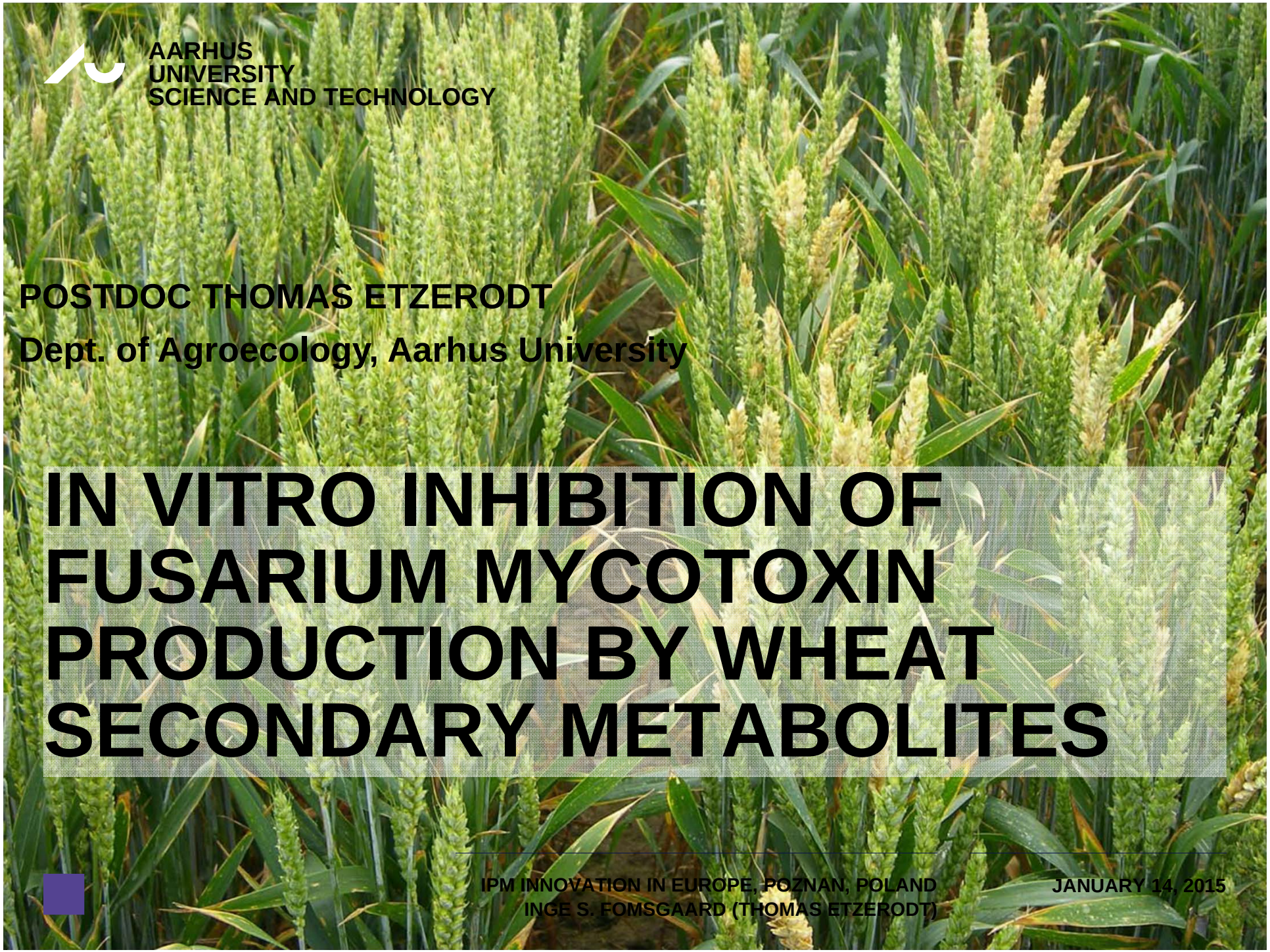

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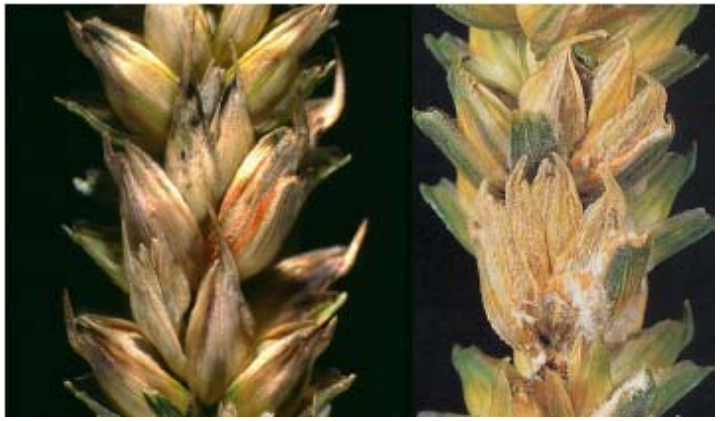
IN VITRO INHIBITION OF FUSARIUM MYCOTOXIN PRODUCTION BY WHEAT SECONDARY METABOLITES

Fusarium Head Blight (FHB)

- Devastating disease in wheat caused mainly by *Fusarium graminearum* fungus.
