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Isolation of Catechin from Bark of *Albizia lebbeck* (L.) Benth.

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Abstract*-Albizia lebbeck* (L.) Benth. is reported to have many important medicinal properties. There are number of marketed herbal formulations containing bark extract of *A. lebbeck* (L.) Benth. which are used for treatment of ailments related to respiratory track. Catechin is a phytomarker present in bark of *Albizia lebbeck* (L.) Benth. The present work discusses a thin-layer chromatography technique for isolation of catechin from extract of *Albizia lebbeck* (L.) Benth. bark. Structure of isolated catechin was confirmed by spectral studies such as IR and GC-MS. Isolated catechin can be used as marker compound for marker-based standardization of extracts and formulations containing bark of *Albizia lebbeck* (L.) Benth.

***Keywords*: *Albizia lebbeck* (L.) Benth, Standard Catechin, Thin-layer Chromatography, FT-IR.**

I. INTRODUCTION

The genus *Albizia* comprises approximately species, mostly trees native to subtropical and tropical regions [1]. *Albizia lebbeck* (L.) Benth (Family - Fabaceae) are popularly known as siris is a medium to large tree [2]. The bark is bitter, cooling, and anthelmintic, and cures diseases of leucoderma, blood, itching, piles, skin disease, excessive perspiration, inflammation, bronchitis, and toothache and strengthens the gums and teeth; it is used for deafness, leprosy, boils, scabies, paralysis, syphilis, and weakness [3] after drying and pounding, it is used as a soap substitute [4]. Catechin is chemically, (2*R*, 3S)-2-(3, 4-dihydroxyphenyl)-3, 4-dihydro-2*H*-chromene-3, 5, 7-triol belongs to the group of flavan-3-ols (Figure 1).

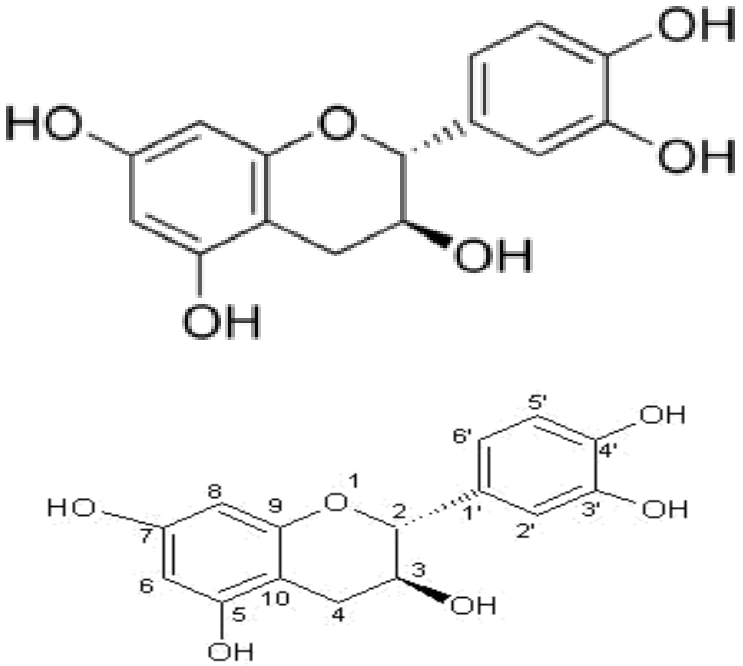


Figure 1 Structure of Catechin

II. MATERIALS AND METHODS

Plant materials
The bark of *Albizia lebbeck* (L.) Benth. were collected from district of Sawai madhopur, Rajasthan (India).

Preparation of methanol extract
Methanol (CH_3OH) extract of bark was prepared by macerating 10 gm of powdered bark with 100 ml of methanol solvent for 72 hours and then filtered. The combined methanol extract was dried under reduced pressure using rotary evaporator and kept in an amber colored container till used.

