Antifungal screening of methanolic extracts of phytochemicals: A strategy to fabricate of industrially active antifungal agents

Conference: 13th AICLST, Kolkata, 6–8 March 2026

Paper reference: TI-105/O

Printed pages: 246–248

Source: *Leather 2050: Challenges & Opportunities*, ILTA (2026)

Antifungal screening of methanolic extracts of phytochemicals: A

strategy to fabricate of industrially active antifungal agents

Kritika Vagmi , Debosmita Sikdar, and Ivy Kanungo *

Government College of Engineering and Leather Technology, Biotechnology Department, Salt Lake city,

Ref. No. TI-105/O

Kolkata – 700106

Abstract

The traditional anti-fungal agents consist of a number of drawbacks in terms of environmental sustainability, toxicity, costing etc. This work is targeted to access the anti-fungal property of three plant extracts i.e. drumstick, curry leaves and china rose, in order to validate the anti-fungal property for leather processing. Qualitative as well as quantitative assessment of various phytochemicals were performed which reveals the existence of phenolic compounds, proteins, flavonoid, xanthoprotein, glycoside, amino acid, tannin, quinone, anthraquionone, carotenoids, phytosterol, phlobatannins, terpenoids etc. All these are most important ingredients for presenting antioxidant properties. Antifungal bioassay of the methanolic leaf extracts of the selected plants indicated significant fungal growth inhibition including fungal infected leather. These results pointed to the fact that drumstick, china rose, curry leaf extracts might be remarkable substitute for biological control of leather fungal pathogens having the possibility to be used as leather fungicide. This might also pave way for controlling the overdependence on chemical fungicides. The phytochemical analyses showed effectiveness in scavenging free radicals and thereby are potent to be powerful antioxidants. The presence of various phytochemicals in the extracts gives future prospective towards a cleaner, greener, eco-friendly, economic and sustainable techniques for leather processing.

Corresponding author E-mail : ivykanungo@gmail.com

Keywords: phytochemicals, anti-fungal, antioxidant, methanolic, leaf extracts, cleaner, greener technology.

Introduction

India is immensely biodiverse hoarding plenty of medicinal plants. Locally available curry, china rose,drumstcik plants contain a lot of bio-active values due to which plant has been proven as the medicinally important plant but least or no contemplation recognized by the scientist.

These are natural medicinal plant. There are different forms of these plants due to which they are found as the important plant such as extract, essential oil, or are directly used .

Various molecules with antifungal activity against different strains of fungus have been found in plants, which are of immense importance. These molecules may be used directly or considered as a pioneer for developing better molecules. This project attempts to review the current status of important antifungal compounds from leaf extracts.

Since fungicides are very costly and can cause severe environmental problems, there should be strategies which can be directed towards replacing the use of dangerous chemical fungicides by nature friendly biological products.

Although there are many reports accessible on the effectiveness of these leaf extracts as bio-fungicide against fungi, additional analysis is required to understand curry, china rose, drum stick leaf extract’s effect on fungal

srains sch as Rhizopus stolinifer, Aspergillus niger. Therefore, the objectives of the present study is to carry out phytochemical analysis of methanolic leaf extract of

(a) (b) (c)

Fig1. pictures of (a) Curry leaves, (b) China rose and (c) Drum stick

2. Objectives

The objective of this study is to identify the anti-fungal properties of the above-mentioned leaf extracts which can be further used as anti-fungal agent in leather industry replacing chemical anti-fungal agent contributing to lesser pollution rate and cost-effectivity.

So, the following specific objectives have been formulated:

3. Results

Quantitative phytochemical analysis

PHYTOCHEMICALS 20% methanolic solution of

curry leaves extract

Tannin + Terpenoids ++ Phlobatannin - Glycosides + Quinone - Amino acid ++ Flavanoid + Phytosterol +

Table 2.1 test of different phytochemical for different

methanolic concentration of curry leaves

selected plant to evaluate its antifungal activity against fungal strains like Rhizopus stolinifer,Aspergilus niger etc and also the effect on fungal infected leather.

 Phytochemical analysis of plant extract by

different qualitative assays

 Peroxidase assay (test for ROS)

 TPC (Total Phenol Content) measurement

 Bradford's assay

 Anti-fungal tests

 Measurement of Zone of Inhibition

PHYTOCHEMICALS 20% methanolic solution of

chinarose leaves extract

Tannin + Terpenoids ++ Phlobatannin - Glycosides + Quinone - Amino acid ++ Flavanoid - Phytosterol -

Table 2.2 test of different phytochemical for different

Methanolic concentration of hibiscus leaves

PHYTOCHEMICALS 20% methanolic solution of

Drumstick leaves extract

Tannin + Terpenoids ++ Phlobatannin - Glycosides + Quinone - Amino acid + Flavanoid + Phytosterol +

Table 2.3 test of different phytochemical for different

methanolic concentration of drum stick leaves

Note: '+' indicates presence '-' indicates absence and ++ represent abundance.

4. Conclusion

In current scenario, growing demand of bioactive enriched plant extract acting as an anti-fungal agent is in high demand as it is eco-friendly and have no cyto-toxic effect.so,the proposed study is to partially or fully replace existing anti-fungal agent used in industry to minimize the cyto-toxic effect. The presence of antioxidants and flavanoids content show that the extracts of phytochemicals are potent enough to be used as antifungal agents and can be used for arresting microbial growth on leather samples to increase vitality and longevity of leather goods

References

(a) Hariom Kumar Singh, Amit Alexander Charan,

Aradhana Irene Charan and Sudhanshu Matthew Prasad. Antifungal and antibacterial activity of methanolic, ethanolic and acetonic leaf extracts of curry leaves (Murraya koenigii).2017; 6(4): 1797-1802

(b) Satish Chand Saini* and Dr. Gopu Bala Show

Reddy. A Review on Curry Leaves (Murraya koenigii): Versatile Multi-Potential Medicinal Plant.2016;vol4 no.7

(c) M V Math & P Balasubramaniam.curry
leaves.2004; 197, page519
(d) Hanan Al Harbi1 , Dr. Uma M. Irfan2 * and
Dr. Sarah Ali3. THE ANTIBACTERIAL EFFECT OF CURRY LEAVES (Murraya Koenigii).2016; 3(10), 382-387.
(e) Suman singh,P.K more,Sandhya Madan
Mohan. CURRY LEAVES (Murraya koenigii Linn. Sprengal)- A MIRCALE PLANT,2014; 4(1), 46-52
(f) Prasan R Bhandari Curry leaf (Murraya
koenigii) or Cure leaf: Review of its curative properties.2012; vol(1)