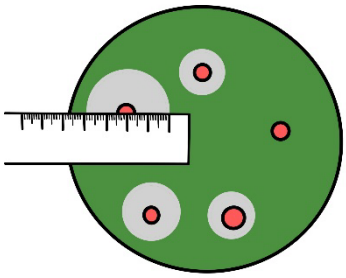
Zone of Inhibition by Clindamycin 2% Topical Hydrogel (EctoSeal P2G) Against *Staphylococcus aureus*

Introduction:

The zone of inhibition (ZOI) test (also referred to as Kirby-Bauer test) is a microbiology, culture-based disk diffusion assay used to determine the susceptibility or resistance of pathogenic bacteria to antibacterial agents. In this study, the antibacterial clindamycin HCl 2% was incorporated in the newly developed base, PCCA EctoSeal P2G, and its effectiveness was tested *in vitro* against the gram-positive bacteria *Staphylococcus aureus* (*S. aureus*).

Methodology:

A total of 30 Mueller-Hinton Agar (MHA) plates were inoculated to create a confluent lawn of *S. aureus*. A sterile disk was placed on the center of the plates, and it was impregnated with either Clindamycin HCl 2% (alone) or Clindamycin 2% Topical Hydrogel (EctoSeal P2G 20%), at the following concentrations: 100% (neat), 75% dilution, 50% dilution and 25% dilution (3 replicates each). Two plates were used as positive control (no disk) and negative control (disk impregnated with sterile water), for each concentration. All plates were incubated at 30-35°C for 18-24 hours and the presence of a ZOI was investigated to determine the *in vitro* effectiveness of the antibacterial agent clindamycin against *S. aureus*. The ZOI is a clear circular area around the disk where there is no bacterial growth.



Figures 1 and 2. *Illustration of the ZOI antimicrobial susceptibility test. Stock photos ID 688079770 and 2340799933.*

Results and Discussion:

Following incubation, the MHA plate for the positive control displayed confluent growth across the entirety of each plate, whereas the MHA plate for the negative control showed no visible inhibition of growth by the disk impregnated with sterile water, as expected. In the contrary, the MHA plates for both Clindamycin HCl 2% (alone) and Clindamycin 2% Topical Hydrogel (EctoSeal P2G 20%) displayed a visible ZOI against *S. aureus* at 100% (neat), 75% dilution, 50% dilution and 25% dilution (all replicates). The ZOI was consistent in size throughout the dilution series, with little change in diameter. For Clindamycin 2% Topical Hydrogel (EctoSeal P2G 20%), the average ZOI diameter for the 100% (neat) was 45.6 mm; for the 75% dilution was 45.4 mm; for the 50% dilution was 45.3 mm; and for the 25% dilution was 46.3 mm, as shown in the table below.

	Clindamycin 2% Topical Hydrogel (EctoSeal P2G 20%)			
	100%	**75% dilution**	**50% dilution**	**25% dilution**
Zone of Inhibition (ZOI) (mm)	46.4 44.2 46.3	45.3 44.8 46.2	46.3 46.6 42.9	47.6 45.2 46.1
Inocula Count (CFU/mL)	$2.4x10^8$	$2.4x10^8$	$2.4x10^8$	$2.4x10^8$

It is concluded that the Clindamycin HCl 2% (alone) and Clindamycin 2% Topical Hydrogel (EctoSeal P2G 20%) yielded a comparable ZOI and, therefore, both formulations are capable of inhibiting the growth of *S. aureus.*