

## Preparation, Characterization, and Antimicrobial Activity of Carboxymethyl Chitosan Schiff Bases with Different Benzaldehyde Derivatives

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**Abstract :** Eighteen carboxymethyl chitosan (CMCh) schiff bases and their reduced derivatives have been synthesized. They were characterized by spectral analyses (FT-IR and H1-NMR) and scanning electron microscopy observation. Their antibacterial activities against *Streptococcus pneumoniae* (RCMB 010010), *Bacillus subtilis* (RCMB 010067), as Gram positive bacteria and *Escherichia coli* (RCMB 010052) as Gram negative bacteria and the antifungal activity against *Aspergillus fumigatus* (RCMB 02568), *Geotricum candidum* (RCMB 05097), and *Candida albicans* (RCMB 05031) were examined using agar disk diffusion method. The results demonstrate how the antibacterial and the antifungal activity are clearly affected by both the nature and position of the substituent groups in the aryl ring of the prepared derivatives. CMCh-4-nitroBenz Schiff base and its reduced form show higher antimicrobial activity comparing with other para substituted derivatives. CMCh-4-nitroBenz Schiff base: 18.3, 17, and 15.6 mm against *Bacillus subtilis*, *Streptococcus pneumoniae*, and *Escherichia coli* respectively and 16.2, 17.3, and 16.4 mm against *Aspergillus fumigatus*, *Geotricum candidum*, and *Candida albicans* respectively. CMCh-4-nitroBenz reduced form: 19.5, 18.7, and 16.2 mm against *Bacillus subtilis*, *Streptococcus pneumoniae*, and *Escherichia coli* respectively and 17.5, 19.5, and 17.4 mm against *Aspergillus fumigatus*, *Geotricum candidum*, and *Candida albicans* respectively. Also CMCh-3-bromoBenz show good results; CMCh-3-bromoBenz schiff base: 19.2, 16.9, and 14.6 mm *Bacillus subtilis*, *Streptococcus pneumoniae*, and *Escherichia coli* respectively and 18.4, 17.6, and 15.9 mm against *Aspergillus fumigatus*, *Geotricum candidum*, and *Candida albicans* respectively.

**Keywords :** chitosan, schiff base, minimum inhibition concentration, antimicrobial activity

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