



**5TH INTERNATIONAL
STRAWBERRY CONGRESS**

WELCOME

**Connecting the dots
in a complex world
of strawberries**

Antwerp – Belgium
17 – 20 September 2025



**5TH INTERNATIONAL
STRAWBERRY CONGRESS**

Wednesday

Parallel Session 2: Integrated Pest Management



Short wavelength UV and blue lighting in combination with cold storage can minimize postharvest gray mold losses in strawberry

A. Suthaparan

Faculty of Biosciences, Norwegian University of Life Sciences

aruppillai.suthaparan@nmbu.no

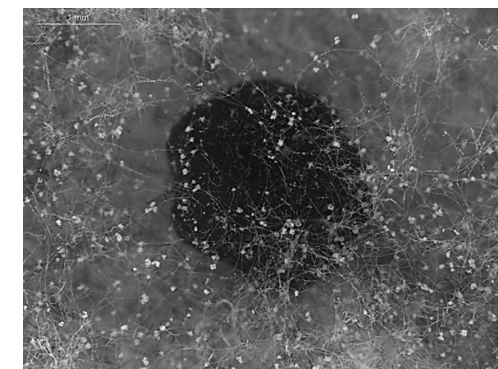
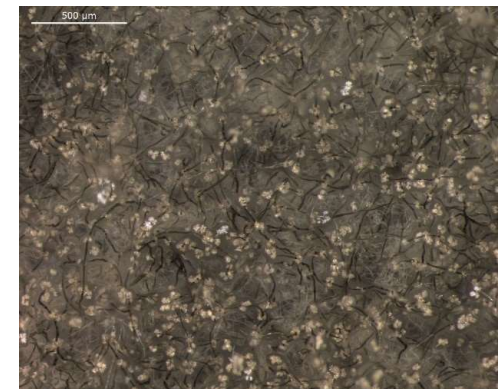


Gray mold

- Caused by cryptic species of *Botrytis*
 - ✓ *Botrytis cinerea* is predominant
- *Botrytis cinerea*
 - ✓ Can infect more than 1400 plant species
 - ✓ Can cause severe pre and postharvest crop losses worldwide
 - ✓ Ranked as the second most important fungal phytopathogen



(Dean *et al.*, *Mol. Plant Pathol.* 2012)



Management of diseases

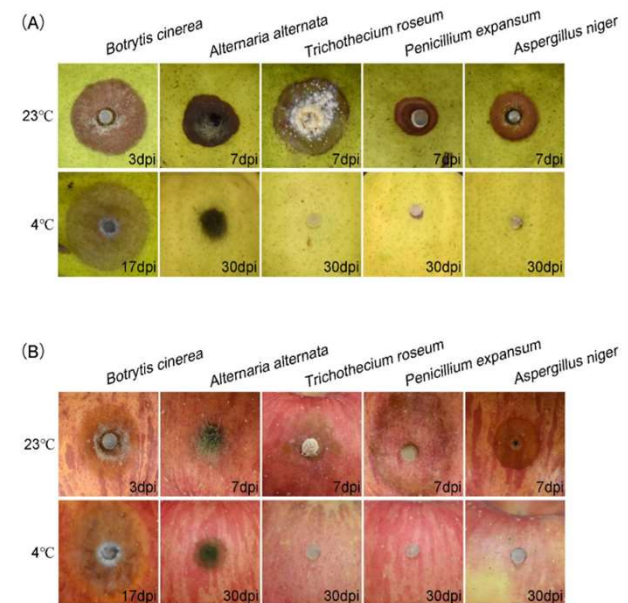
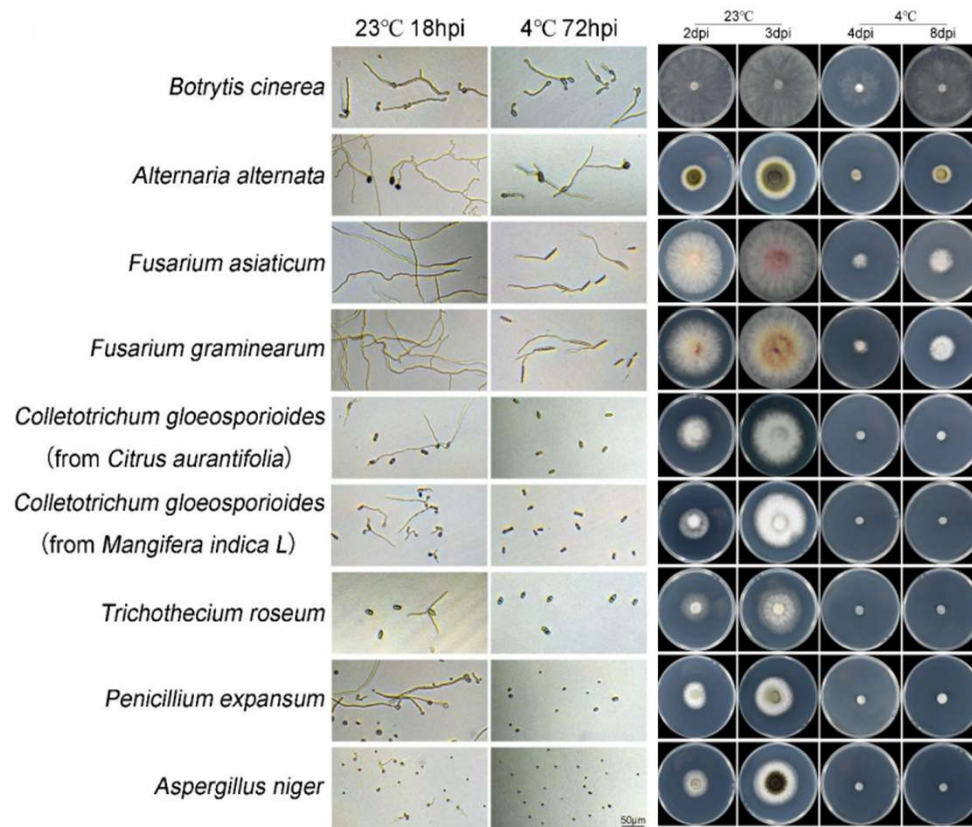
- Management of diseases includes (not limited to)
 - ✓ Development of resistant varieties
 - ✓ Application of fungicides
 - ✓ RNA interference
 - ✓ Biological control

- *Botrytis cinerea* is a high risk pathogen
 - ✓ Break host resistance
 - ✓ Develop fungicide resistance
 - Develop multiple mutations in different target genes

