

Chapter 10

Phytochemical analysis of seeds of *Annona reticulata* L. (Annonaceae)

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Abstract: *Annona reticulata*, a tree of Annonaceae family, has been traditionally used in folk medicine. This study aimed to investigate the secondary metabolites of *A. reticulata* seeds using n-Hexane, ethanol, and aqueous extracts. Phytochemical analysis revealed the presence of tannins, saponins, reducing sugars, and alkaloids in all three extracts. However, flavonoids, terpenoids, phenolic compounds, steroids, and carbonyl compounds were absent. The presence of these bioactive compounds suggests that *A. reticulata* seeds may possess medicinal properties. Present study highlights the need of further investigation into their potential therapeutic applications.

Keywords: Bioactive compounds, fruits, phytochemical screening, trees

INTRODUCTION

Trees have been a cornerstone of human civilization (Das *et al.*, 2025). Beyond their ecological and economic importance, trees are a treasure trove of secondary metabolites (Das *et al.*, 2022). These secondary metabolites, including alkaloids, glycosides, phenolics, and terpenoids, have been a rich source of inspiration for the development of medicines (Nayak and Kumar, 2023; Hossain *et al.*, 2025). Many trees serving as a source of traditional remedies for various ailments (Sahu *et al.*, 2024). *Annona reticulata*, a such tree species has

ethnomedicinal uses (Thang *et al.*, 2013). It is commonly known as the custard apple (Kumar *et al.*, 2021). *A. reticulata* has been used in traditional medicine for its various health benefits (Al Kazman *et al.*, 2022). The seeds, leaves, and bark of this tree have been reported to contain a range of bioactive compounds (Jamkhande and Wattamwar, 2015). Despite its potential, the phytochemical composition of *A. reticulata* seeds remains largely unexplored. Present study aims to investigate the phytochemical profile of *A. reticulata* seeds, with a focus on identifying the bioactive compounds present and their potential therapeutic applications.

MATERIALS AND METHODS

The seeds of *Annona reticulata* were collected from the nearby Mahanadi River area of Cuttack district of Odisha, India. The plant species was identified by the authors followed by the published literature (Figure 1; Saxena and Brahmam, 1994). The Soxhlet extraction method was adopted using three solvents for phytochemical analysis. Detection of nine secondary metabolites were conducted using standard methods (Kumar *et al.*, 2013; Devi *et al.*, 2023; Marndi *et al.*, 2024).

Results and discussion

The phytochemical analysis of *Annona reticulata* seeds revealed the presence of tannins, saponins, reducing sugars, and alkaloids in all three extracts (Table 1; Figures 3-5). These bioactive compounds have been reported to possess various biological activities (Jaiswal *et al.*, 2024). The presence of tannins in the seeds may contribute to their antimicrobial and antioxidant activities (Sahoo *et al.*, 2021).

Table 1: Phytochemical analysis of seeds of *Annona reticulata* using different extracts

Bioactive compounds	n-Hexane extract	Ethanol extract	Aqueous extract
Tannin	+ve	+ve	+ve
Saponin	+ve	+ve	+ve
Flavonoids	-ve	-ve	-ve
Terpenoids	-ve	-ve	-ve
Phenolic compounds	-ve	-ve	-ve
Reducing sugar	+ve	+ve	+ve

Steroids	-ve	-ve	-ve
Alkaloids	+ve	+ve	+ve
Carbonyl compounds	-ve	-ve	-ve

(+ve: Presence; -ve: Absence)



Figure 1: Fruit of *Annona reticulata*



Figure 2: Collection of seeds of *A. reticulata*

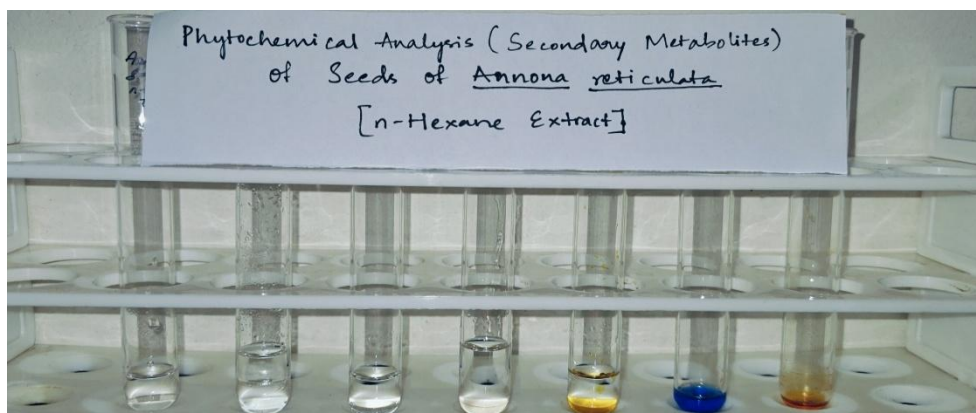


Figure 3: Phytochemical analysis of seeds of *A. reticulata* using n-hexane extract

