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To cite this version:
Hilariòn Vàsquez, Jawad Aarrouf, Laurent Urban, Yves Lizzi, Marine Forges, et al.. Preharvest hormetic doses of UV-C radiation can decrease susceptibility of lettuce to Botrytis. 10. Conférence de la Société française de phytopathologie, May 2017, Malo-les-Bains, France. 2017, Deepen knowledge in plant pathology for innovative agro-ecology. hal-02735122

HAL Id: hal-02735122
https://hal.inrae.fr/hal-02735122
Submitted on 2 Jun 2020

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Session 6
Poster 158

Preharvest hormetic doses of UV-C radiation can decrease susceptibility of lettuce to Botrytis
Hilarion Vásquez¹, Jawad Aarrouf², Laurent Urban¹, Yves Lizzi¹, Marine Forges¹,³, Chayma
Ouhibi¹,², Nasser Azzouz¹, Marc Bardin³ and Philippe Nicot³

¹Laboratoire Physiologie des Fruits et Légumes (UMR Qualisud), Université d’Avignon et des Pays du
Vaucluse, 301 Rue Baruch de Spinoza, 84916 Avignon
²Unité de Physiologie et Biochimie de la Réponse des Plantes aux Contraintes Abiotiques,
Département de Biologie, FST, Université Tunis El Manar, 1068 Tunis, Tunisie
³Plant Pathology, INRA, F-84140, Montfavet, France

Post harvest applications of UV-C radiation have proven very efficient in reducing the development
of post-harvest diseases in many species including lettuce (Lactuca sativa L.). Several studies suggest
that UV-C radiation is effective not only because of its disinfecting effect but also because it may
stimulate plant defences. Preharvest treatment with UV-C radiation may thus offer an interesting
potential for lettuce protection, provided that application doses are effective while excluding any
harmful effects on the plants. Here we provide evidence that 0.85 kJ.m⁻² and 1.70 kJ.m⁻² represent
doses of UV-C radiation that are not deleterious for lettuce plants. We used several criteria to
evaluate the effect of UV-C radiation on the plant, including histological observations; the
concentration of malondialdehyde, an indicator of membrane integrity, as well as parameters
derived from measurements of chlorophyll fluorescence, such as maximal efficiency of photosystem
II (Fv/Fm) and the Performance Index (PI) of Strasser. We observed that a single dose of 0.85 kJ.m⁻²
slightly increased plant resistance to grey mould (Botrytis cinerea L.) while a single dose of 1.70 kJ.m⁻²
had the opposite effect. When a 0.85 kJ.m⁻² dose was applied 4 times, at two-day intervals, there was
an increase in the total phenol content of leaves, and in phenylalanine ammonia lyase, catalase, and
MDAHR activities. Leaves inoculated 2 days after the last UV-C treatment showed significantly
increased resistance (-30%) when compared to the control.

Keywords: UV-C, Botrytis, fluorescence, resistance, PAL, Lactuca