Chapter 3

Phytochemical profiling of fruits of *Pterospermum xylocarpum* (Gaertn.) Oken

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ABSTRACT

Present study investigated the bioactive components of fruits of *Pterospermum xylocarpum* using different extracts (n-hexane, ethanol and aqueous). The qualitative phytochemical analysis revealed that tannins, saponins, reducing sugars and alkaloids were present in fruit extracts. The findings indicated that fruits of *P. xylocarpum* can be a good source of therapeutic bioactive compounds.

Keywords: Bioactive components, novel pharmaceuticals, trees

INTRODUCTION

Plants have served as a fundamental element of traditional medicines and therapeutic agents (Kumar and Jena, 2014). They are the source of different bioactive compounds (Sahoo et al., 2021). In current situation, where global population facing different types of health problems and microbial resistance

(Aradhana et al., 2022). In this scenario, screening of medicinal plants for their secondary metabolites are an important task for the development of novel drugs (Devi et al., 2025). Keeping this in view, an attempt has been made to find out the bioactive compounds present in the fruits of *Pterospermum xylocarpum*, which is an evergreen tree species belonging to Malvaceae family (Kumar et al., 2022). It has diverse ethnomedicinal uses (Singh et al., 2023). Present study highlights the bioactive compounds of fruits and brings attention towards the future ethnopharmacological uses.



Figure 1: Leaves and fruit of *P. xylocarpum*



Figure 2: Collected fruits of *P. xylocarpum* for experimental work

METHODOLOGY

The fruits of *P. xylocarpum* were collected from Khordha district of Odisha, India (Figure 2). The plant species was identified by authors (Figure 1) followed by flora books (Kumar et al., 2022). The phytochemical analysis was carried out using different solvents using standard methods (Devi et al., 2023; Jena et al., 2024; Marndi et al., 2024; Jena et al., 2025).

Qualitative phytochemical analysis

Detection of nine secondary metabolites were conducted using standard methods.

Test for Tannin: About 1 ml of the fruit extract was taken. Added 3-5 drops of 10% lead acetate solution to it. The formation of gelatinous precipitate confirmed the positive results for the presence of tannin.

Test for saponin: About 1 ml of the fruit extract was taken and 1 ml of distilled water was added and shaken well. The persistent froth formation confirmed the presence of saponin.

Test for flavonoids: About 1 ml of the fruit extract was taken. Added 2 ml of 2% NaOH solution and then dilute HCl to it. The colour initially turned to an intense yellow with NaOH solution and later became colourless. This colour changing transformation confirmed for the presence of flavonoids.

Test for terpenoids: About 1 ml of the filtrate was added with 6 drops of chloroform and placed in the water bath for a few minutes. Then 6 drops of concentrated sulphuric acid were added. The appearance of reddish-brown interface confirmed the presence of terpenoids.

Test for phenolic compounds: About 1 ml of the fruit extract was taken and added few drops of 5% ferric chloride solution to it. The dark bluish black appearance confirmed the presence of phenolic compounds.

Test for reducing sugars: About 1 ml of the fruit extract was taken and 2-3 drops of Fehling's solution A and B were respectively added. Then kept in the water bath for some time. The presence of red-orange precipitate confirmed the presence of reducing sugar.

Test for steroids: About 1 ml of the fruit extract was taken. 1 ml of chloroform and 1 ml of concentrated sulphuric acid wad added into it. The appearance of 2 phases with the upper red and lower yellow with green fluorescence confirmed the presence of steroids.

Test for alkaloids: About 1 ml of the fruit extract was taken and added 3 to 4 drops of Dragendroff's reagent. The formation of reddish-brown precipitate confirmed the presence of alkaloids.

Test for carbonyl compounds: About 1 ml of the fruit extract was taken added 3 to 4 drops of 2,4-dinitrophenylhydrazine (DNPH) reagent. The yellow crystal formation confirmed the presence of carbonyl compounds.

RESULTS AND DISCUSSION

The qualitative phytochemical screening of *P. xylocarpum* fruits revealed distinct profiles for each solvent. Tannins were detected in aqueous and ethanol extracts, while saponins were present in all three extracts (aqueous, ethanol, and n-hexane). Alkaloids were detected in aqueous and ethanol extracts, but not in n-hexane (Table 1).

