



Antifungal Potential of Purified Gambier (*Uncaria gambir* Roxb.)

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Abstract

The opportunistic *Candida* species that cause candidiasis are fungi that are infectious. The incidence of candidiasis has increased, due to prolonged antibiotic therapy and an increased number of immunocompromised patients. This study aimed to evaluate if Purified Gambier extracts have antifungal activity in vitro against *Candida albicans*. The antifungal activity of Purified gambir extract (*Uncaria gambir* Roxb.) with concentrations of 32%, 16%, and 8% was tested against *Candida albicans* using the agar diffusion method. Purified gambir extract at concentrations of 8%, 16%, and 32% showed antifungal activity against *Candida albicans* with an average inhibition zone diameter of 5.95 mm, 13.8 mm, and 15.9 mm, respectively. In conclusion, purified gambir extract (*Uncaria gambir* Roxb.) has strong antifungal activity against *Candida albicans*.

Keywords: Antifungal, *Uncaria gambir*, Purified Gambier, Diffusion Agar Method.

1. Introduction

In recent years, fungal infections have emerged as significant sources of morbidity and mortality, particularly in people with impaired immune systems. Antifungal drug resistance has increased and becomes more diversified as a result of increased antifungal use. Natural compounds with antifungal activity have drawn more attention in the search for alternative treatments (Noites *et al.*, 2022). Thus, the search for antimicrobial drugs from alternative sources is gradually gaining significance, especially in relation to the search for antifungal drugs. Since secondary metabolites are a significant chemical diversity reservoir, they are viewed as a possible source of novel medications to counteract the dangers of drug resistance (Sen & Samanta, 2014). Recent studies have shown that different plants have a wide range of pharmacological properties with the potential to treat a number of ailments (Cahyo *et al.*, 2021; Ifora *et al.*, 2016, 2019, 2022; Mustika *et al.*, 2021).

Gambir (*Uncaria gambir* Roxb.) is one of the plants that grow in Indonesia that is rich in catechins (Kurniatri *et al.*, 2019). Catechins are one of the main components of gambir leaf extract, along with a few other components such as catechu tannin acid, quercetin, red catechu, gambir fluorescent, fats, and waxes (Alif Gita Arumsari, 2021; Munggari *et al.*, 2022). The presence of a high content of catechins in Gambir leaves makes it a potential plant to be used in traditional medicine. The *Uncaria gambir* Roxb. plant has long been used in traditional medicine to treat diarrhea, sore throat, swollen gums, dysentery, arteriosclerosis, and obesity (Ilmu *et al.*, 2016). According to earlier research, gambir extract has the potential for a variety of pharmacological effects, including antioxidant (Amir *et al.*, 2012), antihypertensive (Permatasari *et al.*, 2022), anticancer (Syarifah *et al.*, 2019), antifungal (Handayani *et al.*, 2022), anti-inflammatory (Auliana *et al.*, 2022; Munggari *et al.*, 2022; Yunarto *et al.*, 2020), anti-hyperglycemic (Yunarto *et al.*, 2021), anti-hyperuricemia (Rismana *et al.*, 2017), and antihyperlipidemic (Mita *et al.*, 2022; Of *et al.*, 2021). Therefore, these various bioactivities prove the potential of this plant to be applied in treating many diseases. However, only limited research on the antifungal properties of gambir extract has been reported. The purpose of this investigation was to determine whether purified gambir extract might kill or prevent the growth of fungal.

2. Materials and Method

2.1 Materials

Purified gambier was obtained from PT. Andalas Sitawa Fitolab, Padang, Indonesia which is equipped with CoA, SDA (Sabouraud Dextrose Agar) (Oxoid), DMSO (Dimethylsulfoxide) (Merck), Nystatin disk 100 unit/disc (Oxoid).

2.2 Sample preparation

Purified gambier extract was dissolved with Dimethylsulfoxide (DMSO), then made dilutions with concentrations of 32%, 16%, and 8%.

2.3 Screening for antifungal activity

The antifungal activity from Purified Gambier extract (*Uncaria gambir* Roxb.) was tested against *Candida albicans* using the diffusion agar method. Briefly, sterilized disks with Purified Gambier were placed on SDA plates with the test organisms and incubated at 37°C for 24 h. The presence of a clearance zone around the disk were used as an indicator of antifungal bioactivity. Nystatin disc (100 U) is a positive control, while DMSO is negative. The zone of inhibition was measured in mm. The diameter of the inhibition zone were used to categorize the strength of antifungal activity according to Davis and Stout (1971) as follows: Very strong (≥ 20 mm), strong (10–20 mm), moderate (5–<10 mm), and weak (≤ 5 mm)(Davis & Stout, 1971).

3. Result and Discussion

This study examines the performance of purified gambier in inhibiting the growth of *Candida albicans* using the agar diffusion method. The results of those studies are described in Table 1.

In the present study, a purified gambier extract with a concentration of 32%, 16%, and 8% was used. The antifungal activity of the gambier extract was verified against *Candida albicans*. At concentrations of 8%, 16%, and 32%, the average diameter of the inhibition zone was 5.95 mm, 13.8 mm, and 15.9 mm, respectively. The concentration of 8% is included in the moderate category, while the concentrations of 16% and 32% are in the strong category. The positive control (Nystatin) resulted in an average inhibition zone diameter of 27.3 mm which was included in the very strong category (Figure 1).

Table 1. Antifungal Activity of Purified Gambier

No.	Groups	Diameter of inhibition zone (mm) (Mean \pm SD) (<i>Candida albicans</i>)
1	8%	5,95 \pm 0,49
2	16%	13,8 \pm 0,92
3	32%	15,9 \pm 0,85
4	Nystatin (K+)	27,3 \pm 0,07



Figure 1. Diameter of the inhibition zone against *Candida albicans*



The findings of this study are supported by several previous studies that demonstrated *Uncaria gambir*'s ability to fight a variety of fungal, including:

Munggari *et al*. reported that the characteristics of catechins from gambir and their bioactivity against the wood-rot fungus *Schizophyllum commune* (Munggari *et al.*, 2022). In addition, previous studies also reported that *Uncaria gambir* leaves extract have an antifungal activity which can inhibit the growth of *Candida albicans* with an inhibition zone at a concentration of 2.5% is 9 mm. Based on this data it means that it still needs to increase the dose (Rosa, 2021). Various classes of phytochemicals have been identified in *U. gambir* extracts such as alkaloids, flavonoids, and tannins (Auliana *et al.*, 2022; Faiz *et al.*, 2020). The current study has shown the promising potential of *Uncaria gambir* especially the purified gambir extract as a potential antifungal drug candidate. Further research is needed on its effects on other fungal species.

4. Conclusion

In summary, the results from the present study indicate that the Purified gambir extract (*Uncaria gambir* Roxb.) has strong antifungal activity against *Candida albicans*.

5. Acknowledgments

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6. Conflict of Interest

The authors declare that they have no conflicts of interest

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