Thin-layer chromatography studies of methanol extract
Thin-layer chromatography of methanol extract of bark of *Albizia lebbeck* (L.) Benth was carried. Some mobile phases were tried and following mobile phase was selected which gave maximum resolution.

Stationary phase - Precoated plates of Silica gel G
Mobile phase
Ethyl acetate: Toluene: Formic acid (5:5:1) v/v/v.
Sample
Methanol extract of bark and standard of (+) Catechin hydrate
Procedure
Bark extract and standard of (+) Catechin hydrate were dissolved in minimum amount of methanol and spotted in the form of bands on precoated silica plates. The plates were developed in the mobile phase, ethyl acetate: toluene: formic acid (5:5:1, v/v/v). After development the plates were dried and observed under short (254 nm) and long (366 nm) UV light. The plates were derivatives with 5 % ferric chloride solution and VSR.

Isolation of catechin
Catechin was isolated from the methanol extract of bark of *Albizia lebbeck* (L.) Benth by thin layer chromatography.
Procedure
Bark extract was dissolved in minimum amount of methanol and spotted in the form of bands on silica plates. The plates were developed in the mobile phase. After development the plates were dried and band at R_f 0.33 was scrapped and dissolved in methanol, filtered through 0.2 µ PTFE filter and evaporated to dryness to get catechin residue. Catechin residue thus obtained was further purified by recrystallization using methanol. Isolated catechin was confirmed with comparison with standard catechin by thin-layer chromatography studies.

III. RESULTS AND DISCUSSION

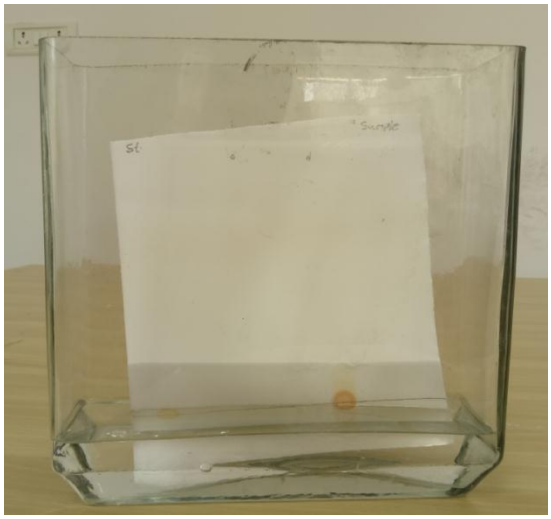
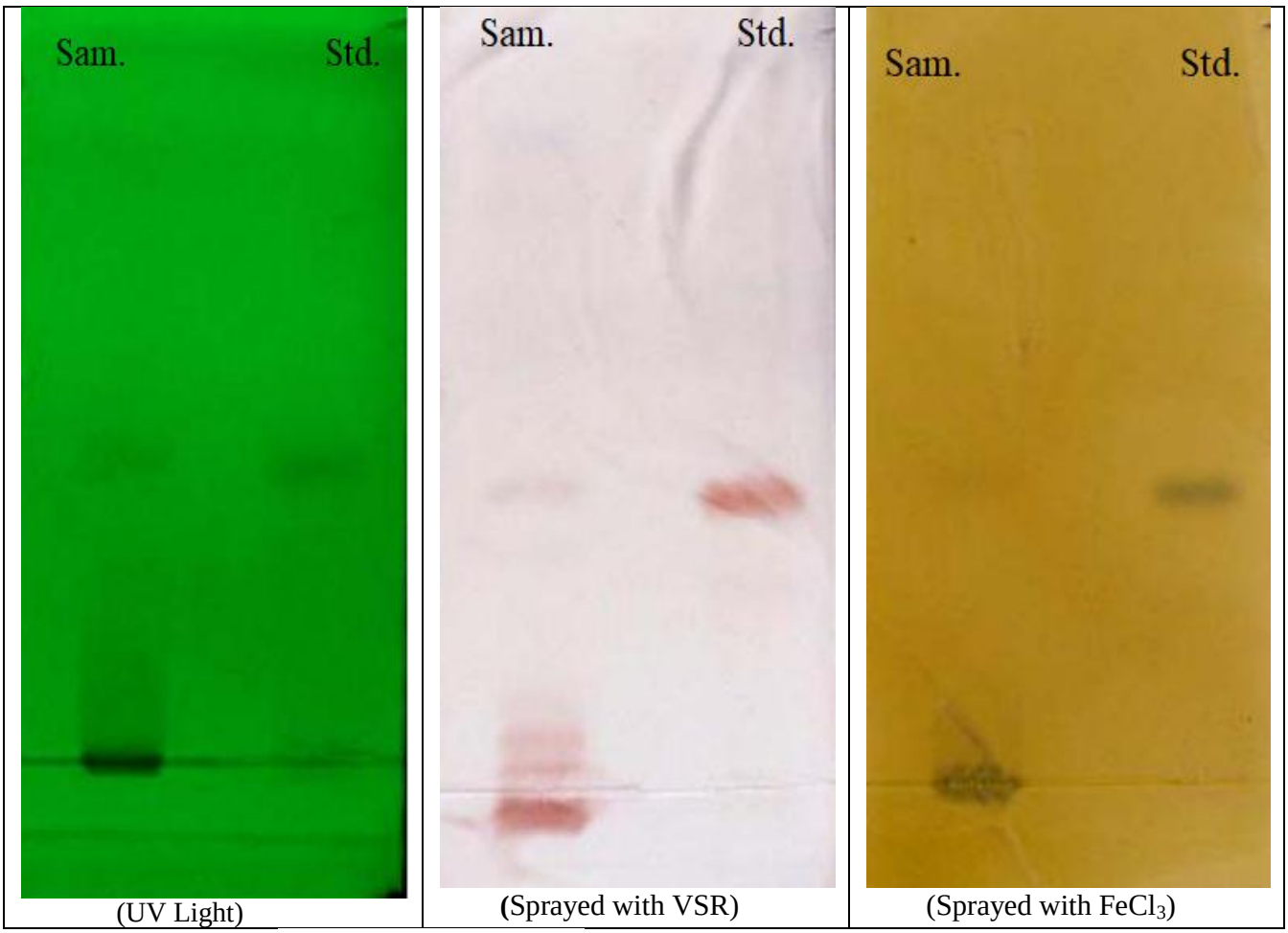