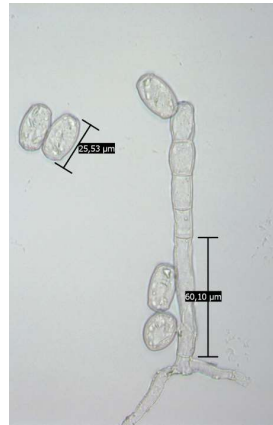


Cold storage and gray mold

- Cold tolerant pathogens pose threat to cold storage of fruits
 - ✓ *Botrytis*, *Fusarium*, *Alternaria* were tolerant to low temperature



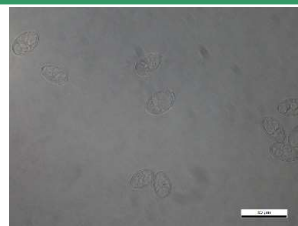
Potential of optical radiation



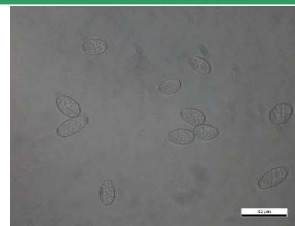
O. neolycopersici



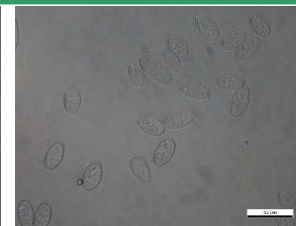
0 min UV



1 min UV



2 min UV

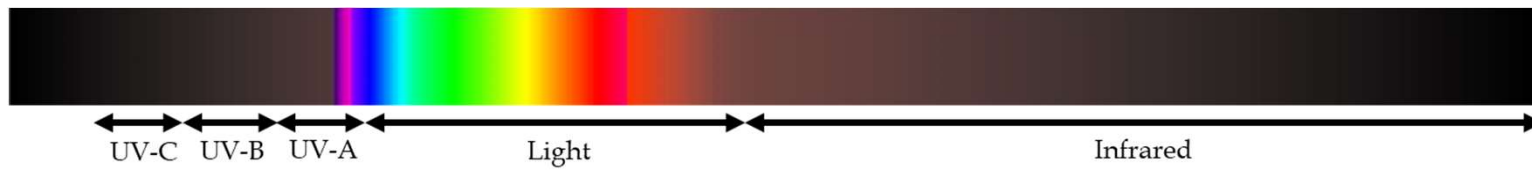
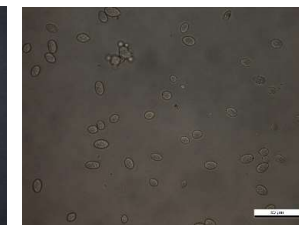
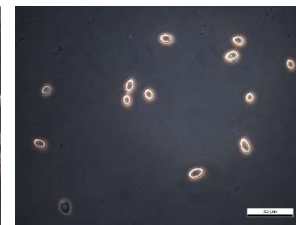


