RES-380

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Antimicrobial Potential of Polyphenol-Containing Medicinal Plants: A Study on the Antibiotic-Resistant *Staphylococcus aureus* from Cattle and Poultry Farms

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Introduction

Livestock-associated methicillin-resistant *S. aureus (MRSA)* poses significant implications for animal and public health. Alternative treatments for MRSA are necessary to reduce the health burden. A polyphenol-containing medicinal plant would be a solution.

Objectives

- To determine the prevalence of antibiotic-resistant S. aureus among poultry and cattle farm samples
- To explore the antimicrobial effects of polyphenol-containing plant extracts against antibiotic-resistant *S. aureus*

Methodology

Poultry and cattle farm selection and sample collection

Enrichment, culture and isolation of S. aureus

Determination of the cefoxitin (30 µg) resistance pattern of the isolates using the disk diffusion method

Selection of polyphenol-rich medicinal plants through review and methanolic extraction of polyphenols

Assessment of antimicrobial activity of the extract against cefoxitin-resistant S. aureus

Results

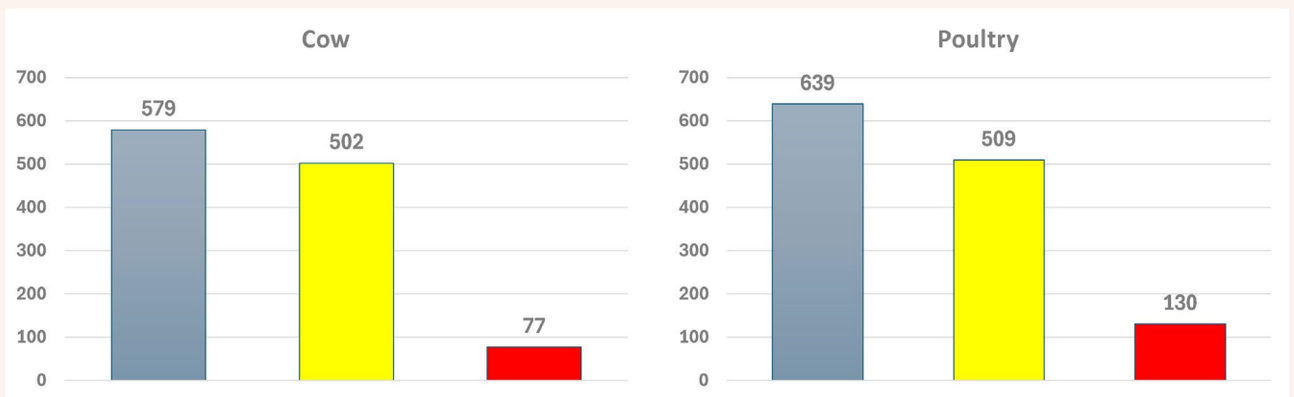

Figure 1: recovery of *S. aureus* (yellow colonies) from poultry and cow farm samples.

Table 1: Coagulase-positive S. aureus among the presumptive yellow conies

Sample	Presumptive *S. aureus* (Yellow Colony)	Coagulase Positive S. aureus	(%)
Poultry (125)	104	83	80.0
Cow (125)	91	75	82.41

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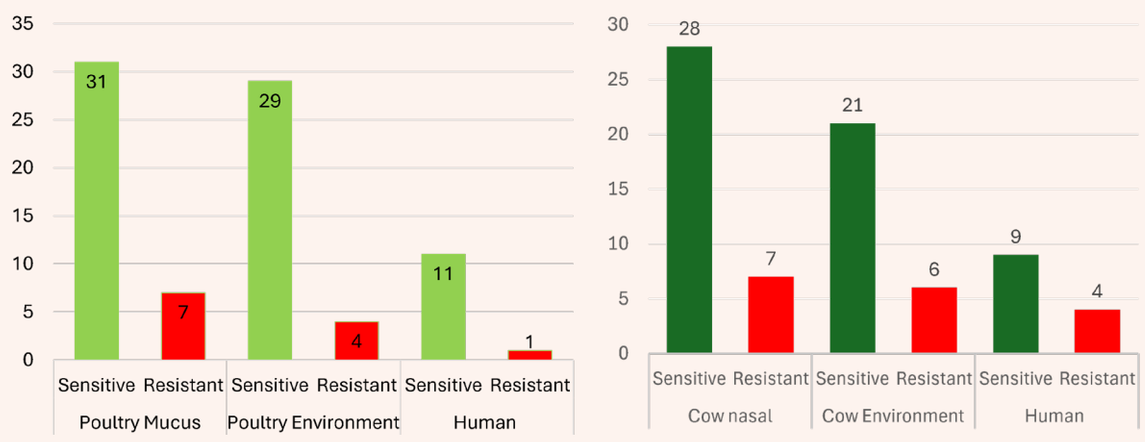

Figure 2: Cefoxitin (30 µg) susceptibility test to *S. aureus* recovered from poultry and cow farm samples. A zone of inhibition with a diameter of ≤19 mm around a 30-µg cefoxitin disk is generally interpreted as methicillin-resistant (MRSA) according to the CLSI. Figure 2 showed that 17% of *S. aureus* from poultry and 23% *S. aureus* from cow farms samples were methicillin-resistant.

Table 2: Polyphenol content of selected plants

Name of plant	Scientific name	Total phenolic content (µg/ml GAE)
Thankuni	*Centella asiatica*	281.52 ± 1.10[a]
Misri dana	*Scoparia dulcis*	278.16 ± 1.25[a]
Hatisur	*Heliotropium indicum*	269.25 ± 1.40[a]
Sajna	*Moringa oleifera*	305.40 ± 1.80[b]
Neem	*Azadirachta indica*	276.57± 1.25[a]

Table 2 shows the polyphenol content of the selected medicinal plants. A standard curve (R^2) was constructed using a UV spectrophotometer. *Moringa olifera* contains the highest polyphenol. **Table 3** shows that *Moriga olifera* highly inhibited the resistant *S. aureus* followed by *Centella asiatica*.

Table 3: Average inhibition zone (mm) of the plant extracts on the antibiotic-resistant *S. aureus*

Name of isolate	Origin	Average diameter of inhibition zone (mm) *Centella asiatica*	*Scoparia dulcis*	*Heliotropium indicum*	*Moringa oleifera*	*Azadirachta indica*
S. aureus	Animal	14±1[a]	11±1[b]	13±2[a]	16±2[a]	13±2[a]
	Environment	14±2[a]	11±2[b]	12±2[a]	16±2[a]	12±2[a]
	Worker	13±1[a]	11±1[b]	11±1[b]	16±1[a]	11±1[b]

Conclusion

The prevalence of MRSA among livestock is alarming. Polyphenol containing medicinal plants or herbs would be an alternative solution to the antibiotic resistance S. aureus.