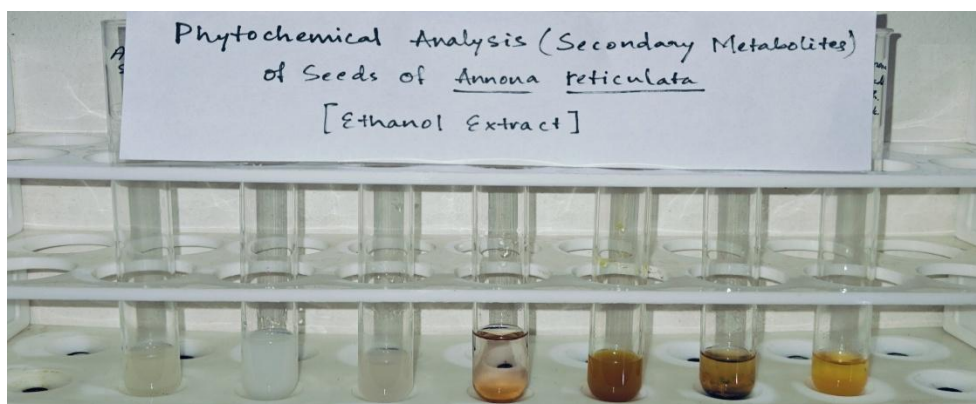


Figure 4: Phytochemical analysis of seeds of *A. reticulata* using ethanol extract

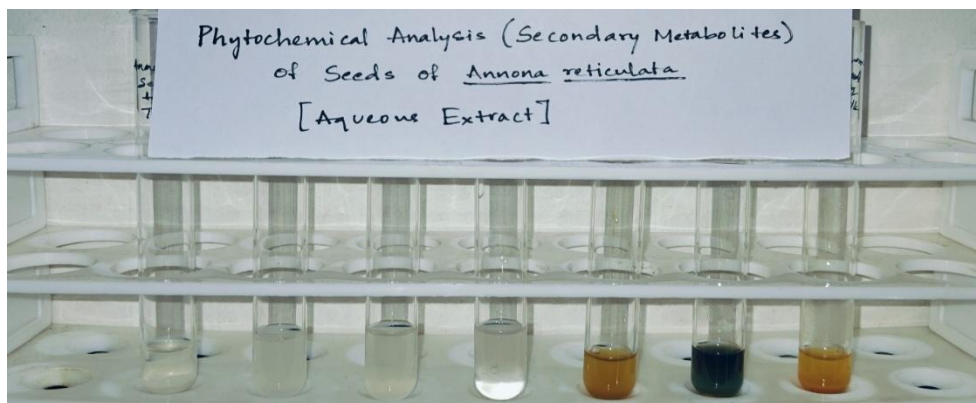


Figure 5: Phytochemical analysis of seeds of *A. reticulata* using aqueous extract

Tannins have been reported to inhibit the growth of various microorganisms and to scavenge free radicals (Singh *et al.*, 2022). Saponins, which were also detected in the seeds, have been reported to possess anti-inflammatory and antioxidant activities (Kumar *et al.*, 2012). They may contribute to the seeds' potential therapeutic applications. The presence of reducing sugars in the seeds may indicate the presence of glycosides, which are known to possess various biological activities (Palei *et al.*, 2024). Alkaloids, which were detected in the seeds, have been reported to possess antimicrobial, anti-inflammatory, and antioxidant activities (Tripathy *et al.*, 2015). The absence of flavonoids, terpenoids, phenolic compounds, steroids, and carbonyl compounds in the seeds may indicate that these compounds are not present in significant amounts or are not extractable using the methods employed in this study.

CONCLUSION

The phytochemical analysis of *Annona reticulata* seeds revealed the presence of several bioactive compounds, including tannins, saponins, reducing sugars, and alkaloids. These compounds have been reported to possess various biological activities, including antimicrobial, anti-inflammatory, and antioxidant properties. The presence of these bioactive compounds in *A. reticulata* seeds supports the traditional use of this plant in folk medicine and suggests its potential as a source of new therapeutic agents. Further studies are needed to isolate and characterize the bioactive compounds present in *A. reticulata* seeds and to investigate their biological activities in more detail. Additionally, in vivo studies and clinical trials are necessary to confirm the safety and efficacy of *A. reticulata* seeds as a therapeutic agent.

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