4 min UV

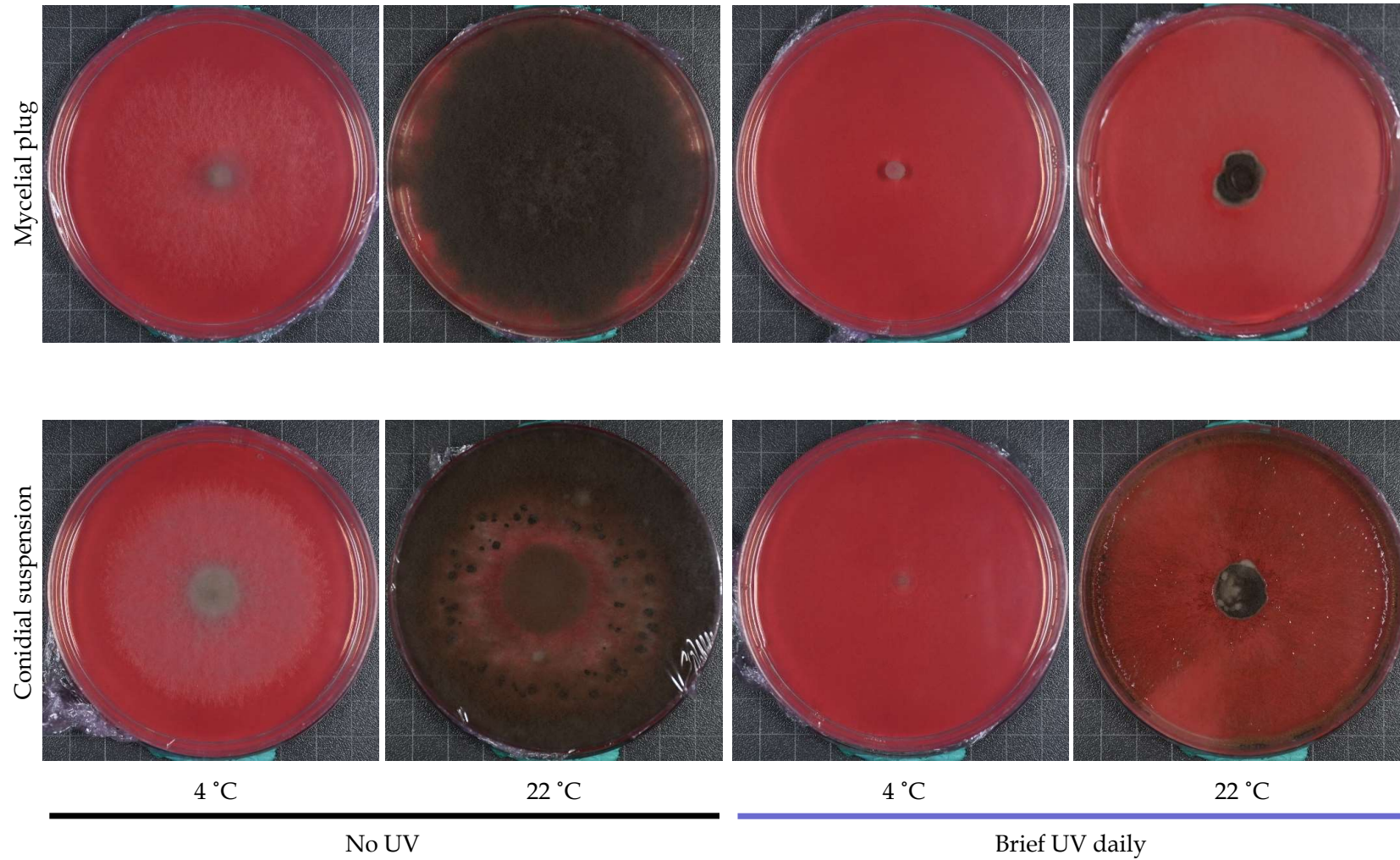


8 min UV

B. cinerea



Short wavelength UV and storage temperature



Short wavelength UV and storage temperature

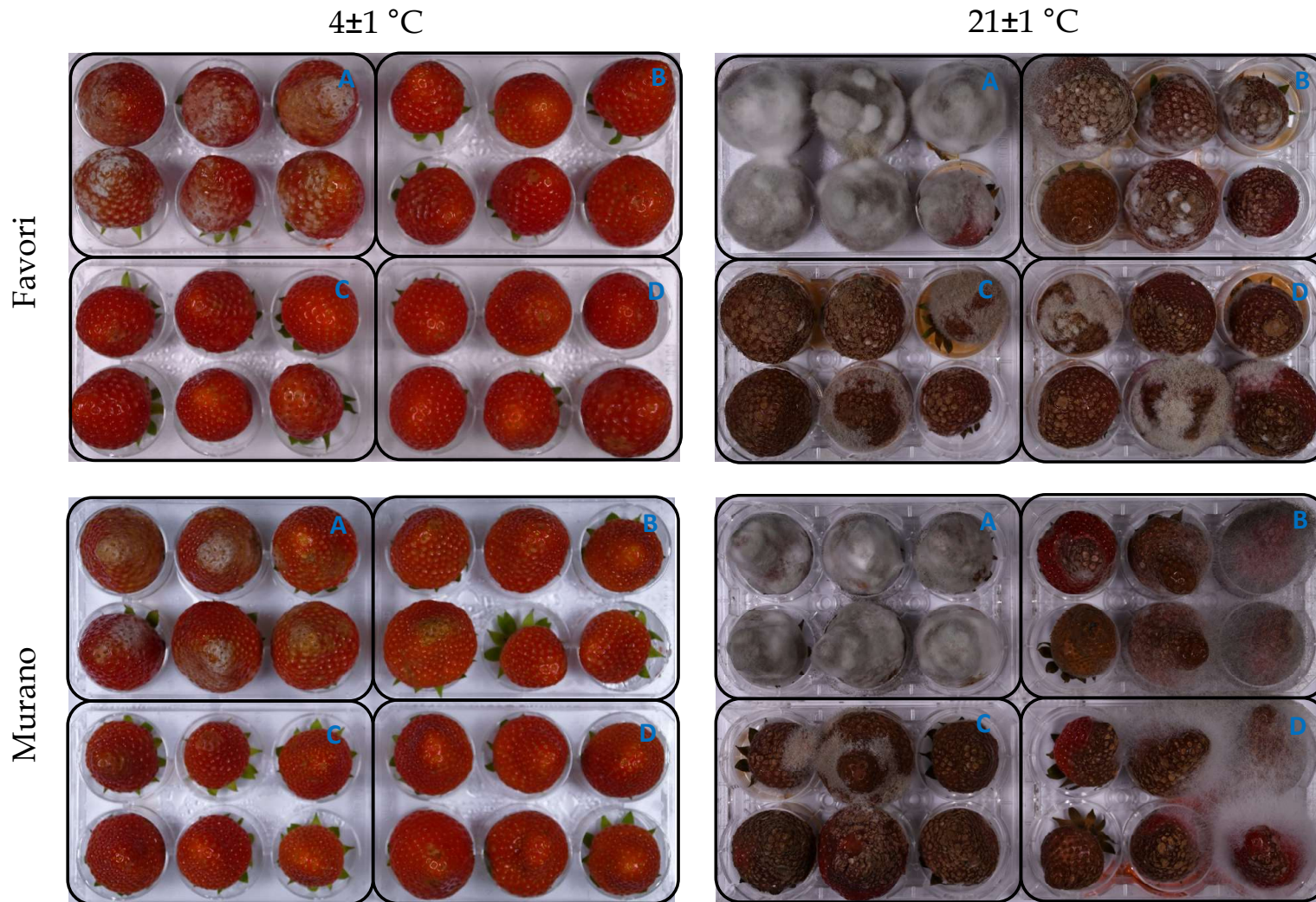


Fig. Effect of storage temperature (4 ° C or 21 ° C) and brief daily exposure of short wavelength UV (A = No UV, B = 2 min UV, C = 4 min UV, D = 8 min UV) on severity of gray mold in strawberry Favori and Murano 12 days after inoculation.

