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► **To cite this version:**

Julián D Restrepo-Leal, Jochen Fischer, Nicolas Richet, Caroline Rémond, Olivier Fernandez, et al.. Differential carbohydrate-active enzymes and secondary metabolite productions by the grapevine trunk pathogen *Neofusicoccum parvum* Bt-67 on a host and non-host biomass. 12th International Congress of Plant Pathology, Aug 2023, Lyon, France. <hal-04668144>

HAL Id: hal-04668144

<https://hal.science/hal-04668144v1>

Submitted on 6 Aug 2024

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HAL Authorization

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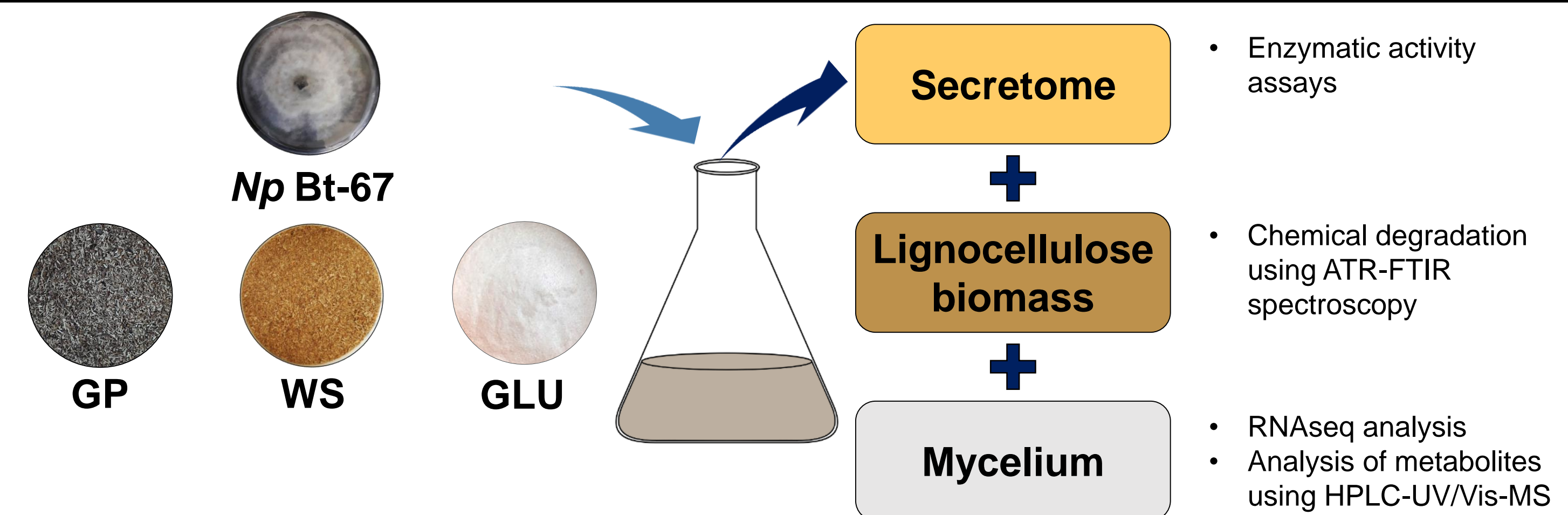
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^aUniversité de Reims Champagne-Ardenne, INRAE, FARE, UMR A 614, AFERE, 51100, Reims, France; ^bUniversité de Reims Champagne-Ardenne, RIBP USC INRAE 1488, MALDIVE, 51100 Reims, France; ^cInstitut für Biotechnologie und Wirkstoff-Forschung gGmbH (IBWF), Hanns-Dieter-Hüsch-Weg 17, 55128, Mainz, Germany; ^dUniversité de Reims Champagne-Ardenne, Plateau Technique Mobile de Cytométrie Environnementale MOBICYTE, URCA/INERIS, UFR Sciences Exactes et Naturelles, Reims, France.

