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Antimicrobial, Antioxidant, and Cytotoxic Activities of *Bixa orellana* Linn

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SUMMARY. *Bixa orellana* Linn., commonly known as 'lipstick plant', is used in folk medicines to treat infections of microbial origin as well as coloring agents in food stuffs in the LDCs like Bangladesh. The minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) of the warm water extract of leaves of *B. orellana* were evaluated against 25 multidrug resistant (MDR) clinical isolates and 6 food-borne pathogens using the micro-dilution broth method modified to comply with the NCCLS standards. The total phenolic content and antioxidant capacity of warm water, ethanol, and methanol extracts of the seeds and leaves of *B. orellana* were also evaluated. The brine shrimp lethality assay was conducted to assess the toxicity of the extracts. Except *Pseudomonas* spp., all the MDR isolates and food-borne pathogens tested were susceptible to the warm water extract of the leaves. The MIC and MBC ranged between 8-256 μg/mL and 16 - 256 μg/mL, respectively. Among the test organisms, *Streptococcus* spp. and *Shigella dysenteriae*-1 MJ-84 showed highest susceptibility while *Escherichia coli* exhibited moderate susceptibility to warm water extract of the leaves. The highest total phenolic content (99.99 mg of GAE/g of extractives) and antioxidant capacity (IC_{50} value 13 μg/mL) were observed in ethanolic extract of seeds of *B. orellana,* whereas the IC_{50} of the reference standard BHT (*tert*-butyl-1-hydroxytoluene) was 59.2 μg/mL. On the other hand, in the brine shrimp lethality bioassay the methanolic extract of the seeds of *B. orellana* demonstrated strong cytotoxic activity with LC_{50} value of 19.3 μg/mL. These results suggest that the extracts of *B. orellana* possess bioactive compounds.

KEY WORDS: Antioxidant capacity, *Bixa orellana* Linn, Brine shrimp lethality bioassay, Multidrug resistant (MDR) bacteria, Total phenolic content.

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