

A COMPARATIVE STUDY OF THE GROWTH AND STRUCTURAL ORGANIZATION OF *GANODERMA LUCIDUM* AND *GANODERMA RESINACEUM* MYCELIA FOR BIOCOMPOSITE DEVELOPMENT

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<https://doi.org/10.52757/bsd26.15>

Background: The building sector is a major contributor to greenhouse gas emissions owing to the widespread use of petroleum-derived materials and the high energy demand associated with heating and air conditioning. In this context, improving thermal insulation represents an important lever for reducing building-related environmental impacts. Mycelium-based composites are therefore increasingly investigated as sustainable alternatives to conventional insulation materials. As their performance strongly depends on fungal colonization and network architecture, understanding mycelial growth and structural organization is a necessary preliminary step for strain selection and biocomposite development.

Aim of the study: The aim of this study is to characterize and compare the growth behavior and structural organization of *Ganoderma lucidum* and *Ganoderma resinaceum* mycelia under different temperature conditions, as a preliminary step toward strain selection for biocomposite development.

Materials and methods: To address this objective, the mycelial growth dynamics of the two species were analyzed on a nutrient-rich solid medium under controlled laboratory conditions. The effect of temperature was assessed through radial growth rate, network densification, and hyphal organization. Mycelial development was monitored over time and complemented by imaging analyses. Particular attention was given to the temporal evolution of the mycelium, which grows radially and exhibits clear spatial stratification. Sampling at four positions along a radial axis was performed to evaluate spatial variations associated with mycelial development.

Results: The results showed distinct temperature optima for the two species. *G. lucidum* exhibited maximal radial growth (11 mm/day) and increased network densification at 25 °C after 10 days, whereas *G. resinaceum* reached optimal growth at 30 °C within 6 days (21 mm/day). Under the tested conditions, *G. lucidum* consistently formed denser mycelial networks, while *G. resinaceum* exhibited a more structured and organized mycelial network.

Conclusions: Overall, these findings highlight species-specific thermal preferences and contrasting strategies of mycelial organization, providing valuable insights for strain selection in the development of high-performance mycelium-based composites.

Keywords: *Ganoderma lucidum*, *Ganoderma resinaceum*, growth dynamics, hyphal organization, mycelium-based composites.

Acknowledgments: Communauté Urbaine du Grand Reims, Département de la Marne, Région Grand Est and European Union (FEDER Champagne-Ardenne 2014-2020, FEDER Grand Est 2021-2027) are acknowledged for their financial support to the Chair of Biotechnology of CentraleSupélec and the Centre Européen de Biotechnologie et de Bioéconomie (CEBB).