

ICFC 2017



International Conference on Food Contaminants

13-14 JULY 2017

BRAGA, PORTUGAL

CONFERENCE THEME

Climate change and food safety:
challenges in the near future

BOOK OF Abstracts



ICFC2017 Book of Abstracts

Coordinated by

Luís Abrunhosa, Armando Venâncio and Paula Alvito

Published by

Departamento de Engenharia Biológica

Universidade do Minho

Departamento de Engenharia Biológica

Campus de Gualtar

4710 - 057 Braga, Portugal

Copyright © 2017 SY4SCI Events, Lda. Printed in Portugal.

All rights reserved. This book, or parts thereof may not be reproduced in any form or by any means, electronic or mechanical, including photocopying, recording or any information storage and retrieval system now known or to be invented, without written permission from the Publishers.

Editor: Miguel Pinheiro

Proofreader: Luís Abrunhosa

Editing Services: SY4SCI Events, Lda.

Production Services: Copissaurio, Lda.

Interior Designer: Miguel Pinheiro

Cover Designer: Tomás Capa

July 2017: First edition (120 copies)

DOI: 10.21814/icfc2017

ISBN: 978-989-97478-9-0

While every precaution has been taken in the preparation of this book, the publishers and the editor assume no responsibility for errors or omissions, or for damages resulting from the use of the information contained herein. This book presents information about scientific methods and materials that are constantly changing, and therefore it may contain errors and/or information that, while accurate when it was written, is no longer accurate by the time you read it. The content of this book represents the views and contributions of the authors only, and does not represent the views of SY4SCI Events, Lda.

For more information on the services provided by Synergy for Science, please visit synergy4science.com



Session 2

Poster Abstracts

Chemical contaminants:
occurrence and surveillance

Ecophysiology of *Penicillium expansum* and patulin production in synthetic and olive-based media

Hamdi ¹; Jorge Sá-Morais ¹; Hend Bejaoui ²; Paula Rodrigues ¹

ABSTRACT

The olive and its derivatives, in particular olive oil, represent one of the most significant agricultural products in the Mediterranean basin. Storage under inadequate conditions poses serious problems concerning fungal contamination, with consequent defects and potential mycotoxin production in olives and olive oils. *Penicillium expansum* represents one of the most significant postharvest pathogens in several fruits, including olives. Not only it causes blue mold but also is one of the most relevant patulin (PAT) producing species of the genus *Penicillium*. The aim of this research was to evaluate the ecophysiological conditions governing growth and PAT production by *P. expansum* strains previously isolated from Tunisian olives. For this purpose, four *P. expansum* isolates were tested in a synthetic medium (Czapek Yeast Autolysate, CYA) and in olive-based medium (OM) for their ability to grow and produce PAT under different temperatures (4 °C, 15 °C and 25 °C) for 10 and 20 days. The mycotoxin was analysed by HPLC-UV. Results showed that all isolates were able to grow on tested media at different temperatures. Different PAT production profiles were found, showing that at 25 °C *P. expansum* isolates were able to produce PAT on CYA and OM medium. At 15 °C the production of PAT was only detected on CYA medium, while no PAT production was detected at 4 °C for the two media.

Acknowledgments: The authors are grateful to the Foundation for Science and Technology (FCT, Portugal) and FEDER under Programme PT2020 for financial support to CIMO (UID/AGR/00690/2013).

Keywords: Mycotoxins, storage conditions

1 - Centro de Investigação de Montanha (CIMO), ESA, Instituto Politécnico de Bragança, Campus de Santa Apolónia, 5300-253 Bragança, Portugal; 2 - Institute Supérieur de Biotechnologie de Monastir, Université de Monastir, Tunisia



Ecophysiology of *Penicillium expansum* and patulin production in synthetic and olive-based media



Mohamed Hamdi^{1,2}, Jorge Sá-Moraes¹, Hend Bejaoui^{2,*}, Paula Rodrigues^{1,*}

¹ Centro de Investigação de Montanha (CIMO), ESA, Instituto Politécnico de Bragança, Campus de Santa Apolónia, 5300-253 Bragança, Portugal

² Institute Supérieur de Biotechnologie de Monastir, Université de Monastir, Tunisia

* Contact persons: prodrigues@ipb.pt; hend.bejaoui@hotmail.fr

Introduction: The olive and its derivatives, in particular olive oil, represent one of the most significant agricultural products in the Mediterranean basin. Storage under inadequate conditions poses serious problems concerning fungal contamination, with consequent defects and potential mycotoxin production in olives and carry-over to olive oils. *Penicillium expansum* represents one of the most significant postharvest pathogens in several fruits, including olives. Not only it causes blue mold but also is one of the most relevant patulin (PAT) producing species of the genus *Penicillium*.