- Leads to contamination of wheat with highly toxic trichothecenes (TCTs)

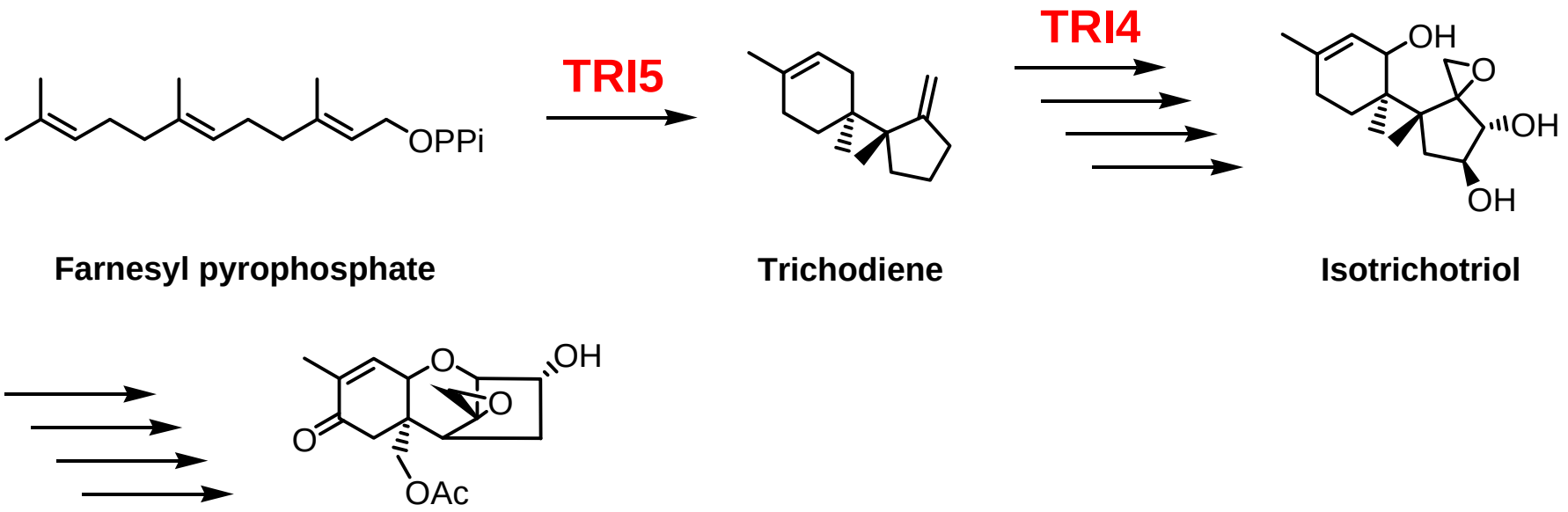


Purpose of research performed with Dr. Kimura in Japan

- Identify wheat secondary metabolites with suppressive effects on the formation of Fusarium mycotoxins
- Elucidate the mechanisms behind such suppression

