

## ***In vitro* Anti-Biofilm Activity of Oregon Mineral Technologies Blue Clay**

**Katherine M. Caflisch**, Suzannah M. Schmidt-Malan, Jayawant N. Mandrekar, Melissa J. Karau, Jonathan P. Nicklas, Robin Patel, Lynda B. Williams

Background: Oregon Mineral Technologies (OMT) Blue Clay is a natural clay that has demonstrated possible antibacterial activity but has not been specifically evaluated for anti-biofilm activity. Here, we assessed activity of OMT Blue Clay in an *in vitro* model of monomicrobial biofilms with a view towards understanding potential activity against wound biofilms.

Materials: Monomicrobial biofilms grown on medical-grade Teflon discs were incubated for 24 h with either OMT Blue Clay or OMT Blue Clay leachate (200 mg/mL), followed by comparison of population density via quantitative culture to that of controls. Bacterial species selection was based on prevalence in wounds (Table). All testing was performed in triplicate.

Results: OMT Blue Clay exposure resulted in statistically significant reductions in population density for all organisms tested compared with controls ( $p \leq 0.05$ ) (Table). Treatment with OMT Blue Clay Leachate likewise resulted in statistically significant population density attenuation compared with controls for all organisms except for *S. aureus* IDRL-6169. Clay versus leachate formulations supported statistically significant increased population reductions for five of the twelve organisms tested.

Organism	Control	Clay	Leachate
	Log <sub>10</sub> cfu/cm <sup>2</sup>	Log <sub>10</sub> cfu/cm <sup>2</sup>	Log <sub>10</sub> cfu/cm <sup>2</sup>
<i>Staphylococcus aureus</i> IDRL-6169	5.51	0.10**	6.09
<i>Staphylococcus epidermidis</i> RP62A	6.25	0.10**	0.50*
<i>Streptococcus pyogenes</i> IDRL-7467	3.07	0.10*	0.10*
<i>Streptococcus dysgalactiae</i> IDRL-10052	3.76	0.10*	0.10*
<i>Pseudomonas aeruginosa</i> IDRL-11465	7.02	0.55*	2.10*
<i>P. aeruginosa</i> IDRL-10628	7.15	0.58*	1.93*
<i>Enterobacter cloacae</i> IDRL-10306	6.51	2.21**	3.75*
<i>E. cloacae</i> IDRL-10375	6.45	1.14**	3.08*
<i>Acinetobacter baumannii</i> ARLG-1268	5.23	0.10*	0.89*
<i>Klebsiella pneumoniae</i> IDRL-10377	6.43	3.31**	1.54*
<i>Escherichia coli</i> IDRL-10366	5	1.24*	0.93*
<i>E. coli</i> ATCC 25922	6.26	1.02*	2.10*

Table 1. Bacterial species tested against clay and leachate. Note \* denotes statistically significant population reduction ( $p \leq 0.05$ ) compared to controls and # denotes significantly significant reduction compared to the leachate treatment.

Conclusion: OMT Blue Clay demonstrates promising *in vitro* activity against biofilms.