Objective: In this study we aimed to evaluate the ecophysiological conditions governing growth and PAT production by *P. expansum* strains previously isolated from Tunisian olives, using olive-based medium as model.

Materials & Methods

1. Fungal strains

- Three PAT producing strains of *P. expansum* isolated from Tunisian olives (TUN isolates)
- One PAT-producing strain of *P. expansum* (MUM 10.175), obtained from Micoteca da Universidade do Minho (MUM), Braga, Portugal, used as control.

2. Incubation conditions

P. expansum strains were inoculated onto CYA (synthetic santard medium) and olive-based medium (OM; olive-puree:water, 1:6) at 25 °C, 15 °C and 4 °C for 20 days.

3. Measurement of fungal growth

Fungal colonies were measured after 3, 5, 10, 15 and 20 days of incubation. The process was done in triplicate.

4. PAT evaluation

PAT was extracted after 10 and 20 days of incubation from agar plugs with methanol and quantified by HPLC-UV ($\lambda=276$ nm), with a RP-C18 column (150 x 4.6 mm, 5 μ m), with isocratic elution in water:methanol (90:10) at 0.8 mL/min.

Results and Discussion

Fungal growth

- Matrix and temperature had a significant influence on *P. expansum* growth, with growth on OM based on rare and spread synnemata (Fig. 1).

