

## Chapter 2

### Ethno-medicinal uses and HPTLC profiling of *Tamarindus indica* and *Pongamia pinnata*

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**Abstract:** *Tamarindus indica* and *Pongamia pinnata* of the family Fabaceae are selected for exploration works on their ethnomedicinal uses followed by HPTLC profiling due to various uses and local availability in Konkan areas. Results revealed that the densitometric analysis shows fingerprinting, R<sub>f</sub> values, peaks of densitogram and chemical variation. HPTLC fingerprint analysis showed different peaks of these two selected plant leaf extracts. HPTLC fingerprint analysis of these tree species will be helpful for drug identification and adulteration. Present study bring attention on the importance of biomarker from plant in pharmaceutical industry.

**Keywords:** Fabaceae, Local tree species, HPTLC

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**Introduction:** The medicinal plants are useful for curing various human diseases due to presence of different phytochemical constituents. Due to antimicrobial resistance problems in drug formulation, researchers globally searching medicinal agents. Keeping this in view, two common tree species (*Tamarindus indica* and *Pongamia pinnata*) of Konkan regions are selected for collection of medicinal uses and HPTLC profiling. *Tamarindus indica* is locally known as chinch and commonly known as tamarind, a medium-sized tree, leaflets 10-20 pairs, racemose flower, petals yellow, stripped with red, stamens 3, monadelphous pods sub compressed brown up to 12 seeded. Fruit and leaves are edible and used in making curries, salads, stews and soups in many countries, especially in times of scarcity (Present study). Tamarind leaves are considered to be very effective in easing joint pain and swelling. It is rich in ascorbic acid, Vitamin C and tartaric acid that help in building your immunity naturally. Tamarind tea can help in relieving cold, cough and sore throat (Buchholz 2011; Bhadoriya 2016; Erma et. al 2022). *Pongamia pinnata* is a small or middle-sized fast-growing tree, known as Karanj, leaves pinnate, leaflets opposite, 5-7, broadly ovate, flowers in axillary racemes, shorter than leaves, corolla pinkish-white, pods woody, seed solitary, reniform, brown. All plant parts are used as a crude drug for the treatment of tumors, piles, skin disease, wounds, ulcers, and cleaning teeth. The seed powder of the plant is used in the treatment of bronchitis. An infusion of leaves is used to relieve rheumatism. Flower used to treat bleeding haemorrhoids, or piles Fruit Aid treatment of abdominal tumours, female genital tract infections, ulcers, and haemorrhoids. Seed extracts used to heal scar tissue tumors, treat high blood pressure, and treat anaemia Powder reduces fever and helps in treating bronchitis and whooping cough, leaves are used as a digestive and laxative and to treat inflammation and wounds (Sowjanya et al. 2018; Sarje et al. 2020). Leaf paste is used in the treatment of leprosy (Present study). The above-mentioned medicinal values of the selected two plant encouraged to do HPLC profiling of their leaves extract.

**Material and methods:** Preliminary phytochemical analysis of *Tamarindus indica* is done as per method described by Wagner et al. (1908), Harborne (1988) and Eike and Anne (2006). HPTLC profiling is done by using CAMAG HPTLC System with WIN CATS software.

**Collection of plant material:** The leaves of *Tamarindus indica* and *Pongamia pinnata* were collected from Poladpur of district Raigad, Maharashtra and brought to the laboratory for further analysis. Leaves washed gently with running tap water to remove surface dust and pollutants. The dried plant material was made of powder using a mixture grinder.

**Extraction of plant materials:** About 10 g of powder of *Tamarindus indica* and *Pongamia pinnata* were extracted separately using 70 % ethanol in a Soxhlet Extractor. After extraction the extracts were evaporated. The dried extracts were dissolved in 5 ml ethanol and filtered using Whatman filter. The filtered extracts were later used for further phytochemical and HPTLC analysis (Pawar et al. 2011).