Spectral quality of light and storage temperature

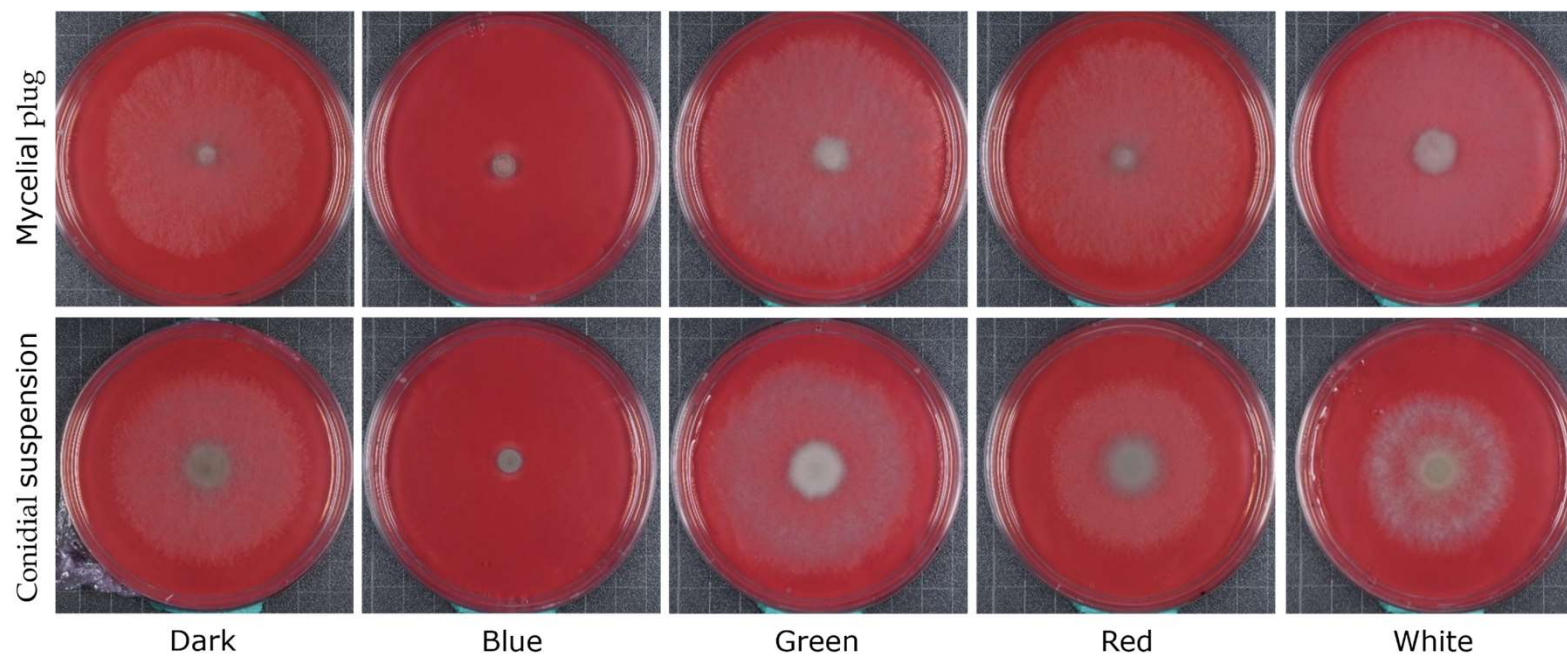


Fig. Effect of daily lighting of 18 h with cold storage temperature (4 ° C) on colony growth of *Botrytis