TCT biosynthesis

tri6 ⟹ **Transcription factor for majority of TCT biosynthesis genes**

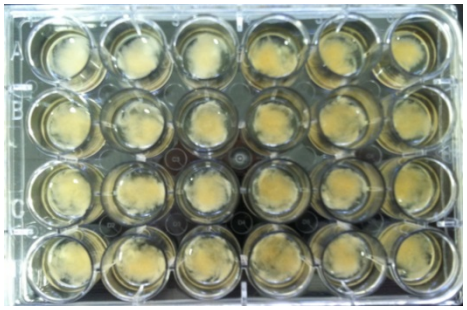


Farnesyl pyrophosphate **Trichodiene** **Isotrichotriol**

TCT (15-ADON) (One of several TCT's type A and B)

14 Wheat secondary metabolites (SMs) tested for TCT inhibition

Test method – TCT inhibition



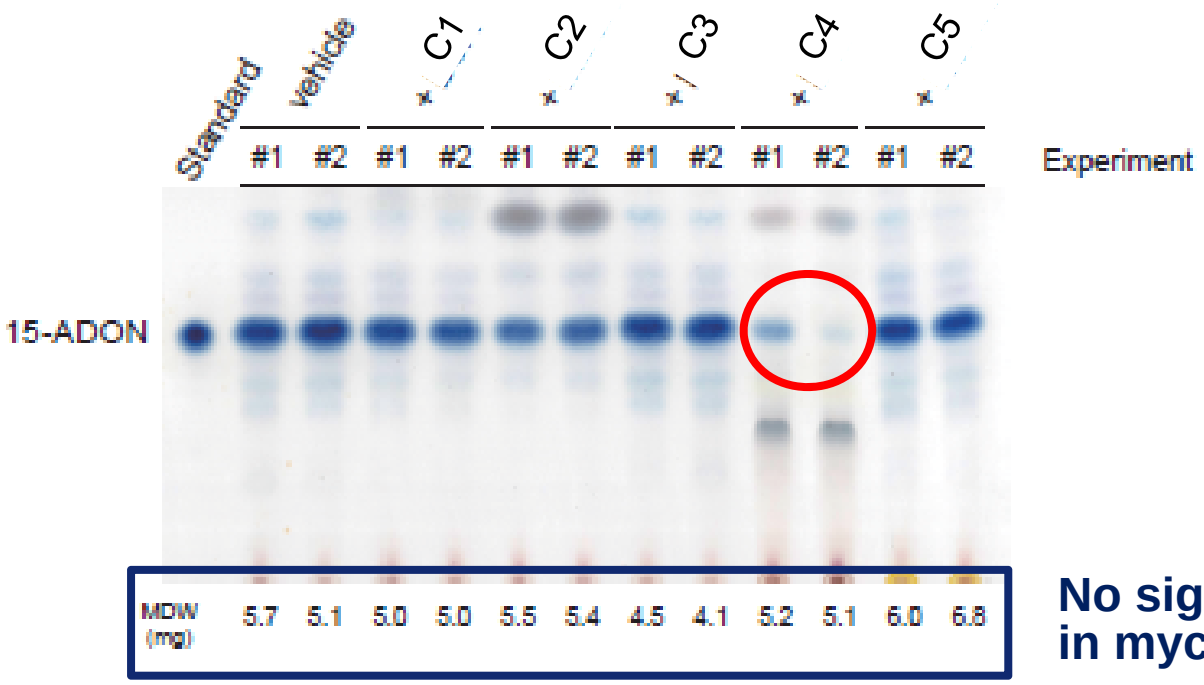
Extraction → Analysis

F. graminearum (JCM9873 lineage)

Sucrose 6%, BYE 0.1%
(high toxin production)

