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ANTIBACTERIAL ACTIVITY OF AQUEOUS EXTRACTS OF Zanthoxylum rhetsa. ROXB. AGAINST METHICILLIN RESISTANT Staphylococcus aureus AND EVALUATION OF RADICAL SCAVENGING ACTIVITY

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The treatments for infections due to multidrug resistance bacteria (MDR) have become a greater challenge in healthcare sector. Hence, these infections are lead to significant increase in mortality, morbidity and health care cost. Therefore, identifying novel and alternative therapeutic agents to combat them is an urgent need. The medicinal plants are good competitors for the task. *Zanthoxylum rhetsa* (Roxb), commonly known as "Thanahalu" in Sinhala has traditionally been used among Sri Lankan "Vedda" population to treat infected wounds. Therefore, current investigation was designed to evaluate the antibacterial and antioxidant activities of *Z. rhetsa*. The plant samples (fresh leaves, stem bark, root bark and prickles) were collected from Dambana, Sri Lanka. Each sample was shade dried and freeze dried to remove the trace amount of water. The dried powdered plant material (2.5 g) of each part was dissolved in 100 ml of deionized water and microwave assisted extraction was carried out for 5 min. Each aqueous extract was screened for antibacterial activity against 6 methicillin resistant *Staphylococcus aureus* (MRSA) strains, *S. aureus* ATCC 25923 and *S. aureus* NCTC 6571 by cut-well diffusion method. The bacterial suspensions adjusted to McFarland turbidity of 0.5 (approximately 1 x 108 cfu/ml) *were* inoculated on to Muller-Hinton Agar (MHA) plates and incubated at 35 ºC for 24 hours. The minimum inhibitory concentration (MIC) was determined by micro-broth dilution method. All the susceptibility testing was performed according to Clinical and Laboratory Standards Institute (CLSI) methods. The preliminary antibacterial screening to identify MRSA was done by disc diffusion assay using cefoxitin (30 µg) discs and the resistance strains were selected based upon there ZOI (≤ 21 mm). In addition, *in vitro* antioxidant potential was determined using DPPH (2, 2-diphenyl-1-picryl-hydrazyl) radical scavenging assay using L-ascorbic acid as a positive control. The aqueous leaves extract of *Z. rhetsa* showed comparatively larger Zones of Inhibition (ZOIs) against all MRSA strains (13-15 mm). Furthermore, there is no comparable difference in ZOIs for the aqueous extracts of *Z. rhetsa* stem bark, root bark and prickles. The aqueous leaf extract of *Z. rhetsa* showed significantly low ($p < 0.05$) MIC value (0.3125 – 1.25 mg/ml) compared to the aqueous extracts of stem bark, root bark and prickles tested. The aqueous extracts obtained from the stem bark and root bark showed high DPPH radical scavenging activity by showing EC50 values low as 64.31 ± 6.31 and 81.53 ± 3.42 µg/ml, respectively, and these values are significantly lower

than ($p < 0.05$) it for other aqueous extracts of other parts of the plant tested. The current findings add to a growing body of literature on antibacterial activity of *Z. rhetsa against MRSA strains and it is open up new dimensions to find low cost, non-toxic antibacterial agents to combat MRSA infections.*

Keywords: *Multidrug-resistant (MDR), antibacterial activity, Minimum inhibitory concentration (MIC), Zanthoxylum rhetsa, methicillin resistant Staphylococcus aureus (MRSA)*