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البحث السادس

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مشترك مع آخرين داخل التخصص – منشور	6

Title	**Evaluation of synthesized biosurfactants as promising corrosion inhibitors and alternative antibacterial and antidermatophytes agents.**				
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ABSTRACT

This study investigated different amino acid-based surfactants (AASs), also known as biosurfactants, including sodium N-dodecyl asparagine (AS), sodium N-dodecyl tryptophan (TS), and sodium N-dodecyl histidine (HS) for their potential anticorrosion, antibacterial, and antidermatophyte properties. The chemical and electrochemical techniques were employed to examine the copper corrosion inhibition efficacy in H_2SO_4 (1.0 M) solution at 298 K. The results

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indicated their promising corrosion inhibition efficiencies (% IEs), which varied with the biosurfactant structures and concentrations, and the concentrations of corrosive medium. Higher % IEs values were attributed to the surfactant adsorption on the copper surface and the production of a protective film. The adsorption was in agreement with Langmuir adsorption isotherm. The kinetics and mechanisms of copper corrosion and its inhibition by the examined AASs were illuminated. The surfactants behaved as mixed-kind inhibitors with minor anodic priority. The values of % IEs gained from weight loss technique at a 500 ppm of the tested surfactants were set to be 81, 83 and 88 for AS, HS and TS, respectively. The values of % IEs acquired from all the applied techniques were almost consistent which were increased in the order: TS > HS ≥ AS, establishing the validity of this study. These surfactants also exhibited strong broad-spectrum activities against pathogenic Gram-negative and Gram-positive bacteria and dermatophytes. HS exhibited the highest antimicrobial activity followed by TS, and AS. The sensitivity of pathogenic bacteria varied against tested AASs. *Shigella dysenteriae* and *Trichophyton mantigrophytes* were found to be the most sensitive pathogens. HS exhibited the highest antibacterial activity against *Shigella dysenteriae, Bacillus cereus, E. coli, K. pneumoniae,* and *S. aureus* through the formation of clear zones of 70, 50, 40, 39, and 35 mm diameters, respectively. AASs also exhibited strong antifungal activity against all the tested dermatophyte molds and fungi. HS caused the inhibition zones of 62, 57, 56, 48, and 36 mm diameters against *Trichophyton mantigrophytes, Trichophyton rubrum, Candida albicans, Trichosporon cataneum,* and *Cryptococcus neoformans*, respectively. AASs minimal lethal concentrations ranged between 16 to 128 µg/ml. HS presented the lowest value (16 µg/ml) against tested pathogens followed by TS (64 µg/ml), and AS (128 µg/ml). Therefore, AASs, especially HS, could serve as an effective alternative antimicrobial agent against food-borne pathogenic bacteria and skin infections-associated dermatophyte fungi.