Introduction

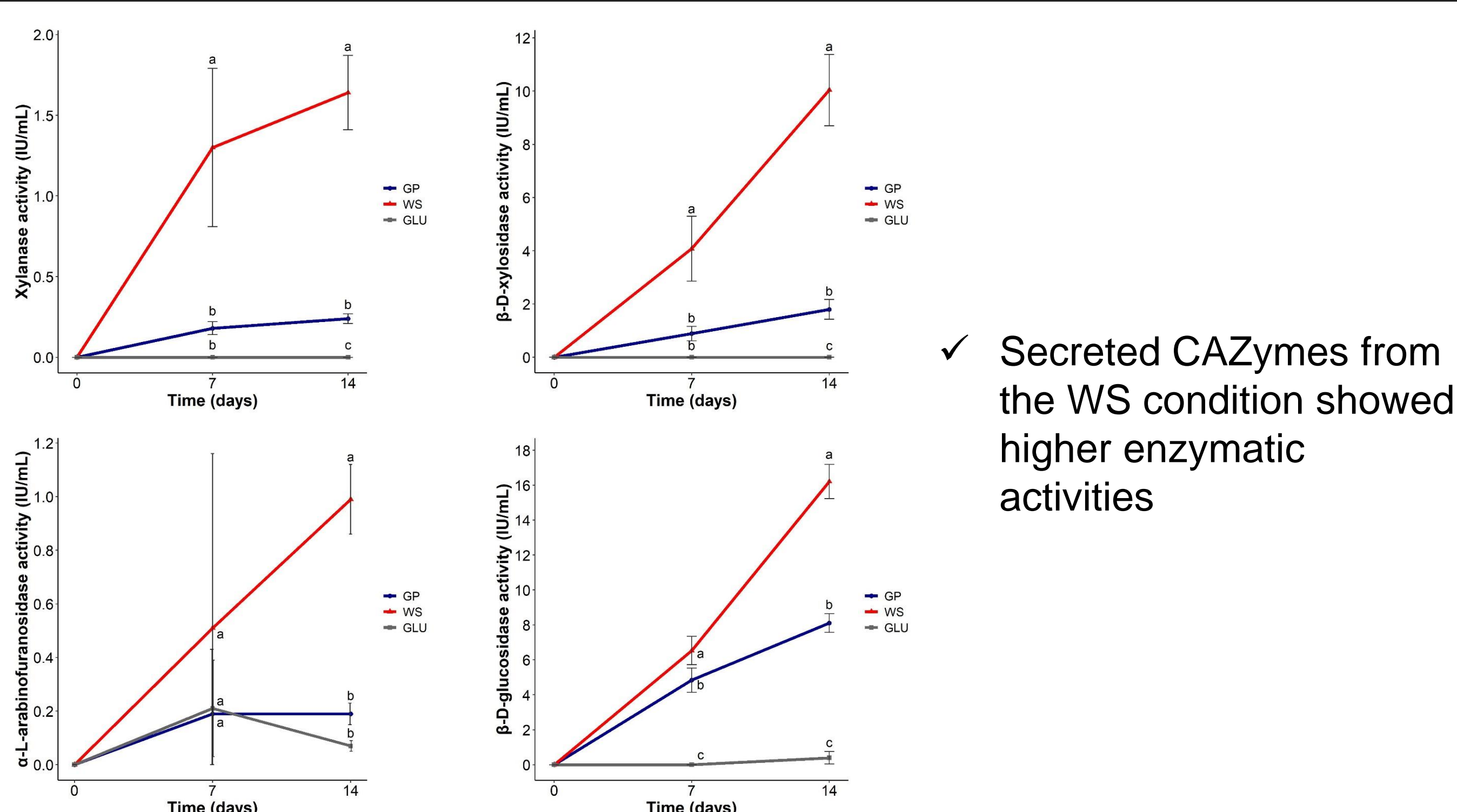
Neofusicoccum parvum is one of the most aggressive *Botryosphaeriaceae* species in grapevine, commonly reported as one of the causal agent of Botryosphaeria dieback. This species may secrete cell wall-degrading enzymes capable of overcoming the plant cell wall barriers [1]. Furthermore, *N. parvum* produces toxic secondary metabolites that may contribute to its virulence. To increase knowledge on the mechanisms underlying pathogenicity and virulence, we evaluated the capacity of *N. parvum* to produce Carbohydrate-Active eNzymes (CAZymes) and secondary metabolites when grown *in vitro* on two lignocellulosic biomasses: grapevine canes (GP) and wheat straw (WS), and with glucose (GLU) as control. For this purpose, we combined enzymology, transcriptomic, and metabolomic analyses [2].

