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Impregnation is the simplest technique to load a given porous support with a component in the solid or liquid state. It has traditionally been used to load catalytic species into porous materials, but it is also suitable for loading porous materials for biomedical applications. Conventionally, the incipient wetness impregnation with organic/aqueous solvent is used. This method is often chosen because of its technical simplicity and low expenses, however supercritical impregnation (SI) provides higher diffusivity, lower viscosity, lower surface tension and solvent free polymer matrices. SI can be used in case of drug impregnation, forming of active packaging and impregnation of scaffolds as an environmentally friendly and effective method.[1,2]

The vision of this work is to prepare polymeric support loaded with natural extracts and their bioactive compounds in order to create wound dressing with anti-inflammatory and anti-bacterial properties. The use of such a dressing may contribute to the wound's healing mechanism by creating a proper physiologic environment, being a barrier for microorganisms and releasing bioactive compounds to the wound site. The choice of the polymeric dressing material plays a significant role because of the interactions with the wound, which can influence the healing process. This project will focus on natural materials, especially polysaccharides, which are biodegradable and biocompatible and will be used in a form of hydrogels. Hydrogels will be transformed to alcogels and supercritically dried before impregnation to remove the remaining solvent and produce aerogels in form of films or monoliths. As a model polymer, chitosan, which have bactericide and fungicide activity, will be used and bioactive compounds from *Boswellia sacra* extract will be impregnated.

Impregnation of one single compound will be compared with impregnation of mixture of compounds and the whole extract. The synergistic or antagonistic effect of individual compounds on impregnation process will be observed. The effect of operational conditions (pressure, temperature, extract: CO_2 mass ratio, impregnation time, depressurization rate) on efficiency of impregnation and subsequent

release of the bioactive compounds will be tested. The efficiency of impregnation will be determinated gravimetrically as the weight difference of the polymer after and before impregnation. The release of the compounds from the polymer will be determined using UV-VIS spectrophotometry. The composition of the loaded extract before and after impregnation will be characterized using GC/MS and FT-IR. For the determination of the changes in the surface morphology of the gels the scanning electron microscope (SEM) will be used.

References

1. Jelle R. A. Sietsma et al., *Stud. Surf. Sci. Catal.* **2006**, *162*, 95–102.
2. Rojas A. et al., *Crit. Rev. Food Sci. Nutr.* **2020**, *60*, 1290–1301.