



Editorial

# Special Issue: “Biological Control of Pre- and Postharvest Fungal Diseases”

Alessandra Di Francesco <sup>1,\*</sup>, Gianfranco Romanazzi <sup>2,\*</sup> and Rosario Torres <sup>3,\*</sup>

<sup>1</sup> Department of Agricultural, Food, Environmental and Animal Sciences (DI4A), University of Udine, 33100 Udine, Italy

<sup>2</sup> Department of Agricultural, Food and Environmental Sciences, Marche Polytechnic University, 60131 Ancona, Italy

<sup>3</sup> IRTA, Postharvest Programme, Edifici Fruit Centre, Parc Científic i Tecnològic Agroalimentari de Lleida, Parc de Gardeny, 25003 Lleida, Spain

\* Correspondence: alessandra.difrancesco@uniud.it (A.D.F.); g.romanazzi@univpm.it (G.R.); rosario.torres@irta.cat (R.T.)

## 1. Introduction

The 2030 Agenda for Sustainable Development planned 17 Sustainable Development Goals (SDGs) to ensure a better present and future for our planet and the people that are living on it. The European Union joined Agenda 2030 and included some of them in the Farm to Fork strategy of European Green Deal, which plans a list of measures within 2030, including reaching 25% of organic agriculture, halving food waste (often ascribed to the postharvest decay of fruit and vegetables) and halving the use of synthetic pesticides. Therefore, the need to find environmentally friendly and safe solutions and strategies for the management of pre- and postharvest diseases can meet some of these requirements. The Special Issue “Biological Control of Pre- and Postharvest Fungal Diseases” included nine research articles and two reviews. All contributions provided potential alternatives to synthetic pesticides by reporting innovative results about the use of alternative strategies to synthetic pesticides, involving the use of biocontrol agents (BCAs), essential oils (EOs), basic substances, and plant extracts to manage some of the most important pre- and postharvest diseases of fresh fruit and vegetables.

## 2. Special Issue Contents

The Special Issue covered three main topics: (i) plant extracts and basic substances, (ii) BCAs and (iii) future perspectives for the implementation of the use of BCAs in agriculture.

On the first topic, three articles focused on the biocidal activity of natural products derived from plants, such as an aqueous extract of *Calotropis procera* [1], *Reynoutria japonica* and *Humulus lupulus* [2] and rosemary and eucalyptus EOs [3] to control *Fusarium oxysporum* f. sp. *lycopersici*, *Phytophthora infestans* and *Penicillium expansum*, respectively. Basic substances (e.g., water-soluble form of chitosan hydrochloride and calcium chloride) and the biofumigated *Brassica nigra* defatted meal's effectiveness toward *P. infestans* on potatoes and *Cadophora luteo-olivacea* on kiwifruit were discussed in two research articles [2,4].

On the second topic, six articles focused on study cases aiming to detect active microorganisms (*Trichoderma* spp., *Vishniacozyma victoriae*, *Sporobolomyces roseus*, *Aureobasidium pullulans* and *Metschnikowia fructicola*) to control fruit postharvest pathogens by evaluating their main mechanisms of action [4–7] and investigating their effect and variations in the composition of fruit microbiome after the application [8]. An applicative approach was examined in the research article by Bullman et al. (2022) [9] that showed the application in field and during the storage of different *Metschnikowia pulcherrima* bioformulations (freeze dried and liquid) toward bull's-eye rot of apples.

In the Special Issue, as the third topic, the review by Palmieri et al. (2022) [10] provided state-of-the-art methods on the biocontrol of fungal plant pathogens. For the



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BCA's commercial use, an efficient bioformulation that guarantees long-term stability and an easy application is essential. The review of Teixido et al. (2022) [11] covered essential aspects, such as the production, formulation, packaging and shelf life of a single BCA. The review provided new insights for implementing all processes for the development of a bioformulation containing a microbial *consortium* in order to provide improved disease control than using a single BCA.

### 3. Conclusions

The present Special Issue consists of articles with purposes of finding alternative, sustainable, and effective strategies to control important pre- and postharvest diseases. Some fungal pathogens could represent an important problem concerning human health to produce toxic compounds. Moreover, the intensive use of synthetic fungicides to manage plant diseases developed the appearance of resistant fungal isolates. To prevent this, all strategies reported in the present Special Issue can represent a valid alternative for adoption in large-scale trials. In addition, in these last years, consumers are increasingly demanding food free of residues and food produced in an environmentally friendly manner.

All articles of this collection provided interesting contributions that help increase knowledge on these research fields and can help improve future breakthroughs in finding applicable solutions. The Guests Editors thank all authors for ensuring the high-quality research findings in this Special Issue and for sharing their expertise; moreover, we thank the valuable support of the journal "Horticulturae" for allowing us to realize this Special Issue, which allows us to provide advances in the field of the biological control of pre- and postharvest diseases with respect to fresh fruit and vegetables.

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