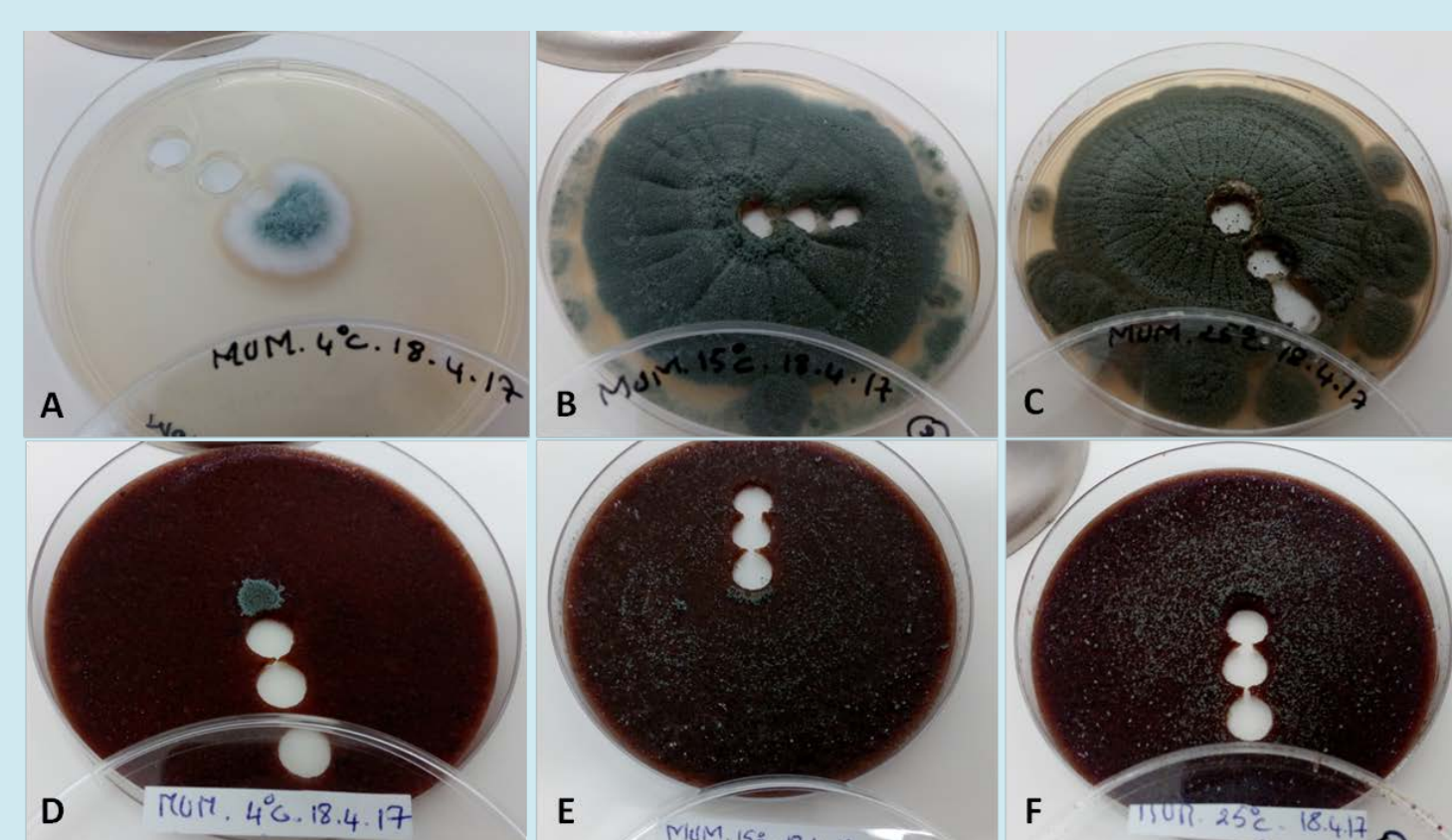


Fig. 1. Colonies of *Penicillium expansum* MUM 10.175 after 20 days of incubation: **A, B and C:** growth on CYA at 4 °C, 15 °C and 25 °C, respectively; **D, E and F:** growth on OM at 4 °C, 15 °C and 25 °C, respectively.

- Optimal growth occurred at 25 °C (Fig. 2).
- Between 10 and 20 days of incubation, fast growth on OM medium was observed.
- Growth at 4°C was significantly reduced.

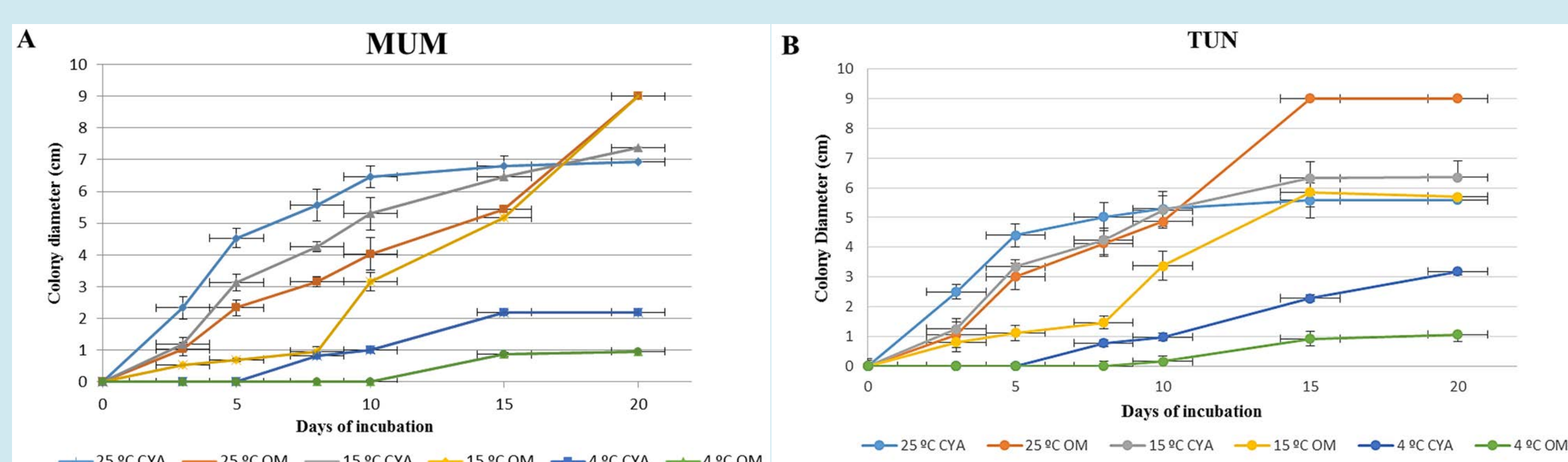


Fig. 2. Growth curves of *Penicillium expansum* strains. **A:** MUM; **B:** TUN, at 25 °C, 15 °C and 4 °C, in CYA and OM.

PAT production

- PAT production was affected by nature of matrix, temperature, time of incubation and strain.
- All *P. expansum* strains were able to produce PAT at 15 °C and 25 °C on both media, but no PAT was detected at 4 °C on OM medium (Fig. 3).
- The highest amount of PAT after 10 days was produced by TUN strains at 15 °C in OM (73.1 μ g/g), but after 20 days the highest amount was detected on CYA, by the same strains, at 4 °C (180 μ g/g).
- PAT production decreased after 10 days of incubation on CYA, while it increased throughout time on OM.