Experiments

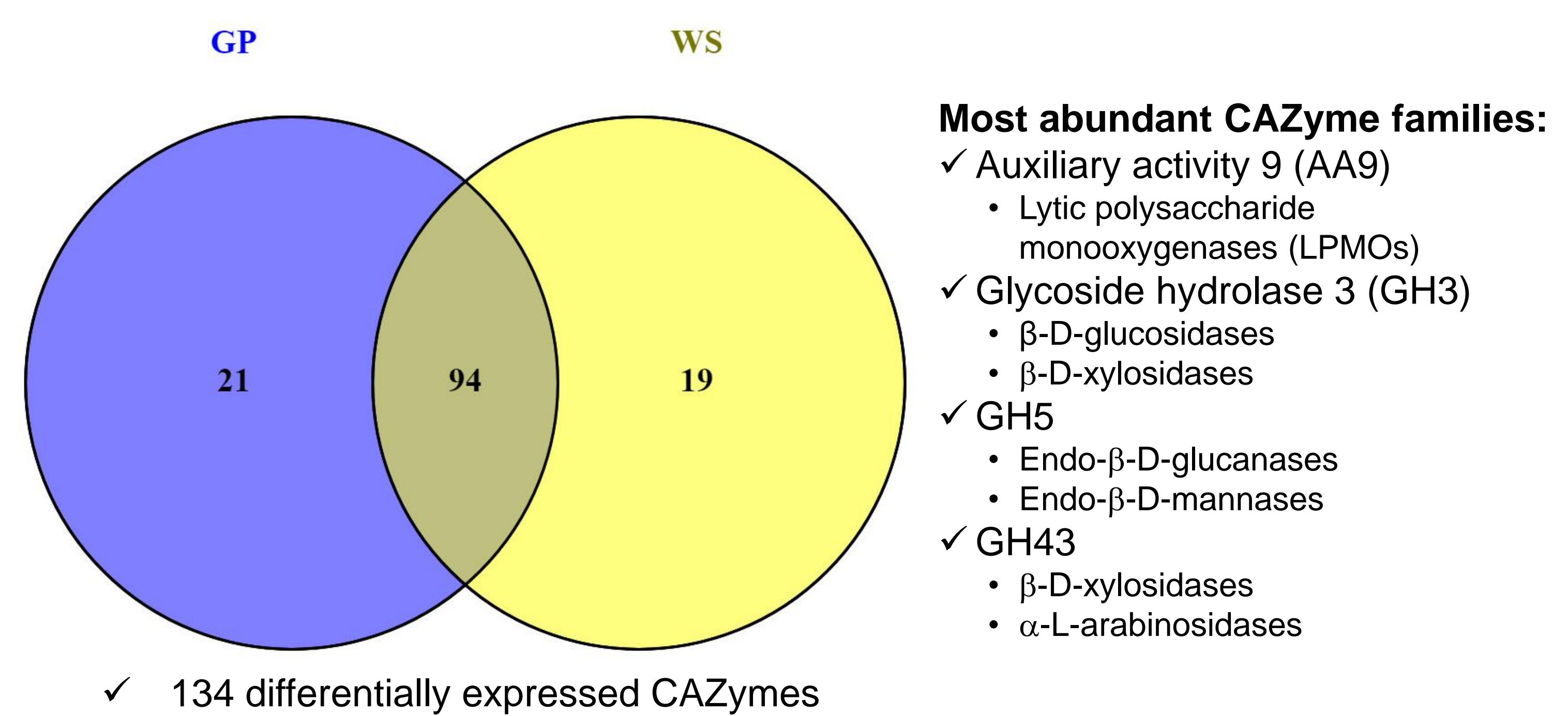


Results

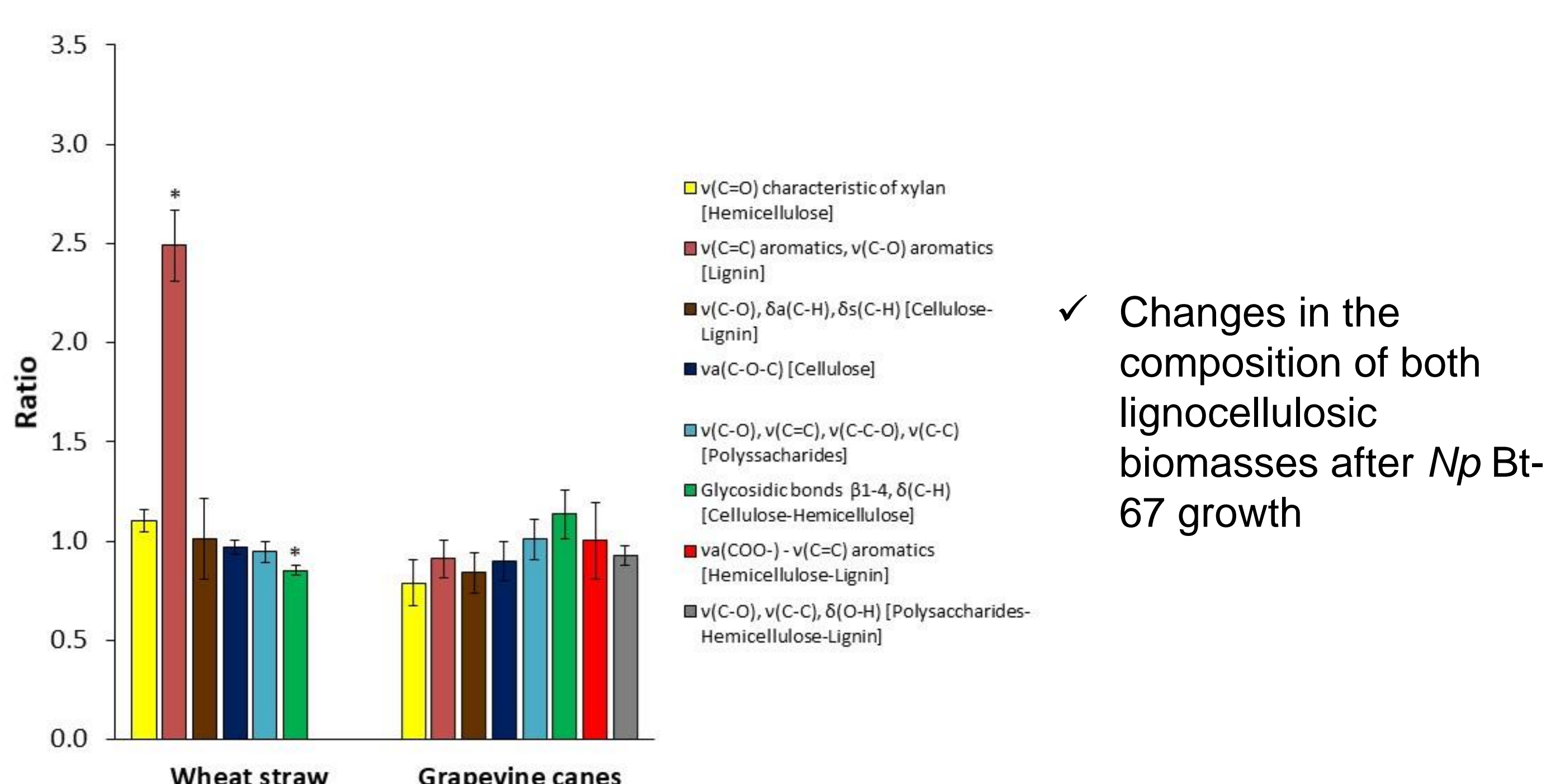
1 Enzymatic activities



3 CAZyme-genes expression

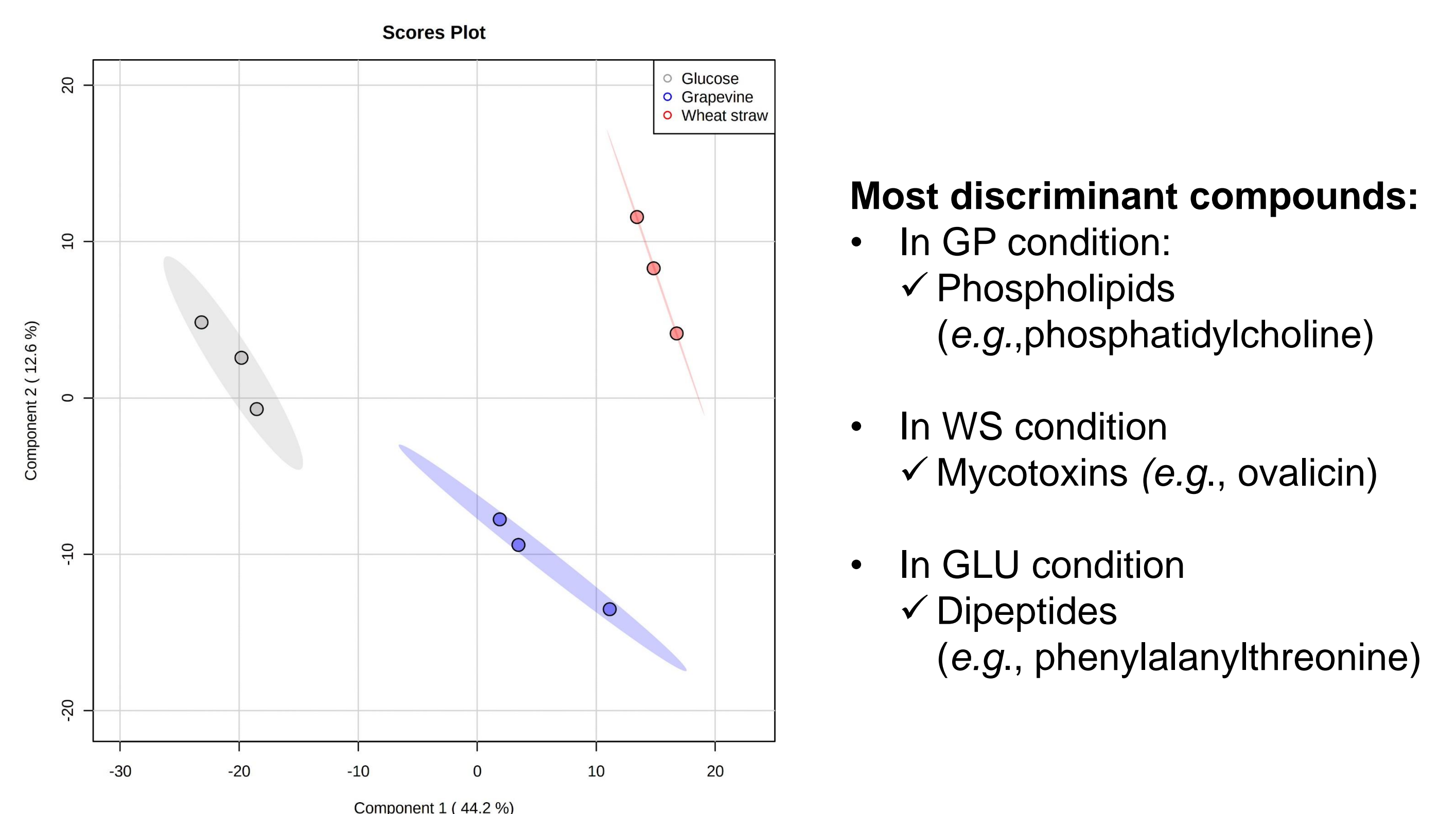


2 Lignocellulose degradation analysis using infrared spectroscopy



Relative degradation (<1) or enrichment (>1) of carbon bonds representative of the lignocellulose polymers (* indicate statistical significance, $P < 0.05$)

4 Metabolites production



PCA analysis of metabolomic data showing segregation according to carbon source

Conclusion and future work