**Results and discussion:** The qualitative analysis of phytochemicals showed richness of diverse bioactive compounds in the leaf of both selected tree species. The HPTLC analysis obtained high resolution and showed that different peak leaf extract of *Tamarindus indica* was run along with the standard and it was perceived to validate the presence of phytochemical compounds from chromatograms after derivatization. The results are given in Table 1 and Figure 1. The graphical representation shows different peaks of polyvalent phytoconstituents. The Rf value starts from 0.1 to 218.1 in which highest concentration of phytoconstituents were found and maximum percentage starts from 5.92 to 59.26 %, and maximum height from 0.00 to 2.8. The HPTLC analysis obtained high resolution and shows different peak leaf extract of *Pongamia pinnata* was run along with the standard and perceived to validate the presence of phytochemical compounds from chromatogram after derivatization. The result from HPTLC fingerprint scanned at wavelength 254 nm for *Pongamia pinnata* shows polyvalent phytoconstituents and corresponding ascending order of Rf value are from 0.01 to 0.97 in which highest concentration of the phytoconstituents was found to be 32.66 % and its corresponding RF value was found to be 0.01 respectively. Results represented in Table 2 and Figure 2. The graphical representation shows different peaks of polyvalent phytoconstituents. The Rf value starts from 0.1 to 218.1 in which highest concentration of phytoconstituents were found and maximum percentage starts from 5.92 to 59.26% and maximum height from 0.00 to 2.8 control. The peak retention in ethanol extracts and is found with Rf start with 0.01, 0.33, 0.42, 0.86 and end with 0.03, 0.39, 0.48, 1.00 and maximum percentage is 59.26, 5.82, 6.30, 28.63.

**Table 1: Rf value of the peak formed of *Tamarindus indica* leaf at UV 254 nm**

| Peak | Start Position | Start Height | Max position | Max height | Max %  | End Position | End Height | Area     | Area % |
|------|----------------|--------------|--------------|------------|--------|--------------|------------|----------|--------|
| 1    | 0.01           | 201.8AU      | 0.01Rf       | 218.1AU    | 59.26% | 0.03Rf       | 0.0AU      | 1134.4AU | 16.20% |
| 2    | 0.33           | 5.2AU        | 0.37 Rf      | 21.8 AU    | 5.92%  | 0.39Rf       | 0.1AU      | 497.5AU  | 7.11%  |
| 3    | 0.42           | 3.4 AU       | 0.44 Rf      | 22.8AU     | 6.20%  | 0.48Rf       | 1.4AU      | 501.4AU  | 7.16%  |
| 4    | 0.86           | 0.5 AU       | 0.98 Rf      | 105.4AU    | 28.63% | 1.00Rf       | 2.8 AU     | 4868.1AU | 69.53% |

Other researchers have also done some works on selected plants for present study. The report of diabetic rats shows significant anti hyperglycaemic and anti-lipid peroxide effects with the leaf extract. It shows that the treatment of *Pongamia pinnata* extract could be used as a safe alternative anti-hyperglycaemic drug for diabetic patient's antiparasmodial activity, and

also shows action on infectious diarrhoea (Joy et al.1998). HPTLC fingerprinting is a valuable quality assessment tool for the evaluation of botanical materials, it allows for the analysis of a large number of compounds both efficiently and cost effectively. These studies have shown that it is more versatile than ordinary TLC methods as the spots are well resolved. The HPTLC method is simple, rapid, accurate, reproducible, selective and economical for quality and quantitative determination of plant materials.