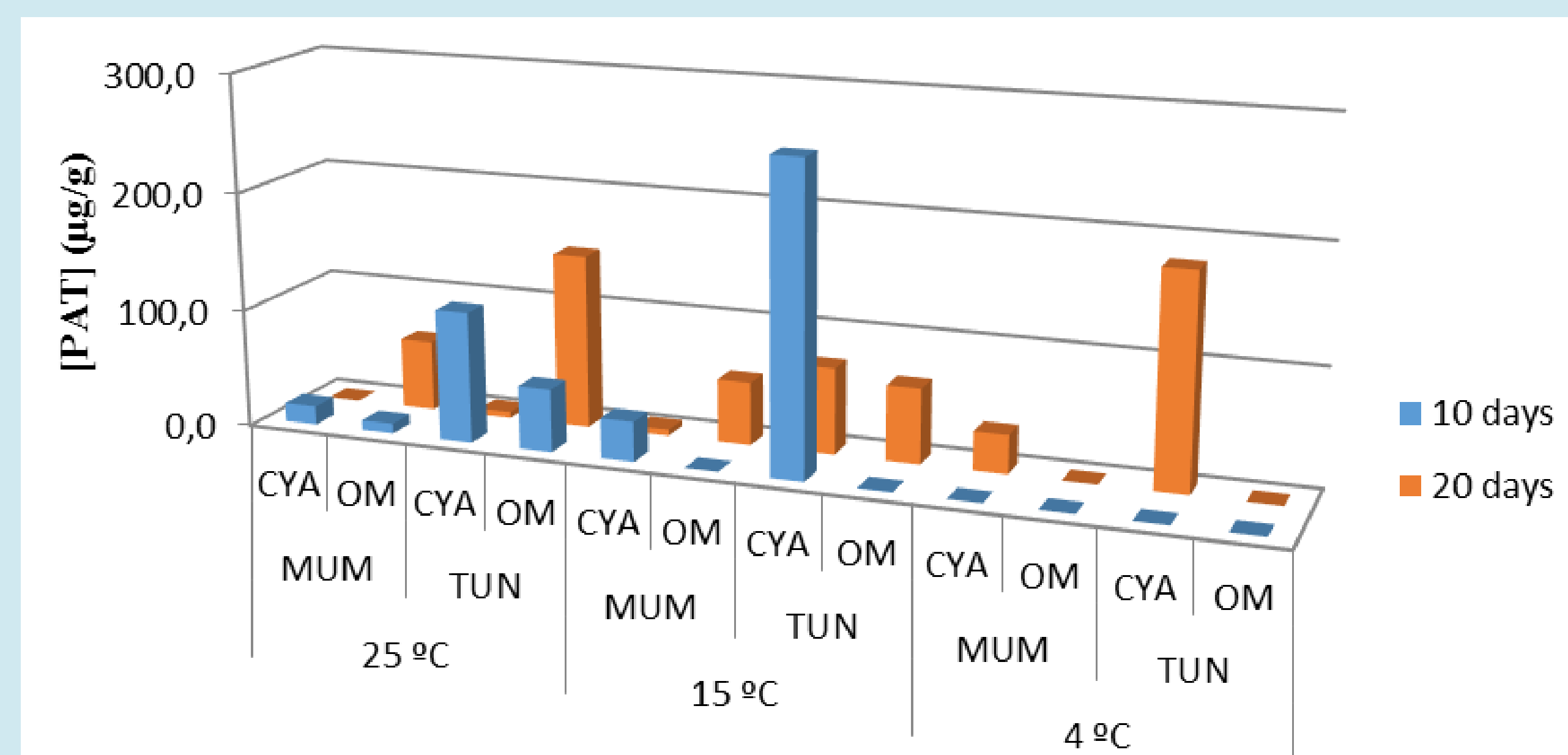


Fig. 3. PAT production by MUM and TUN fungi at 25 °C, 15 °C and 4 °C after 10 and 20 days of incubation on CYA and OM.

Conclusions: Contamination of olives with PAT must be considered a potential risk in the safety plans of the olive producing chain. The olive-based matrix does not seem to be highly adequate for growth and PAT production by *P. expansum* if adequate temperatures throughout storage (refrigeration) are guaranteed. However, if there is an abuse on storage temperature and longevity, PAT can turn into a real risk.

Mechanisms of PAT reduction throughout time observed on CYA but not on OM requires further investigation.