- ✓ *Np* Bt-67 showed a differential production of pathogenicity- and virulence-related factors depending on the lignocellulosic biomass.
- ✓ Transcriptomic revealed that the cellulolytic enzymes, such as LPMOs, glucosidases, and endoglucanases were the most represented CAZymes.
- ✓ Enzymatic activities and lignocellulose biomass degradation were higher when the fungus grew with the non-host biomass (WS).
- ✓ Some differentially produced metabolites, such as phospholipids and ovalicin, appear to be relevant to the plant-microbe interaction.
- ✓ Our future works will focus on the purification and characterization of both CAZymes and toxic secondary metabolites.

Acknowledgements

We are grateful to the Grand Reims for the financial support of the AFERE and MALDIVE Chairs

References

- [1] Belair M, Restrepo-Leal JD, Praz C, Fontaine F, Rémond C, Fernandez O, Besaury L. 2023. *Botryosphaeriaceae* gene machinery: Correlation between diversity and virulence. *Fungal Biology* 127:1010–1031. DOI: 10.1016/j.funbio.2023.03.004
- [2] Restrepo-Leal JD, Belair M, Fischer J, Richet N, Fontaine F, Rémond C, Fernandez O. (in press). Differential carbohydrate-active enzymes and secondary metabolite productions by the grapevine trunk pathogen *Neofusicoccum parvum* Bt-67 grown on a host and non-host biomass. *Mycologia*.