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In vitro and *ex vivo* models for assessing the antibiofilm properties of wound dressings

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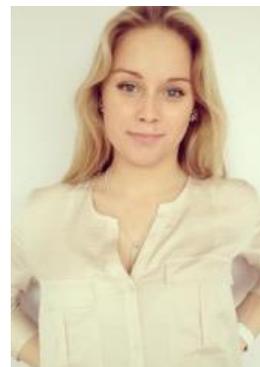
Insufficient infection treatment in chronic wounds is associated more and more with the presence of biofilm, thus, novel biofilm targeting wound care products are being developed. It is of importance to have appropriate analytical methods to quantitatively evaluate these wound care products for their anti-biofilm properties. The aim of present study was to develop *in vitro* and *ex vivo* biofilm models for assessing the antibiofilm properties of electrospun wound dressings.

In vitro model was created using thermally crosslinked electrospun gelatine (GEL) matrix as an artificial skin and for *ex vivo* model pig ear skin was used. Different pathogenic bacteria, isolated from wounds, were used to develop a biofilm. The model was set up in 24-wellplates on top of GEL matrix or pig skin bacterial dispersion was added and after that chloramphenicol (CAM)-loaded electrospun wound dressings were applied. These systems were incubated for 24 and 48 h, subsequently planktonic bacteria were removed, biofilm disrupted and quantified.

The results show that GEL matrix is suitable to be use as an artificial skin in *in vitro* biofilm model, as bacteria adhered to its surface and formed a biofilm. Compared to GEL matrix, the *ex vivo* model on pig skin appeared to be a better and preferred surface for the biofilm formation. Application of CAM-loaded wound dressings effectively reduced the biofilm formation in both models. To conclude, designed *in vitro* and *ex vivo* models allow comparing and evaluating the antibiofilm properties of wound dressings.

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