cinerea* in potato dextrose agar, 12 days after inoculation.

Spectral quality of light and storage temperature

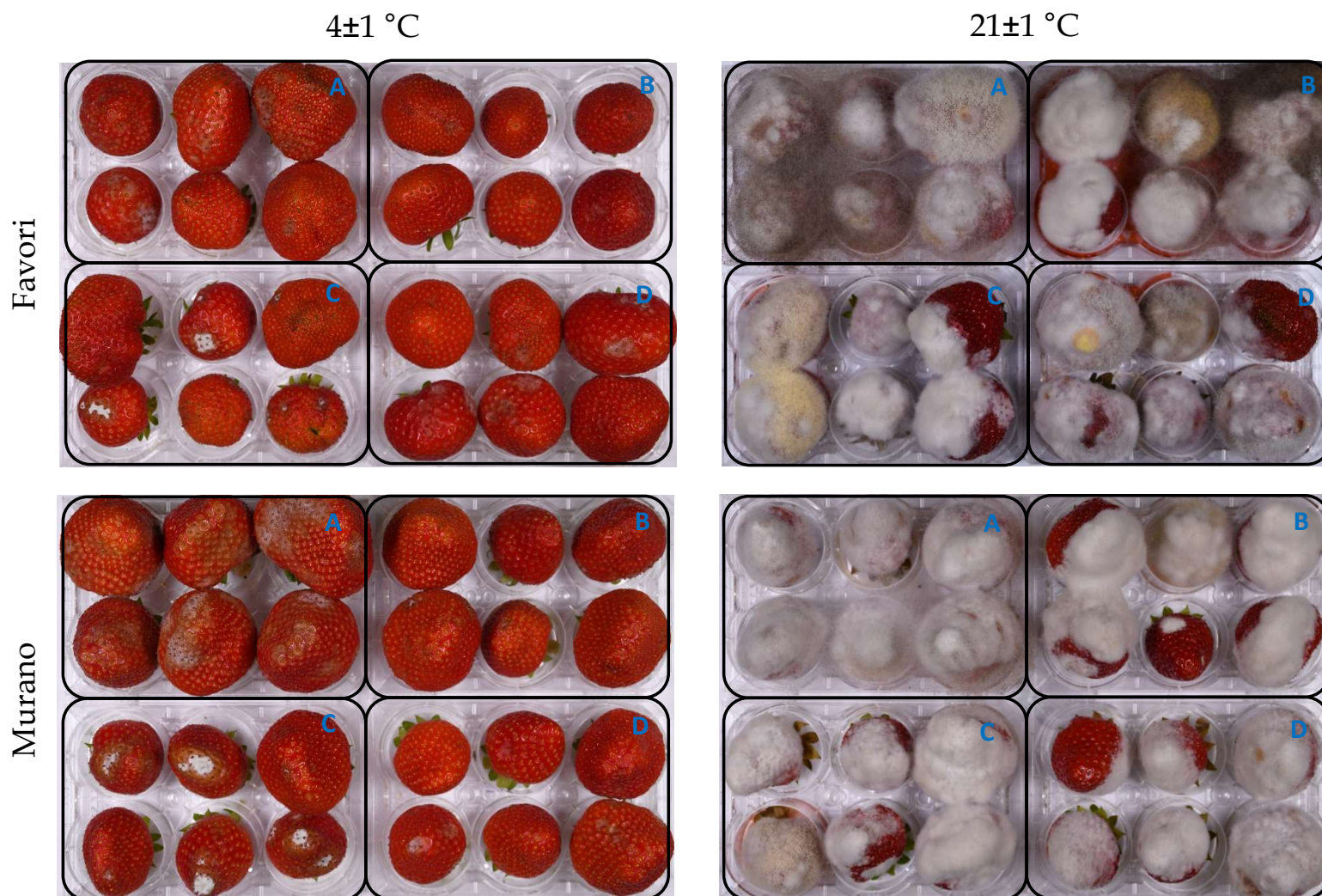
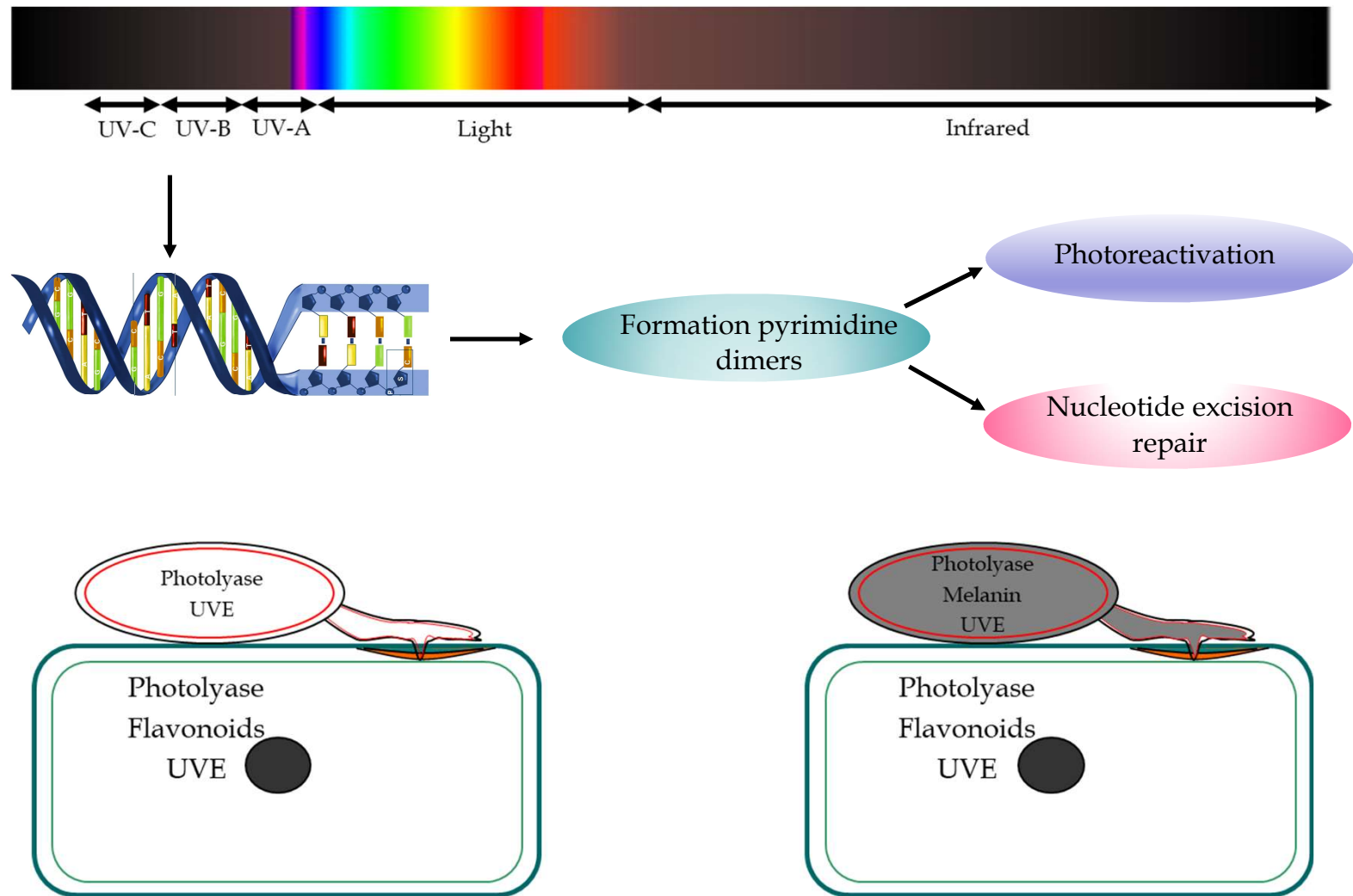


