

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.

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### Report of Selected Studies: Potency and Efficacy

Internal Rank Label	Study Title/Author (ID)	Overview
<b>Rank 1: Absolute Potency</b>	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 <b>lemon grass essential oil (Eo)</b> exhibited the <b>strongest</b> antifungal effect, especially in the vapor phase <sup>12</sup> . The Minimum Inhibitory Concentration (MIC) was significantly lower in the vapor phase (32.7 mg/l) than the liquid phase (288 mg/l) <sup>1</sup> . Vapor exposure achieved <b>complete loss in viability</b> within 4 hours <sup>13</sup> . Microscopic observation confirmed that the <b>potent</b> vapor treatment led to severe cell shrinkage and rupture <sup>1</sup> ....

**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<sup>67</sup>. The nanogel combining camphor and thymol achieved **complete growth suppression** of human pathogens like *P. aeruginosa* and *S. aureus* at 1250 µg/mL<sup>6</sup>. The thymol nanogel showed **potent** effects against *L. monocytogenes*<sup>6</sup>. The study concludes that these nanogels are effective **antibacterial agents** whose findings may be mature enough to measure in **clinical trials**<sup>89</sup>.

**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<sup>10</sup>. Of the reviewed *in vitro* studies, the majority (63%) reported **strong activity** against diarrhea-causing agents<sup>11</sup>. One study noted that the lowest MFC value (**160 µg/ml**) was achieved by *Dalbergiella nyasae* against *C. albicans*, indicating yeast was the **most susceptible** organism tested<sup>12</sup>. This confirms the **potent** antimicrobial activity of several African medicinal plant extracts<sup>13</sup>.

**Rank 1:  
Absolute  
Potency**

Shahina et al. - 2018 -  
*Cinnamomum zeylanicum* bark  
essential oil induces cell wall  
remodelling and spindle  
defects in *Candida*.pdf

This study investigated the **potent** antifungal mechanisms of **cinnamon bark oil (CNB oil)** against *C. albicans*, including **clinical strains from patients**<sup>14</sup>.... CNB oil compromised cell wall integrity, causing extensive cell surface remodelling<sup>15</sup>. Critically, the major component, cinnamaldehyde, achieved **complete inhibition** of the mitotic spindle assembly at 112 µg/mL, leading to cell death<sup>15</sup>. These findings suggest CNB oil could be an effective alternative agent or synergistic partner to address antifungal resistance<sup>17,18</sup>.

**Rank 2:  
Superior  
Comparison**

Mbaveng et al. - 2012 -  
Antimicrobial activities of the  
methanol extract and  
compounds from the twigs of  
*Dorstenia mannii* (M).pdf

Researchers tested the extract and isolated flavonoids from *Dorstenia mannii* against *C. albicans* and multidrug-resistant bacteria, highlighting their medical importance<sup>19</sup>.... The crude methanol extract exhibited its **lowest MIC (64 µg/ml)** against *C. albicans*<sup>22,23</sup>. Isolated **Compound 6** showed especially **potent** activity against *C. albicans* with an MIC of only **8 µg/ml**, a value comparable to or lower than reference drugs<sup>21,22</sup>. This extract and its compounds are considered interesting natural antimicrobial products<sup>24</sup>.

<b>Rank 2: Superior Comparison</b>	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 <b>copper oxide nanoparticles (CuONPs)</b> as alternate <b>biomedical agents</b> <sup>25</sup> . CuONPs were shown to be <b>potent</b> antifungal agents, achieving a <b>MIC of 125 µg/ml</b> against <i>C. albicans</i> <sup>25</sup> . Crucially, they displayed high <b>synergistic</b> potential when combined with fluconazole against <i>C. albicans</i> and <i>C. glabrata</i> <sup>2526</sup> . The nanoparticles also demonstrated <b>potent</b> apoptotic activity against <b>human lung cancer cell lines</b> (A549 and H1299), suggesting broad future applications in nanomedicine <sup>2527</sup> .
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<b>Rank 2: Superior Comparison</b>	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 <b>clinically relevant <i>Candida</i> species</b> , focusing on resistance <sup>2829</sup> . <i>Eugenia dysenterica</i> extracts proved highly effective, demonstrating a <b>lowest MIC of 125 µg/disc</b> against <i>C. tropicalis</i> and <i>C. famata</i> <sup>3031</sup> . <i>Pouteria ramiflora</i> also showed high inhibitory effects, particularly against non- <i>albicans</i> strains <sup>3032</sup> . This <b>potent</b> activity was attributed to the presence of polyphenols, such as flavonoids and catechins <sup>3032</sup> .
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<b>Rank 3: High Potency Claim</b>	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 <b>potent</b> antifungal effects of <i>Mentha suaveolens</i> essential oil (EOMS) against <i>Candida albicans</i> , focusing on <b>vaginal candidiasis</b> <sup>3334</sup> . <i>In vitro</i> , EOMS showed superior candidacidal activity compared to the Tea Tree Oil control, effective even against azole-resistant strains <sup>3536</sup> . Furthermore, using an <i>in vivo</i> mouse model, intravaginal administration of EOMS <b>accelerated the clearance</b> of <i>C. albicans</i> <sup>3437</sup> . These findings lay the groundwork for further investigation into an alternative therapy for chronic vaginal candidiasis in humans <sup>3438</sup> .
<b>Rank 3: High Potency Claim</b>	Alamgir et al. - 2010 - Chemical-genetic profile analysis of five inhibitory compounds in yeast.pdf	This research utilized <b>chemical-genetic profiling</b> in <i>Saccharomyces cerevisiae</i> (yeast) to determine the modes of action for five <b>potent</b> inhibitory compounds, including common antibiotics like streptomycin <sup>3940</sup> . The study focused on compounds that target protein biosynthesis, revealing distinct yet often overlapping profiles <sup>40</sup> . This methodology is essential for understanding the <b>complex interactions</b> between bioactive compounds and cellular machinery, providing a framework for identifying putative gene functions and potential <b>pharmaceutical target sites</b> <sup>3941</sup> .

**Rank 3: High  
Potency  
Claim** Ding et al. - 2021 -  
Inflammasome-mediated  
GSDMD activation facilitates  
escape of *Candida albicans*  
from macrophages.pdf

This study identified that  
inflammasome-mediated **GSDMD  
activation** allows *C. albicans* to escape  
from macrophages, contributing to severe  
infections like **fungal sepsis**<sup>4243</sup>.  
Researchers tested the GSDMD antagonist  
NSA (Necrosulfonamide) in *C.  
albicans*-infected mice<sup>44</sup>. NSA treatment  
proved **potent**, significantly reducing the  
**fungal burden**, improving the clinical  
score, and decreasing kidney weight<sup>4445</sup>.  
The results propose GSDMD inhibition as a  
**potential therapeutic target** to improve  
fungal clearance<sup>43</sup>