

# A new wound closure for vines made of electrospun polymer fibers as a protection against the Esca disease

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Due to climatic changes and the international trade with vines, the Esca disease, originally seated in the Mediterranean area, has spread worldwide during the last decades. Esca causes high losses in yield every year by symptoms on leaves, black measles and leather berries. The disease is considered to be a complex of three wood living fungi *Phaeomoniella chlamydospora* (*Pch*), *Phaeoacremonium aleophilum* (*Pal*) and *Fomitiporia mediterranea* (*Fmed*). In addition symptoms can also be found in the trunk like gummosis, caused by *Pch* and *Pal*, and white rot, caused by *Fmed*. Wounds in the bark of the vines are considered as the main entrance for spores of these fungi.

Therefore particular attention has to be paid to the winter pruning of vines where spores can easily invade the plant through numerous pruning wounds close to the stem head. For that reason the wounds have to be protected. Conventional ways of protection like waxes, resins or the application of fungicides have not led to an

improvement of the situation so far. As a result a prototype of a new wound closure based on electrospun polymer fibers has been developed and tested in a three year project.

The process of electrospinning provides elastic and physically stable non woven fiber mats with a defined pore size providing a physical barrier for the pathogens of the Esca disease, especially *Pch* and *Pal* as they infect the plant in an early age. Additionally, the material provides important properties like air- and water permeability promoting the healing process of the plant and prevent rotting.

At the JKI the tightness of different polymers was tested against spores and germination tubes of *Pch*. Also the degradability of the materials was tested in field trials and in aging tests. Furthermore different methods of applications were evaluated as the fibermats should be applied directly after the winter pruning.