Fig. Effect of storage temperature (4 ° C or 21 ° C) and 18 h daily light conditions (A = Dark, B = Blue, C = Green, D = Red) on severity of gray mold in strawberry Favori and Murano 12 days after inoculation.

UV mediated DNA damage – Screening and damage repair



Melanin pathways in *Botrytis cinerea*

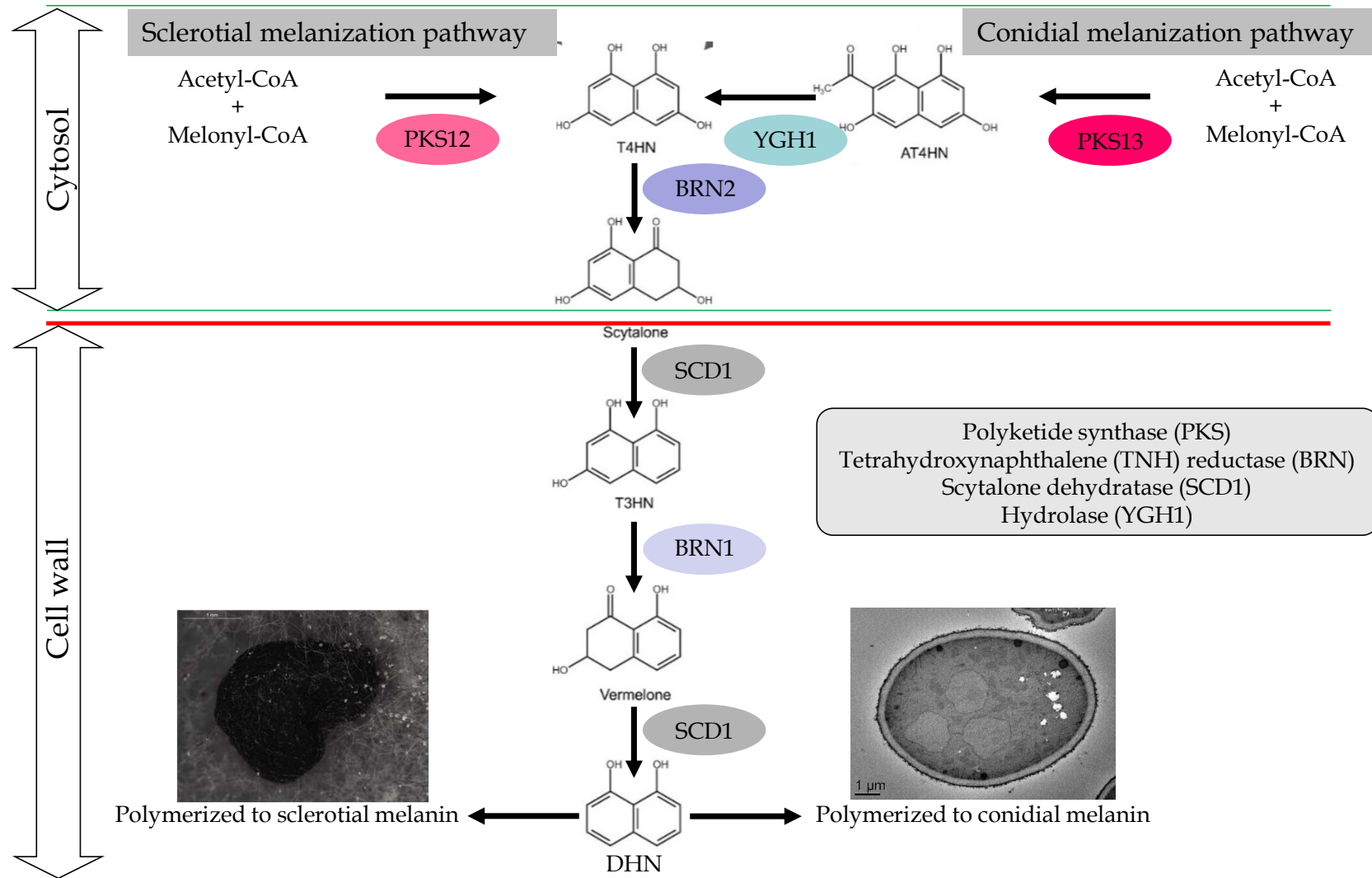
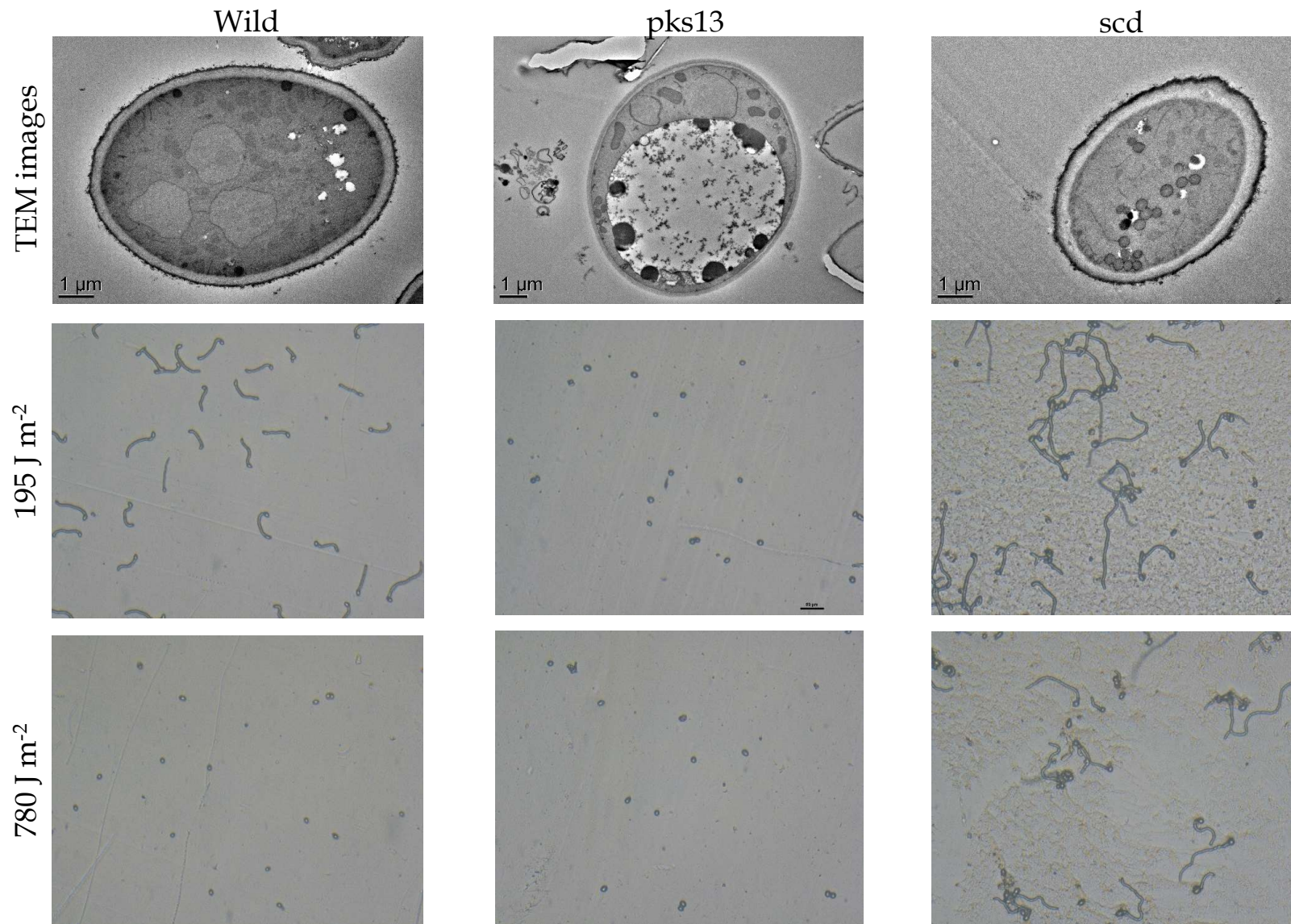


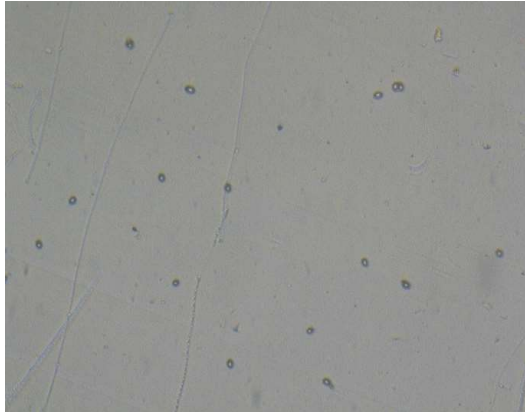
Fig. Dihydroxynaphthalene (DHN) melanin synthesis pathway in *B. cinerea*.

