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Antibacterial activity of Corryocactus brevistylus (Sanky) methanol extract against *Staphylococcus aureus* and *Enterococcus faecalis*

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BACKGROUND

Staphylococcus aureus and *Enterococcus faecalis* are two important pathogens associated with health-care associated infections. In 2017, the WHO published a list of bacteria for which new antibiotics are urgently needed, which included both bacteria in the highest priority group among gram positive bacteria. *Corryocactus brevistylus* (K. Schum. ex Vaupel) Britton & Rose, commonly referred to as Sanky is a Peruvian Cactaceae grown in the Andean regions with antioxidant properties, however, its antibacterial effect has not been studied yet. To determine the antibacterial effect of *Corryocactus brevistylus* (Sanky) methanol extract, against *Staphylococcus aureus* (ATC□25175) and *Enterococcus faecalis* (ATCC□29212).

METHODS

The methanol extract of *Corryocactus brevistylus* was prepared from freeze-dried fruit pulp. Agar diffusion test was used by preparing wells with the experimental solutions cultivated in aerobic conditions for 24 h at 37 °C. Six independent tests were prepared for each type of bacteria, using penicillin-streptomycin and clorhexidine 12% as positive controls. The MIC was determined using the microdilution method as described by the CLSI.

RESULTS

Antibacterial effect of the methanol extract was observed with inhibition halos of 23.33 ± 0.72 mm and 24.34 ± 0.55 mm against *Staphylococcus aureus* and *Enterococcus faecalis*, respectively. Meanwhile, penicillin-streptomycin (10 U) showed an inhibition halo of 28.32 ± 2.6 mm and 22.84 ± 1.2 mm, respectively. Clorhexidine 12% produced halos of 26.8 ± 0.4 mm and 24.3 ± 0.4 mm, respectively. The minimum inhibitory concentration of the fruit extract was 0.83 mg/mL for *Staphylococcus aureus* and 0.21 mg/mL for *Enterococcus faecalis*.

Table 1. Inhibition halos of different concentrations of *Corryocactus brevistylus* (Sanky) on *Staphylococcus aureus* and *Enterococcus faecalis*.

Bacterium	Concentration (mg/mL)	Mean	SD	Minimum	Maximum	Normality
S. aureus.	**6.65**	23.3	0.7	22.3	24.3	0.9
	3.33	18.4	1.2	16.9	19.8	0.4
	1.66	12.2	0.9	10.8	13.3	0.4
	0.83	0.0	0.0	0.0	0.0	0.0
	Pen-Strep 10 U	28.5	2.6	26.1	31.3	0.8
	CHX 12%	26.8	0.4	26.2	27.1	0.6
E. faecalis.	**6.65**	24.3	0.6	23.5	25.0	0.7
	3.33	20.8	1.2	19.0	22.2	0.9
	1.66	14.9	1.2	13.0	16.0	0.4
	0.83	10.7	0.8	9.4	11.5	0.5
	Pen-Strep 10 U	22.9	1.2	21.7	24.0	0.9
	CHX 12%	24.3	0.4	23.8	24.7	0.2

* Halos of inhibition in mm SD: Standard deviation Pen-Strep: Penicillin Streptomycin CHX: clorhexidine.

Table 2. Table 2. Minimum Inhibitory Concentration (MIC), minimum bactericidal concentration (MBC) and MBC/MIC ratio of the Corryocactus brevistylus methanolic extract on Staphylococcus aureus and Enterococcus faecalis

Compound	Microorganism					
	Staphylococcus aureus			*Enterococcus faecalis*		
	MIC	MBC	MBC/MIC	MIC	MBC	MBC/MIC
6.65 mg/mL	-	-	2	-	-	2
3.33 mg/mL	-	-		-	-	
1.66 mg/mL	-	+		-	-	
0.83 mg/mL	+	-		-	-	
0.42 mg/mL	-	-		-	+	
0.21 mg/mL	-	-		+	-	

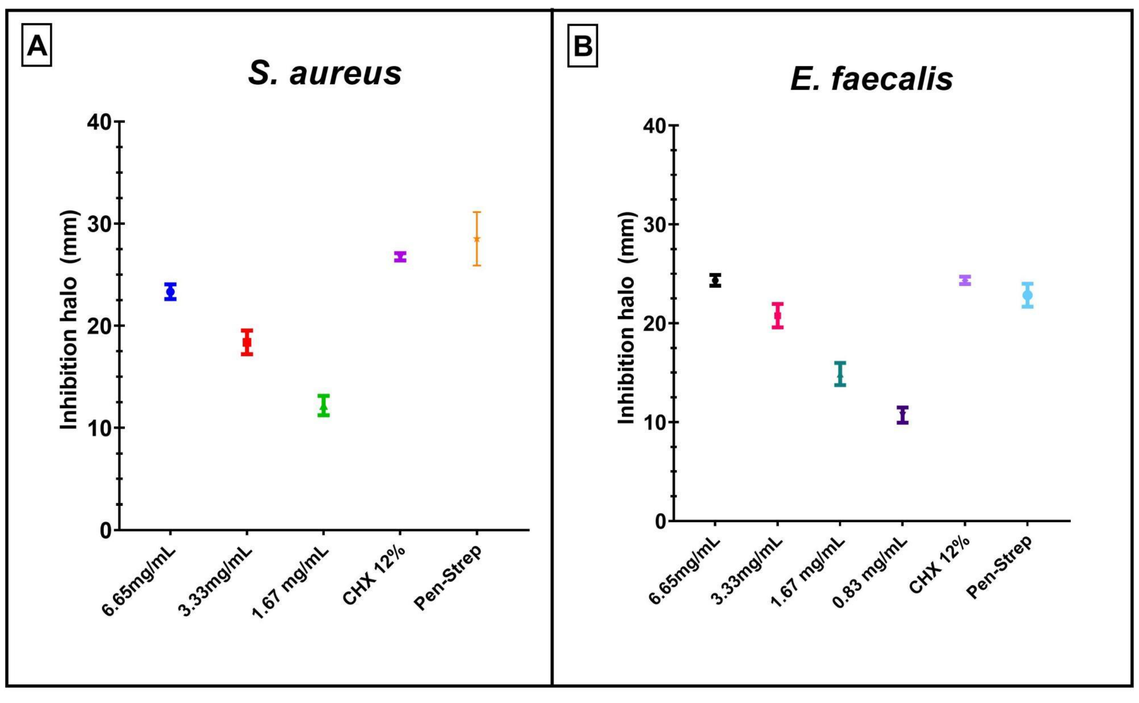

Figure 1. Inhibition halos of different concentrations of Corryocactus brevistylus (Sanky) against S. aureus (A) and E. faecalis (B).

CONCLUSION

The experimental findings showed a favorable in vitro antibacterial effect of the methanol extract of *Corryocactus brevistylus* against Staphylococcus aureus and Enterococcus faecalis.

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