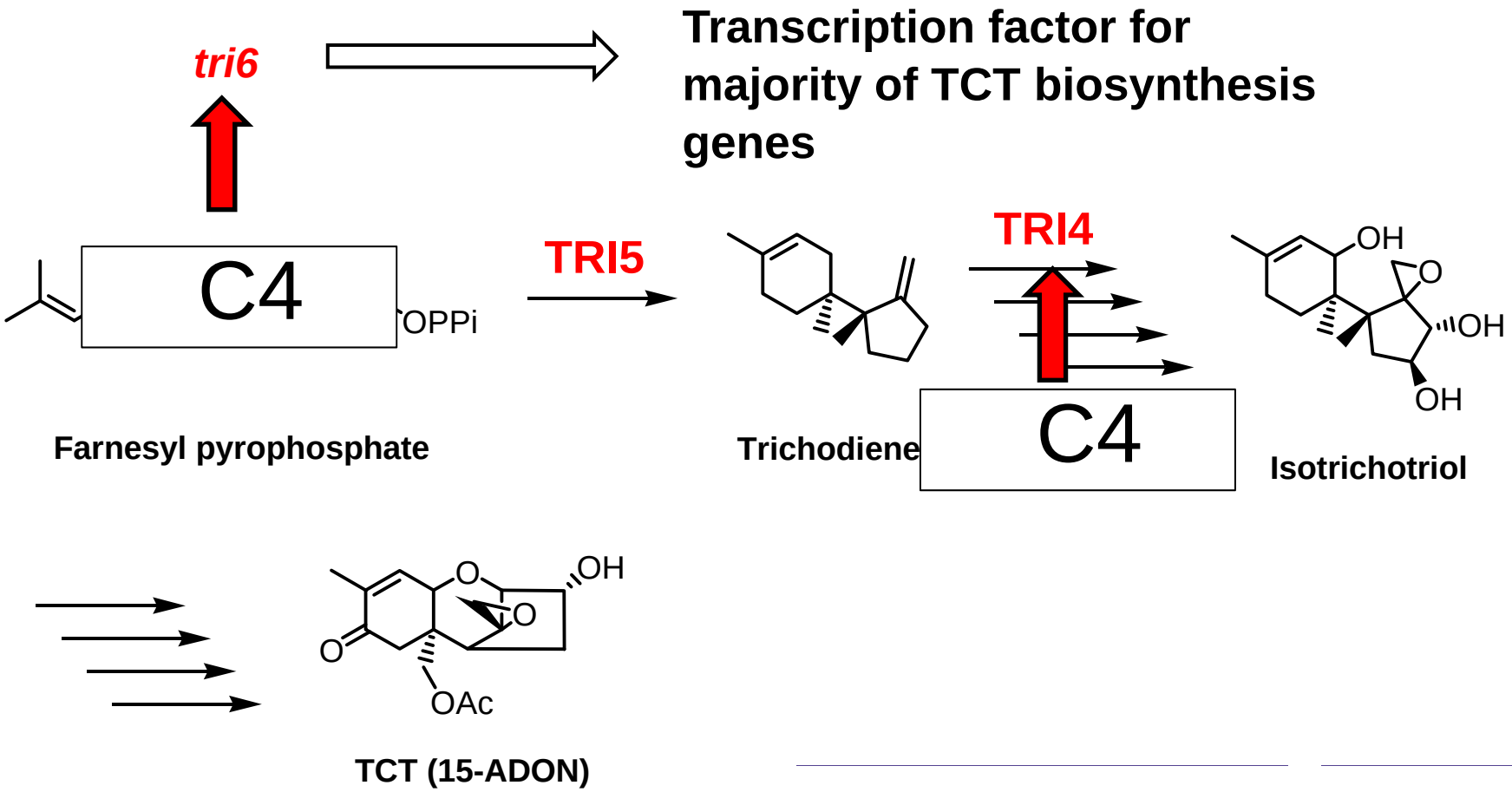
Incubation with individual wheat secondary metabolites

SM screening (250 µM) – in liquid culture - ”inhibitory compounds” (C1-C5)



No significant difference in mycelium dry weight

SM targets of TCT biosynthesis



Conclusions

- Ferulic acid and *p*-coumaric acid can stimulate toxin production
- Compound 4 (C4) inhibits 15-ADON accumulation by targeting *tri6* gene expression and partially by inhibition of TRI4 protein
- Structure of TRI4 protein and C4 inhibited TRI4 protein under research by Thomas Etzerodt with Ivan Rayment in Wisconsin

Perspectives

- **Suppression of Fusarium through inhibition of mycotoxins with wheat secondary metabolites (Type V resistance) to be exploited by breeders?**

- **Information about inhibitor chemistry and fungal interaction could shed new light on the development of novel biocidal candidates?**

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