Role of melanin in UV protection of *Botrytis cinerea*

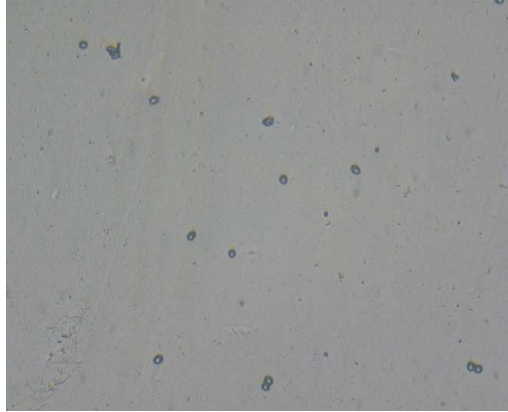


Recovery potential of UV treated *Botrytis cinerea* – Under dark

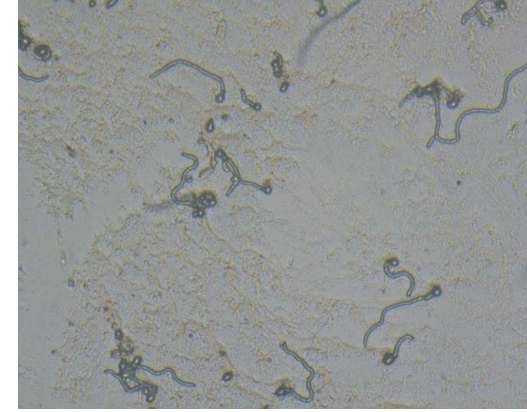
Wild



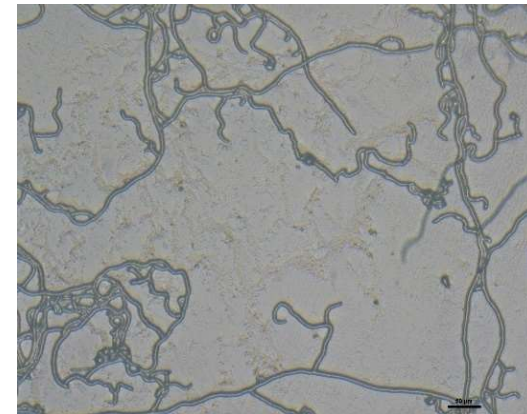
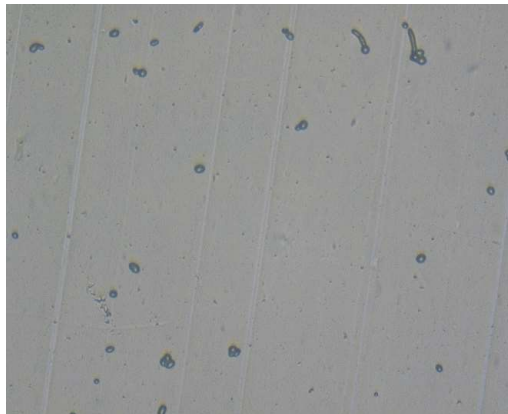
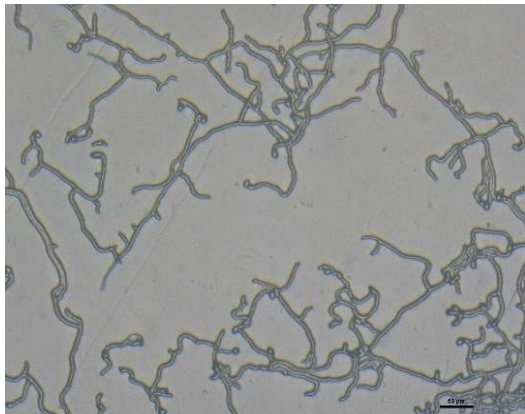
pks13



scd



780 J m⁻² - 6 h after UV treatment



780 J m⁻² - 30 h after UV treatment

Spectral quality of light and storage temperature

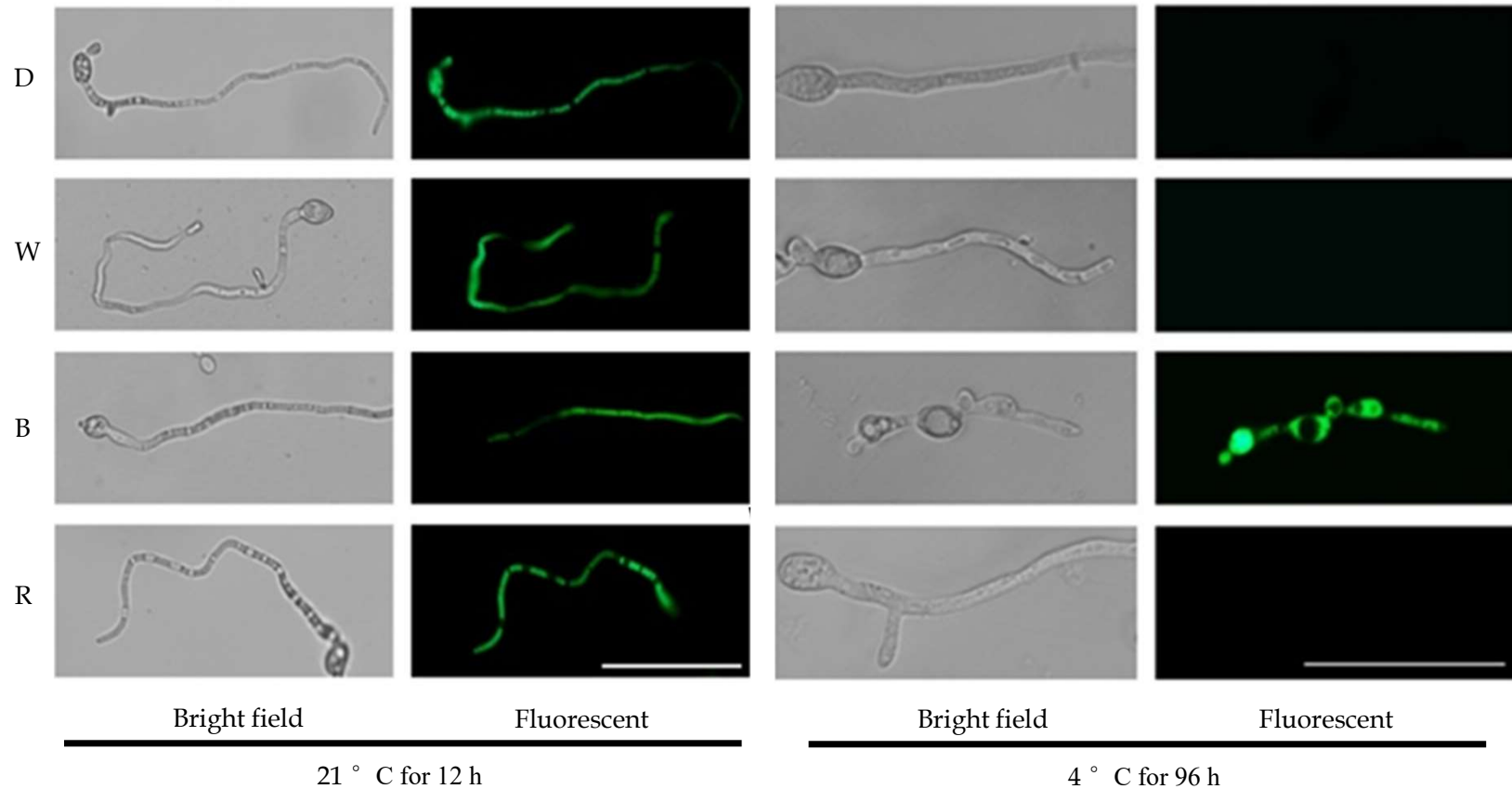


Fig. Phase contrast and fluorescent microscopic observation of the DCFH-DA stained *Botrytis cinerea* grown under different spectral quality of light (D = dark, W= white, B= blue, R= red) and storage temperature (4 ° C or 21 ° C) conditions.