Figure 1 Thin-layer chromatography process

Thin-layer chromatography studies showed presence of well isolated band of catechin in the methanol extract at R_f of 0.33 (Figure 2).



(UV Light) (Sprayed with VSR) (Sprayed with $FeCl_3$)

Figure 2 Thin-layer chromatography images of methanol extract and standard of catechin

It produced brown and pink colour on derivatization with 5 % $FeCl_3$ and VSR, respectively. Purity of isolated catechin was found to be 97.12 % by HPLC. Structure of isolated compound was further confirmed by IR, and GC-MS. (Figure 4).

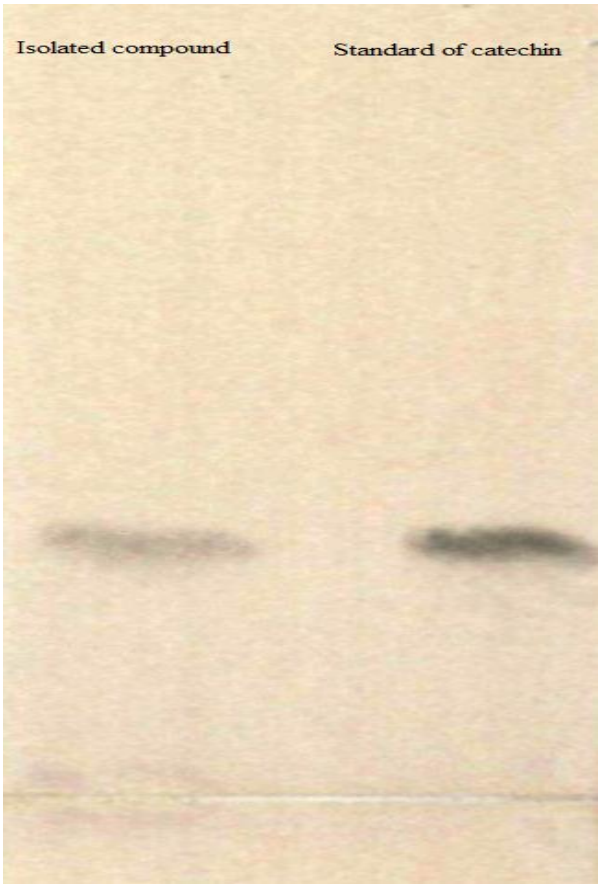


Figure 3 Thin-layer chromatography profiles of isolated catechin and standard catechin

Thin layer chromatography studies showed presence of well isolated band of catechin in the methanol extract at R_f of 0.33(Figure 3).

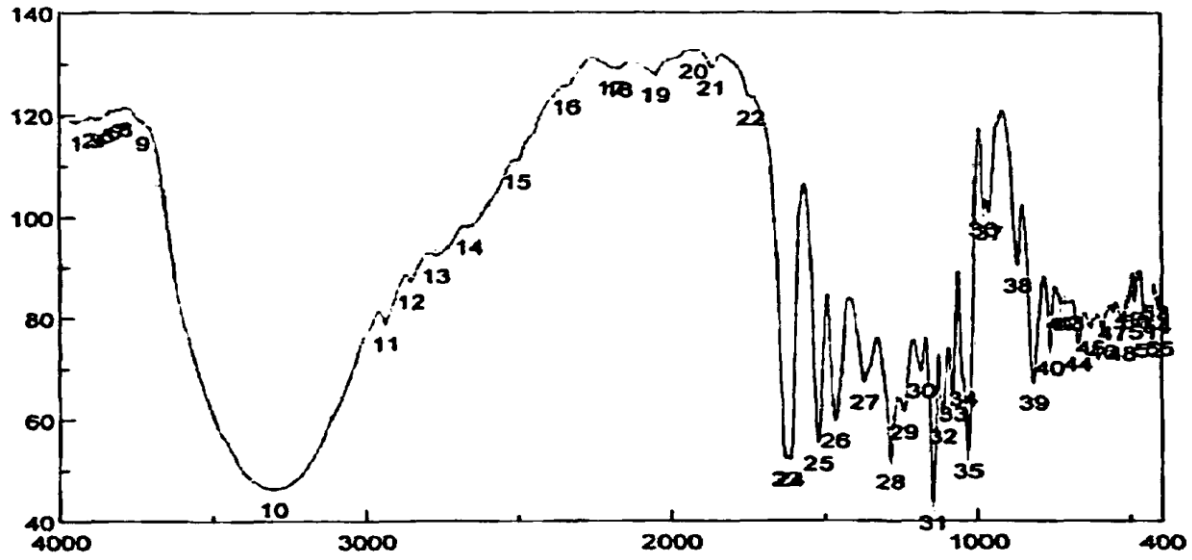


Figure 3 IR spectrum of isolated catechin

Table 1

Peak No.	Wave number (cm^{-1})	Inference
10	3301.54	Presence of exchangeable protons from alcohol
28,29	1285,1242	C-O-C stetching

IV. CONCLUSION

Catechin was successfully isolated from methanol extract of bark of *Albizia lebbeck* (L.) Benth thin layer chromatography method. The isolation method can be employed to isolate catechin which can be used as a phytomarker for marker-based standardization of extracts and formulations containing bark of *Albizia lebbeck* (L.) Benth.

V. ACKNOWLEDGEMENTS

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Mr. Purendra Singh received the Master of Science in Chemistry from Nims University, Jaipur (Rajasthan) and Diploma in Watershed Management from V.M.O. University, Kota (Rajasthan). He has past industries experience and currently, he is research scholar (Ph.D) at Banasthali Vidyapith, Rajasthan (India).

