Sixteen new phthalimide derivatives were synthesized and evaluated for their *in vitro* anti-microbial, anti-oxidant and anti-inflammatory activities. The cytotoxicity for all synthesized compounds was also determined in cancer cell lines and in normal human cells.

None of the target derivatives had any cytotoxic activity. (*ZE*)-2-[4-(1-Hydrazono-ethyl)phenyl]isoindoline-1,3-dione (12) showed remarkable anti-microbial activity. Its activity against *Bacillus subtilis* was 133%, 106% and 88.8% when compared with the standard antibiotics ampicillin, cefotaxime and gentamicin, respectively. Compound 12 also showed its highest activities in Gram negative bacteria against *Pseudomonas aeruginosa* where the percentage activities were 75% and 57.6% when compared sequentially with the standard antibiotics cefotaxime and gentamicin. It was also found that the compounds 2-[4-(4-ethyl-3-methyl-5-thioxo-1,2,4-triazolidin-3-yl)phenyl]isoindoline-1,3-dione (13b) and 2-[4-(3-methyl-5-thioxo-4-phenyl-1,2,4-triazolidin-3-yl)phenyl]isoindoline-1,3-dione (13c) had anti-oxidant activity. 4-(*N'*-{1-[4-(1,3-Dioxo-1,3-dihydro-isoindol-2-yl)-phenyl]-ethylidene}-hydrazino)-benzenesulfonamide (17c) showed the highest *in vitro* anti-inflammatory activity of the tested compounds (a decrease of 32%). To determine the mechanism of the anti-inflammatory activity of 17c, a docking study was carried out on the COX-2 enzyme. The results confirmed that 17c had a higher binding energy score (−17.89 kcal/mol) than that of the ligand celecoxib (−17.27 kcal/mol).