Spectral quality of light and storage temperature

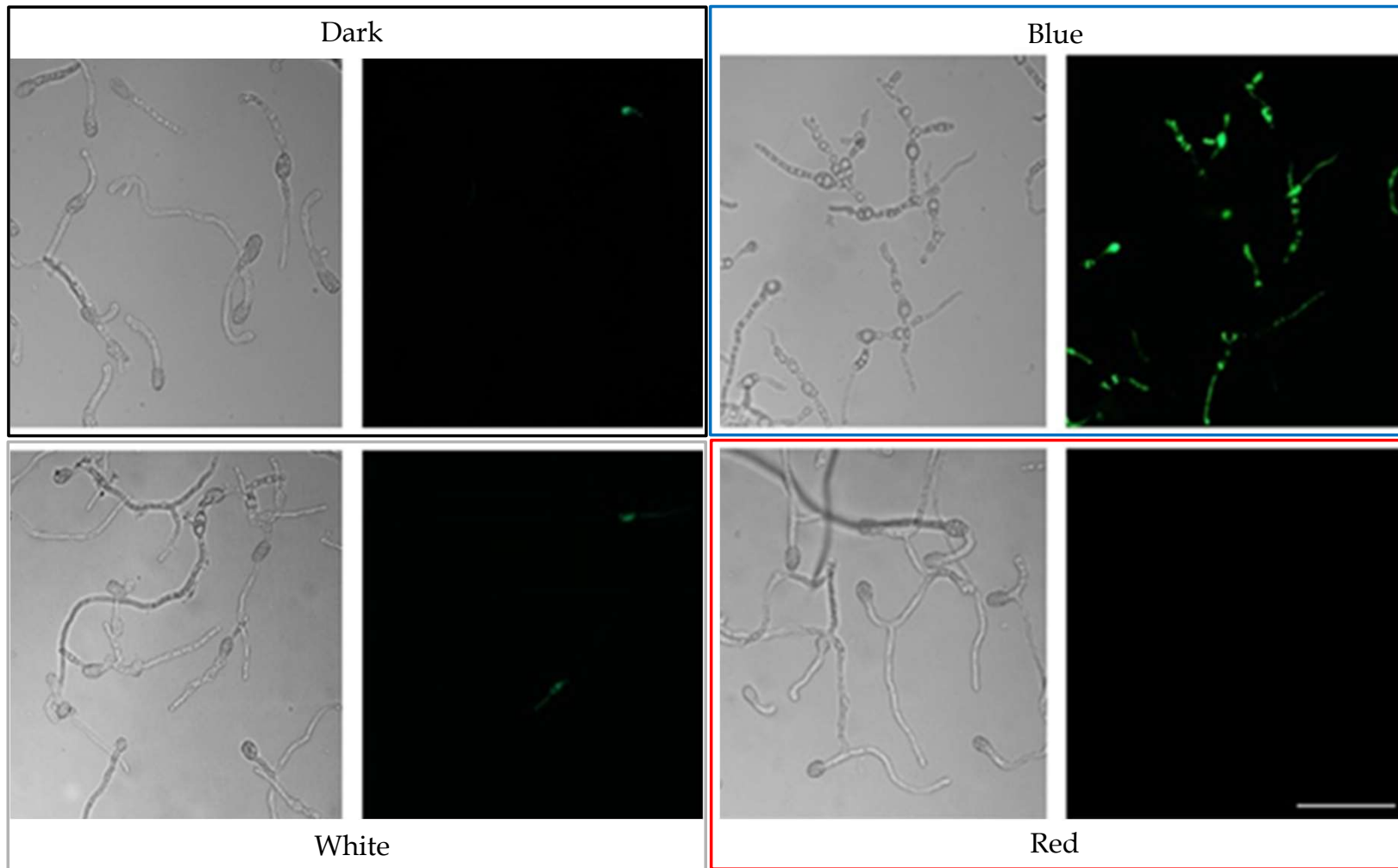


Fig. Phase contrast and fluorescent microscopic observation of the DCFH-DA stained *Botrytis cinerea* grown under different spectral quality of light (D = dark, W= white, B= blue, R= red) at cold storage temperature (4 ° C) conditions.

Optical environment and cold storage on weight loss

Table 3. Effect of variety and brief daily UV treatment on percentage weight loss of strawberry stored at cold storage.

	Weight loss (%) – 6 days after storage		Weight loss (%) – 12 days after storage	
Treatment	Favori	Murano	Favori	Murano
Dark	1.00 ± 0.08	0.94 ± 0.05	2.43 ± 0.36	1.53 ± 0.10
2 min UV daily	0.80 ± 0.14	0.64 ± 0.09	1.60 ± 0.16	1.28 ± 0.13
4 min UV daily	1.18 ± 0.07	1.16 ± 0.16	1.80 ± 0.17	1.85 ± 0.44
8 min UV daily	1.08 ± 0.09	0.83 ± 0.03	2.20 ± 0.34	1.50 ± 0.24

Table 4. Effect of variety and daily light treatment on percentage weight loss of strawberry stored at cold storage.

	Weight loss (%) – 6 days after storage		Weight loss (%) – 12 days after storage	
Treatment	Favori	Murano	Favori	Murano
Dark	0.98 ± 0.12	0.73 ± 0.13	4.16 ± 0.35	3.62 ± 0.43
Blue	3.83 ± 0.27	2.05 ± 0.06	9.55 ± 0.07	7.75 ± 0.36
Green	4.25 ± 0.65	3.36 ± 0.48	12.51 ± 1.02	8.81 ± 0.54
Red	1.85 ± 0.20	1.25 ± 0.19	6.14 ± 0.34	5.92 ± 0.32

Conclusion

- Brief UV and blue light can minimize the postharvest gray mold losses at cold storage
- Blue light may induce the weight loss
- Removal of calyx from the harvested fruits may help to minimize the weight loss
- Integration of potential environmentally friendly options

Acknowledgement





**5TH INTERNATIONAL
STRAWBERRY CONGRESS**

Wednesday

Congress Dinner

**At the Royal Museum
of Fine Arts Antwerp**

Sponsored by



**Smurfit
Westrock**