**Table 2: Rf Value of leaf extract of *Pongamia pinnata* leaf at UV 254 nm**

| Peak | Start Position | Start Height | Max position | Max height | Max %   | End Position | End Height | Area      | Area %  |
|------|----------------|--------------|--------------|------------|---------|--------------|------------|-----------|---------|
| 1    | 0.00           | 29.2A U      | 0.01Rf       | 201.7A U   | 32.66 % | 0.03Rf       | 0.0AU      | 1655.1A U | 11.89 % |
| 2    | 0.18           | 0.2AU        | 0.20Rf       | 13.7AU     | 2.21%   | 0.24Rf       | 1.5AU      | 347.1AU   | 2.49%   |
| 3    | 0.29           | 5.1AU        | 0.32Rf       | 23.9AU     | 3.87%   | 0.34Rf       | 5.2AU      | 535.7AU   | 3.85%   |
| 4    | 0.34           | 14.6A U      | 0.37Rf       | 85.6AU     | 13.86 % | 0.39Rf       | 6.8AU      | 1669.1A U | 11.99 % |
| 5    | 0.39           | 7.3AU        | 0.44Rf       | 87.1AU     | 14.11 % | 0.48Rf       | 3.6AU      | 1879.1A U | 13.50 % |
| 6    | 0.55           | 0.4AU        | 0.57Rf       | 21.7AU     | 3.51%   | 0.60Rf       | 1.3AU      | 396.8AU   | 2.85%   |
| 7    | 0.61           | 0.1AU        | 0.63Rf       | 22.5AU     | 3.65%   | 0.65Rf       | 3.9AU      | 421.0AU   | 3.02%   |
| 8    | 0.69           | 8.8AU        | 0.72Rf       | 16.5AU     | 2.68%   | 0.75Rf       | 0.9AU      | 462.5AU   | 3.32%   |
| 9    | 0.78           | 1.9AU        | 0.81Rf       | 17.8AU     | 2.89%   | 0.85Rf       | 0.1AU      | 370.1AU   | 2.66%   |
| 10   | 0.86           | 0.1AU        | 0.97Rf       | 127.0A U   | 20.56 % | 1.00Rf       | 3.9AU      | 6183.6A U | 44.42 % |

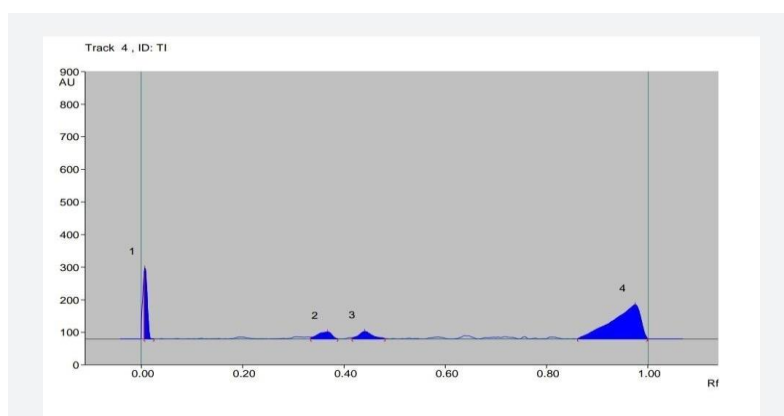


**Figure 1: Chromatogram of *Tamarindus indica* leaf extract**

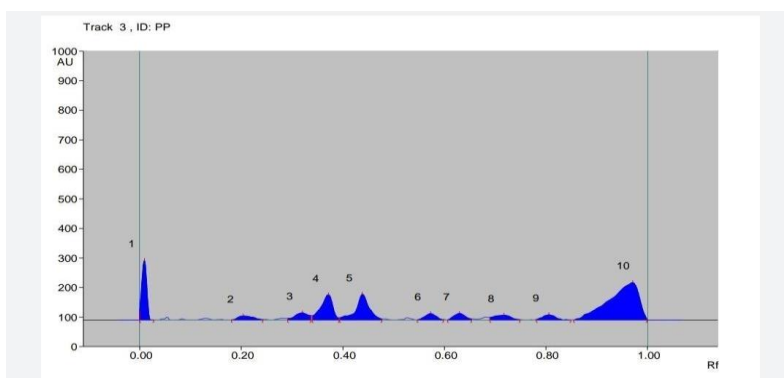


**Figure 2: Chromatogram of *Pongamia pinnata* leaf extract**

**Conclusion:** The present study conclude that the selected plants are used to cure many diseases and disorders by the local people. HPTLC fingerprints profile of *Tamarindus indica* and *Pongamia pinnata* will be useful to determine the quality of crude drugs. It will be is also useful for separation of secondary metabolites which can be used to understand biochemical and physiological mechanisms of selected plants.

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