Table 1: Qualitative phytochemical screening of *P. xylocarpum* fruits using different extracts

Bioactive compounds	Extracts		
	Aqueous	Ethanol	n-Hexane
Tannin	Detected	Detected	Not detected
Saponin	Detected	Detected	Detected
Flavonoids	Not detected	Not detected	Not detected
Terpenoids	Not detected	Not detected	Not detected
Phenols	Not detected	Not detected	Not detected
Reducing sugars	Not detected	Detected	Not detected
Steroid	Not detected	Not detected	Not detected
Alkaloid	Detected	Detected	Not detected
Carbonyl compound	Not detected	Not detected	Not detected

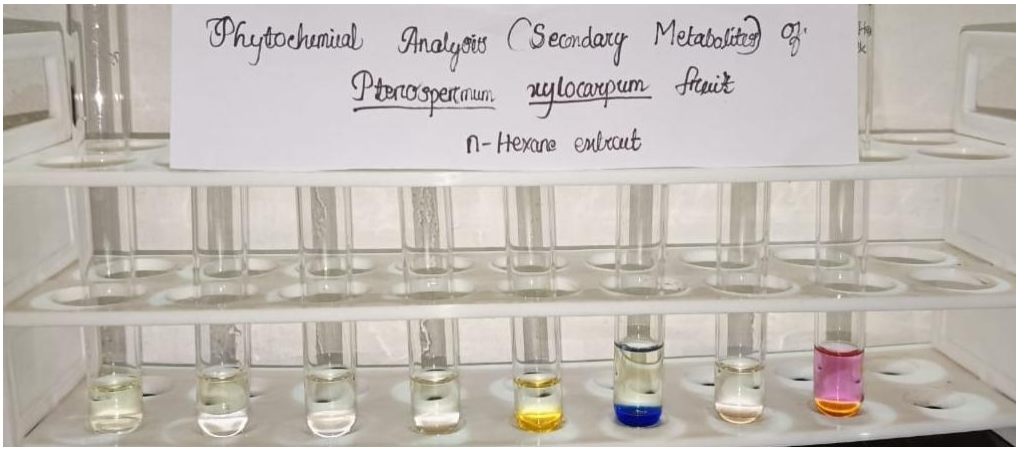


Figure 3: Detection of secondary metabolites of *P. xylocarpum* fruits using n-Hexane extract

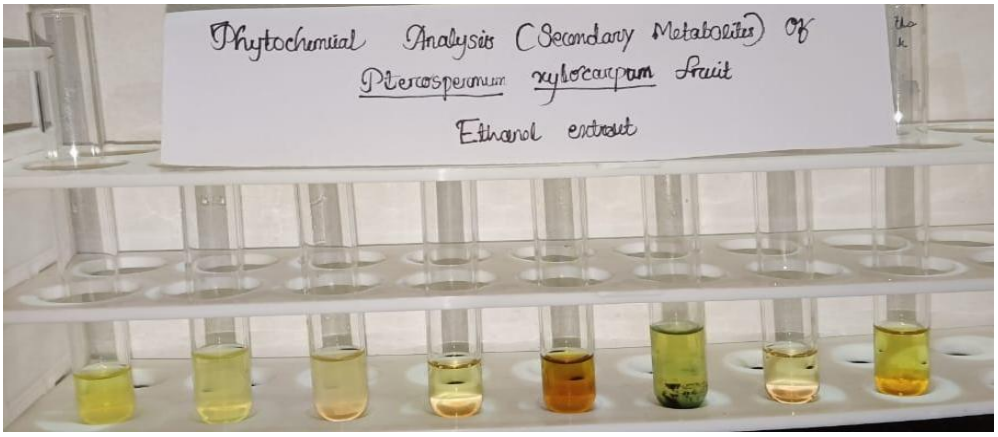


Figure 4: Detection of secondary metabolites of *P. xylocarpum* fruits using ethanol extract



Figure 5: Detection of secondary metabolites of *P. xylocarpum* fruits using aqueous extract

Reducing sugars were found only in the ethanol extract (Figure 4). Notably, flavonoids, terpenoids, phenols, steroids, and carbonyl compounds were not detected in any of the extracts (Figures 3-5). The detection of various phytoconstituents indicating the significant medicinal properties of *P. xylocarpum*.

CONCLUSION

Present study provides valuable understanding into the phytochemical profile of *P. xylocarpum*. The findings suggest its potential therapeutic applications to combat different health ailments. Further research also needs to fully characterize the plant's phytochemical composition and explore its uses in traditional medicine, pharmaceuticals, and nutraceuticals.

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