

This report provides an overview of ten selected studies, categorized by their internal efficacy ranking, detailing their core methodologies and findings related to anti-fungal or antimicrobial potential.

Report of Selected Studies: Potency and Efficacy

Internal Rank Label	Study Title/Author (ID)	Overview
Rank 1: Absolute Potency	Tyagi and Malik - 2010 - Liquid and vapour-phase antifungal activities of selected essential oils against <i>candida albicans</i> m.pdf	This study evaluated essential oils against <i>Candida albicans</i> , finding lemon grass essential oil (Eo) exhibited the strongest antifungal effect, especially in the vapor phase ¹² . The Minimum Inhibitory Concentration (MIC) was significantly lower in the vapor phase (32.7 mg/l) than the liquid phase (288 mg/l) ¹ . Vapor exposure achieved complete loss in viability within 4 hours ¹³ . Microscopic observation confirmed that the potent vapor treatment led to severe cell shrinkage and rupture ¹

Rank 1: Absolute Potency	Abdollahi et al. - 2024 - Nanoformulated herbal compounds enhanced antibacterial efficacy of camphor and thymol-loaded nanoge.pdf	This research developed nanoformulated herbal compounds (camphor and thymol nanogels) to enhance antimicrobial effectiveness and facilitate topical usage ⁶⁷ . The nanogel combining camphor and thymol achieved complete growth suppression of human pathogens like <i>P. aeruginosa</i> and <i>S. aureus</i> at 1250 µg/mL ⁶ . The thymol nanogel showed potent effects against <i>L. monocytogenes</i> ⁶ . The study concludes that these nanogels are effective antibacterial agents whose findings may be mature enough to measure in clinical trials ⁸⁹ .
Rank 1: Absolute Potency	Plaatjie et al. - 2024 - A scoping review on efficacy and safety of medicinal plants used for the treatment of diarrhea in su.pdf	This scoping review assessed the efficacy and safety of medicinal plants used to treat diarrhea in sub-Saharan Africa, driven by the rise of antimicrobial-resistant pathogens ¹⁰ . Of the reviewed <i>in vitro</i> studies, the majority (63%) reported strong activity against diarrhea-causing agents ¹¹ . One study noted that the lowest MFC value (160 µg/ml) was achieved by <i>Dalbergiella nyasae</i> against <i>C. albicans</i> , indicating yeast was the most susceptible organism tested ¹² . This confirms the potent antimicrobial activity of several African medicinal plant extracts ¹³ .

Rank 1: Absolute Potency	Shahina et al. - 2018 - <i>Cinnamomum zeylanicum</i> bark essential oil induces cell wall remodelling and spindle defects in Candid.pdf	This study investigated the potent antifungal mechanisms of cinnamon bark oil (CNB oil) against <i>C. albicans</i> , including clinical strains from patients 14.... CNB oil compromised cell wall integrity, causing extensive cell surface remodelling15. Critically, the major component, cinnamaldehyde, achieved complete inhibition of the mitotic spindle assembly at 112 µg/mL, leading to cell death15. These findings suggest CNB oil could be an effective alternative agent or synergistic partner to address antifungal resistance1718.
Rank 2: Superior Comparison	Mbaveng et al. - 2012 - Antimicrobial activities of the methanol extract and compounds from the twigs of <i>Dorstenia mannii</i> (M.pdf	Researchers tested the extract and isolated flavonoids from <i>Dorstenia mannii</i> against <i>C. albicans</i> and multidrug-resistant bacteria, highlighting their medical importance19.... The crude methanol extract exhibited its lowest MIC (64 µg/ml) against <i>C. albicans</i> 2223. Isolated Compound 6 showed especially potent activity against <i>C. albicans</i> with an MIC of only 8 µg/ml , a value comparable to or lower than reference drugs2122. This extract and its compounds are considered interesting natural antimicrobial products24.

Rank 2: Superior Comparison	Asif et al. - 2023 - Toxicological assessment of <i>Phormidium</i> sp. derived copper oxide nanoparticles for its biomedical and.pdf	This study explored <i>Phormidium</i> sp. derived copper oxide nanoparticles (CuONPs) as alternate biomedical agents ²⁵ . CuONPs were shown to be potent antifungal agents, achieving a MIC of 125 µg/ml against <i>C. albicans</i> ²⁵ . Crucially, they displayed high synergistic potential when combined with fluconazole against <i>C. albicans</i> and <i>C. glabrata</i> ²⁵²⁶ . The nanoparticles also demonstrated potent apoptotic activity against human lung cancer cell lines (A549 and H1299), suggesting broad future applications in nanomedicine ²⁵²⁷ .
Rank 2: Superior Comparison	Correia et al. - 2016 - Activity of crude extracts from Brazilian cerrado plants against clinically relevant <i>Candida</i> species.pdf	This study tested six Brazilian Cerrado plants against clinically relevant <i>Candida</i> species , focusing on resistance ²⁸²⁹ . <i>Eugenia dysenterica</i> extracts proved highly effective, demonstrating a lowest MIC of 125 µg/disc against <i>C. tropicalis</i> and <i>C. famata</i> ³⁰³¹ . <i>Pouteria ramiflora</i> also showed high inhibitory effects, particularly against non- <i>albicans</i> strains ³⁰³² . This potent activity was attributed to the presence of polyphenols, such as flavonoids and catechins ³⁰³² .

Rank 3: High	Pietrella et al. - 2011 - Beneficial effect of <i>Mentha suaveolens</i> essential oil in the treatment of vaginal candidiasis assesse.pdf	This study investigated the potent antifungal effects of <i>Mentha suaveolens</i> essential oil (EOMS) against <i>Candida albicans</i> , focusing on vaginal candidiasis ³³³⁴ . <i>In vitro</i> , EOMS showed superior candidacidal activity compared to the Tea Tree Oil control, effective even against azole-resistant strains ³⁵³⁶ . Furthermore, using an <i>in vivo</i> mouse model, intravaginal administration of EOMS accelerated the clearance of <i>C. albicans</i> ³⁴³⁷ . These findings lay the groundwork for further investigation into an alternative therapy for chronic vaginal candidiasis in humans ³⁴³⁸ .
Rank 3: High	Alamgir et al. - 2010 - Chemical-genetic profile analysis of five inhibitory compounds in yeast.pdf	This research utilized chemical-genetic profiling in <i>Saccharomyces cerevisiae</i> (yeast) to determine the modes of action for five potent inhibitory compounds, including common antibiotics like streptomycin ³⁹⁴⁰ . The study focused on compounds that target protein biosynthesis, revealing distinct yet often overlapping profiles ⁴⁰ . This methodology is essential for understanding the complex interactions between bioactive compounds and cellular machinery, providing a framework for identifying putative gene functions and potential pharmaceutical target sites ³⁹⁴¹ .

Rank 3: High	Ding et al. - 2021 -	This study identified that inflammasome-mediated GSDMD activation allows <i>C. albicans</i> to escape from macrophages, contributing to severe infections like fungal sepsis ⁴²⁴³ .
Potency	Inflammasome-mediated	Researchers tested the GSDMD antagonist NSA (Necrosulfonamide) in <i>C. albicans</i> -infected mice ⁴⁴ . NSA treatment proved potent , significantly reducing the fungal burden , improving the clinical score, and decreasing kidney weight ⁴⁴⁴⁵ .
Claim	GSDMD activation facilitates escape of <i>Candida albicans</i> from macrophages.pdf	The results propose GSDMD inhibition as a potential therapeutic target to improve fungal clearance ⁴³