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A Comparison of ergosterol and PLFA methods for monitoring the growth of ligninolytic fungi during wheat straw solid state cultivation

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The authors have no competing interests to declare

HIGHTLIGHTS

- Ergosterol measurements were found to correspond with increased fungal biomass
- Amount of ergosterol produced differed depending on fungal species.
- Total PLFA and linoleic acid could be used to quantify *Postia placenta.*
- In the other fungi tested the measurement of fatty acids did not correspond with ergosterol values.

ABSTRACT

Ergosterol, total phospholipid fatty acid (PLFA) and linoleic acid (18:2n-6) have all been used to determine fungal growth. This paper compares these methods to assess the growth of four different saprotrophic fungal species during solid state cultivation using a wheat straw substrate that have not been compared or measured previously. Ergosterol production appeared to track the mycelia growth well but its production differed considerably between fungi. This means that a specific conversion factor needs to be determined and applied for any given fungus. In comparison, measurements of total PLFA and linoleic acid only showed promise for determining the growth of *Postia placenta* due to the positive correlation with ergosterol measurements. In contrast, the other fungi tested (*Phanerochaete chrysosporium*, *Serpula lacrymans* and *Schizophyllum commune*) showed either no correlation or in some cases a negative correlation using this assay. The novel findings highlight the variation in fungal fatty acid between species, culture conditions and durations of incubation; suggesting that measurement of linoleic acid is only usable in specific cases. These findings provide important consideration for the study of fungi growing in solid substrates and suggest that the use of PLFA might bias diversity indices.

Keywords : ergosterol; phospholipid fatty acid; fungal biomass; linoleic acid; solid state cultivation; wheat straw

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