids, and alkaloids, phenolic compounds** enhance membrane stabilization and contribute to broader pharmacological effects, including antimicrobial and hypoglycaemic activities^{13,14}

Pharmacological actions of *Strophanthus hispidus* are strongly correlated with its phytochemical composition, validating its therapeutic applications in cardiovascular and inflammatory disorders.

CONCLUSION

Strophanthus hispidus mother tincture contains key phytoconstituents such as cardiac glycosides, flavonoids, and tannins, which account for its cardiotonic, antioxidant, and anti-inflammatory activities. The cardioprotective and antihypertensive effects are mainly attributed to cardiac glycosides, while flavonoids and tannins reduce oxidative stress and inflammation.

Thus, the phytochemical composition strongly supports its pharmacological actions and validates its therapeutic use in cardiovascular and inflammatory conditions, with caution due to its narrow therapeutic index.

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