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**ADMINISTRATIVE INFORMATION**

**Support** - King Khalid University.

**Review Stage at time of this submission** - Completed but not published.

**Conflicts of interest** - None declared.

**INPLASY registration number:** INPLASY202550001

**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 1 May 2025 and was last updated on 1 May 2025.

**INTRODUCTION**

**Review question / Objective** To evaluate the efficacy of nanoparticles in reducing Candida biofilm formation on denture surfaces.

**Rationale** Candida biofilms on dentures resist conventional antifungals, necessitating innovative solutions like nanoparticles.

**Condition being studied** Anti-biofilm activity of nanoparticles against Candida species.

**METHODS**

**Search strategy** Databases: PubMed, EBSCO, ScienceDirect, Cochrane Library, Google Scholar.

**Participant or population** In vitro studies testing nanoparticles on fungal biofilms grown on denture materials.

**Intervention** Incorporation of nanoparticles in denture resins.

**Comparator** Untreated specimens or those with standard antifungal agents served as baselines.

**Study designs to be included** In vitro experimental studies; excluded reviews, case reports, and non-English articles.

**Eligibility criteria** Inclusion: Studies on nanoparticle efficacy against Candida biofilms. Exclusion: Non-English papers, bacterial-only biofilms, or irrelevant outcomes.

**Information sources** Electronic databases PubMed, EBSCO, ScienceDirect, Cochrane Library, Google Scholar.

**Main outcome(s)** Primary outcome shows Nanoparticles significantly reduced biofilm biomass.

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**Additional outcome(s)** Secondary measures included material safety, strength, and long-term efficacy.

**Data management** Excel organized findings; Zotero managed duplicates. PRISMA outlined inclusion/exclusion steps.

**Quality assessment / Risk of bias analysis** Studies showed low bias risk via JBI checklist.

**Strategy of data synthesis** Statistical and descriptive analyses highlighted nanoparticle efficacy despite high heterogeneity.

**Subgroup analysis** Composite ZnO-Ag hybrids were more effective than individual component nanoparticles.

**Sensitivity analysis** Absent in the reviewed literature.

**Language restriction** Only studies published in English included.

**Country(ies) involved** Saudi Arabia, India.

**Other relevant information** PRISMA 2020 guidelines followed; high heterogeneity noted.

**Keywords** Nano-particles; Candida; Biofilm.

**Dissemination plans** Results intended for peer review publication.

#### **Contributions of each author**

Author 1 - Sultan Ainoosah - Conceptualization, Methodology, Supervision, Visualization.

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