

Effective donor skin disinfection is essential in preventing bacterial contamination of blood components with skin flora bacteria like *Staphylococcus epidermidis*” Alabdullatif et al (2017).

Abstract:

BACKGROUND: Effective donor skin disinfection is essential in preventing bacterial contamination of blood components with skin flora bacteria like *Staphylococcus epidermidis*. Cell aggregates of *S. epidermidis* (biofilms) are found on the skin and are resistant to the commonly used donor skin disinfectants chlorhexidine-gluconate and isopropyl alcohol. It has been demonstrated that essential oils synergistically enhance the antibacterial activity of chlorhexidine-gluconate. The objective of this study was to test plant-extracted essential oils in combination with chlorhexidine-gluconate or chlorhexidine-gluconate plus isopropyl alcohol for their ability to eliminate *S. epidermidis* biofilms.

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STUDY DESIGN AND METHODS: The composition of oils extracted from *Artemisia herba-alba*, *Lavandula multifida*, *Origanum marjoram*, *Rosmarinus officinalis*, and *Thymus capitatus* was analyzed using gas chromatography-mass spectrometry. A rabbit model was used to assess skin irritation caused by the oils. In addition, the anti-biofilm activity of the oils used alone or in combination with chlorhexidine-gluconate or chlorhexidine-gluconate plus isopropyl alcohol was tested against *S. epidermidis* biofilms.

RESULTS: Essential oil concentrations 10%, 20%, and 30% were chosen for anti-biofilm assays, because skin irritation was observed at concentrations greater than 30%. All oils except for *O. marjoram* had anti-biofilm activity at these three concentrations. *L. multifida* synergistically enhanced the anti-biofilm activity of chlorhexidine-gluconate and resulted in the highest anti-biofilm activity observed when combined with chlorhexidine-gluconate plus isopropyl alcohol. Gas chromatography-mass spectrometry revealed that the main component contributing to the activity of *L. multifida* oil was a natural terpene alcohol called linalool.

CONCLUSION: The anti-biofilm activity of chlorhexidine-gluconate plus isopropyl alcohol can be greatly enhanced by *L. multifida* oil or linalool. Therefore, these components could potentially be used to improve blood donor skin disinfection.

Reference:

Alabdullatif, M., Boujezza, I., Mekni, M., Taha, M., Kumaran, D., Yi, Q-L., Landoulsi, A. and Ramirez-Arcos, S. (2017) Enhancing blood donor skin disinfection using natural oils. *Transfusion*. September 14th. .

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