



Assessing the Effectiveness of UV-C Treatment in Preventing Downy Mildew (*Plasmopara viticola*) on Grapevines

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Objectives

Assess the effectiveness of UV-C light against downy mildew by testing the irradiation time and date for grapevines and rating the resultant disease severity after inoculation manually and by using the pliman package in R.

Methods | Experiences | Results

Potted grapevines were irradiated with UV-C light in a laboratory setting for different exposure times, at night and day, and at different dates relative to inoculation of downy mildew; then disease severity on leaves were assessed. Stilbenes were quantified through HPLC analysis, and anthocyanins and flavonols were checked with non-invasive fluorescence Force-A devices. Plant damage from irradiation was assessed for different doses and in wet and dry conditions.

The most effective UV-C irradiation dose found was 35 mJ/cm². The most effective date for treating grapevines was determined to be the day after inoculation. The pliman package did not work well with assessing downy mildew infection. Irradiating in the night or day did not have a significant effect on disease severity or accumulation of polyphenols. UV-C exposure did cause noticeable stress and minor damage to the grapevines. No differences in tissue damage or phenolic content were found from irradiating in wet and dry conditions.

UV-C irradiation reduced downy mildew severity on potted vines in the greenhouse, but did not eliminate it. Safe doses of UV-C light should be used immediately after a suspected infection event.

Master Thesis
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Degree programme
Viticulture and Enology

Field of application
Viticulture, Disease management

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Irradiating a potted grapevine with UV-C light in the greenhouse at Hochschule Geisenheim University.



Using a Force-A Multiplex to measure the anthocyanin index in a grape leaf.