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METABOLIC DIVERSITY AND CHARACTERIZATION OF SELECTED CELLULOLYTIC FUNGI ISOLATED FROM ORGANIC WASTE

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INTRODUCTION

Organic waste contains high amount of cellulose, which is an ideal for the growth of cellulolytic microorganisms. Morphological and biochemical uniqueness of these organisms are commonly used for their identification and characterization.

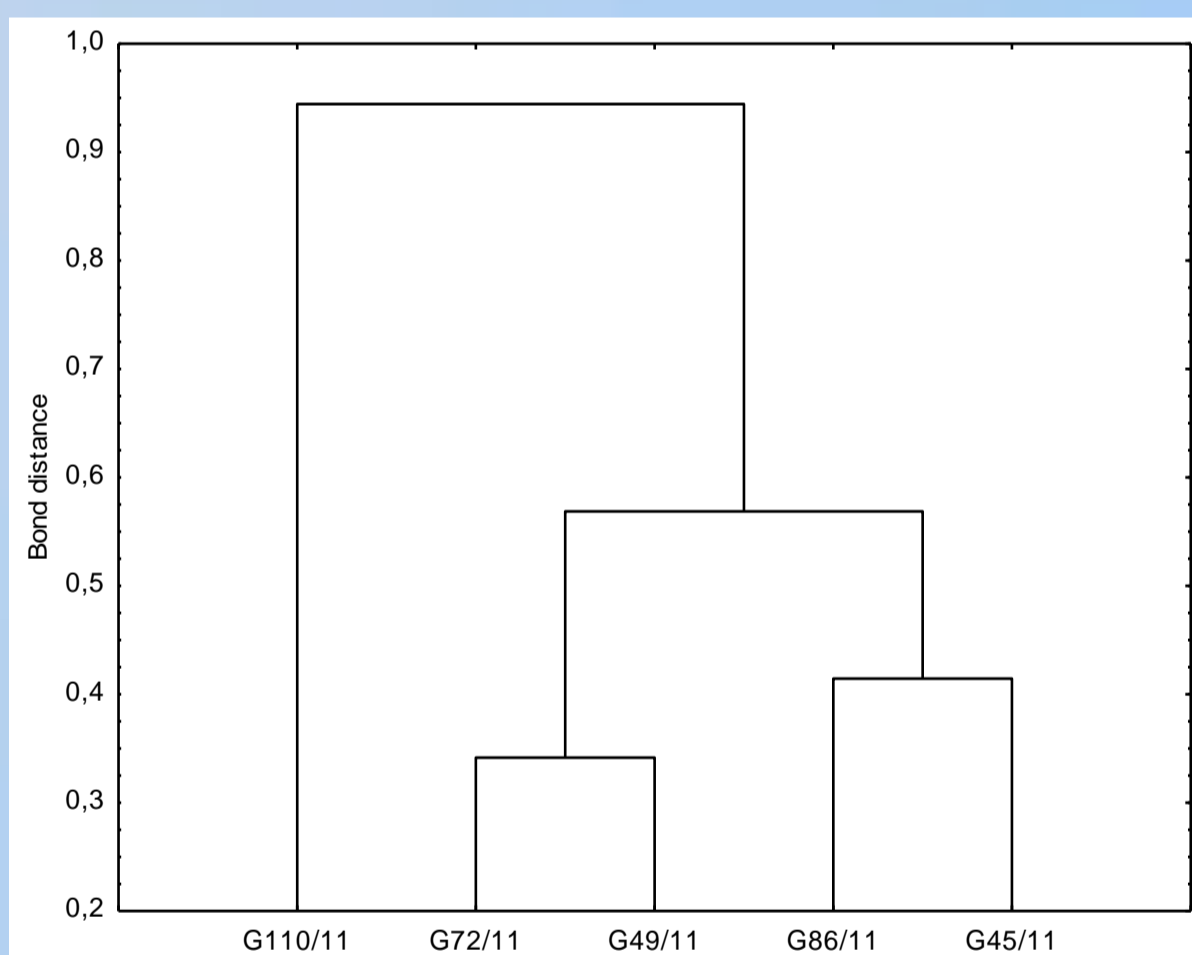
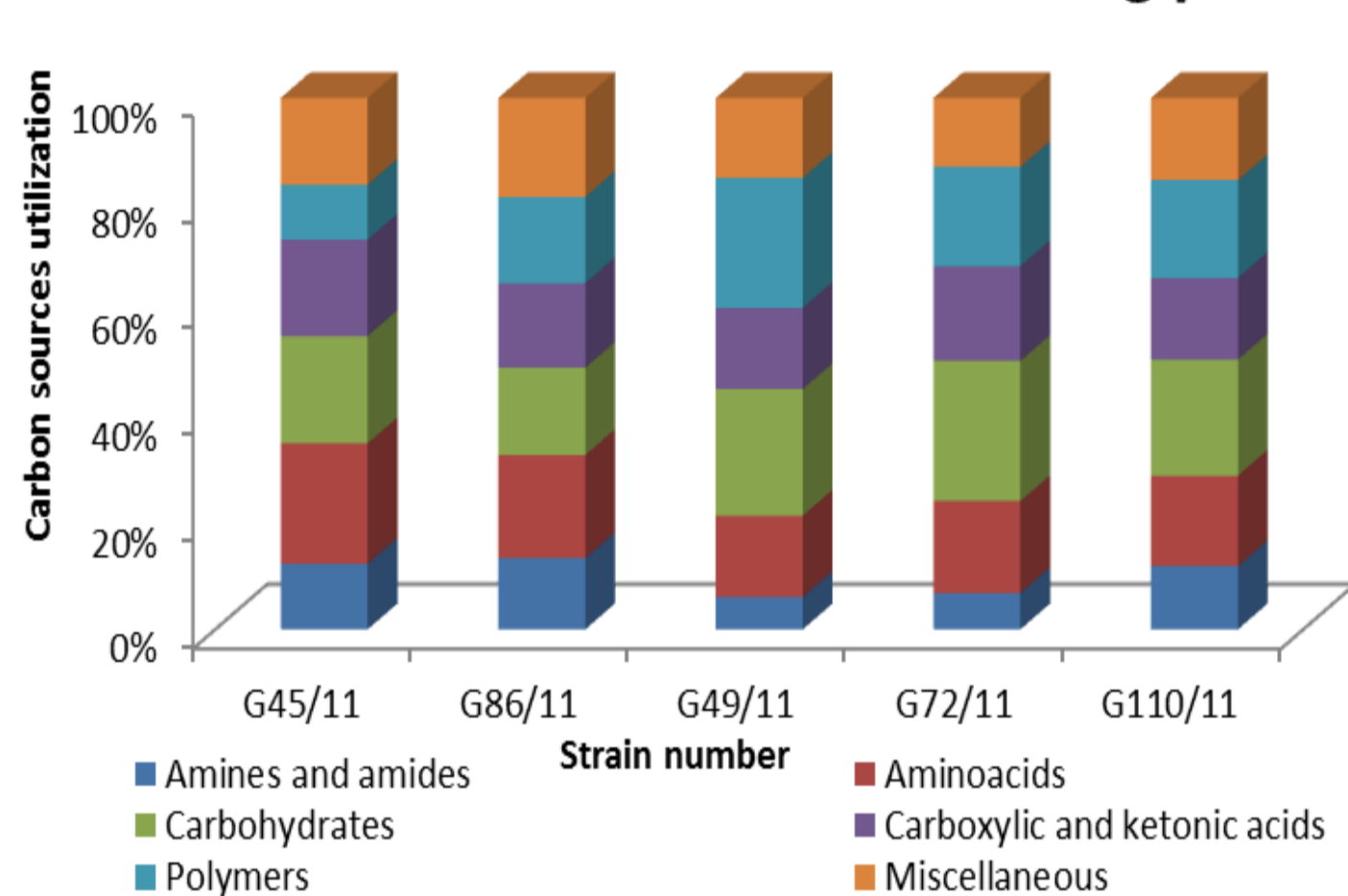
OBJECTIVE

The presented work mainly focused on biochemical diversity of selected fungi isolated from organic waste subjected to methane fermentation and their ability to cellulase production.

MATERIALS AND METHODS

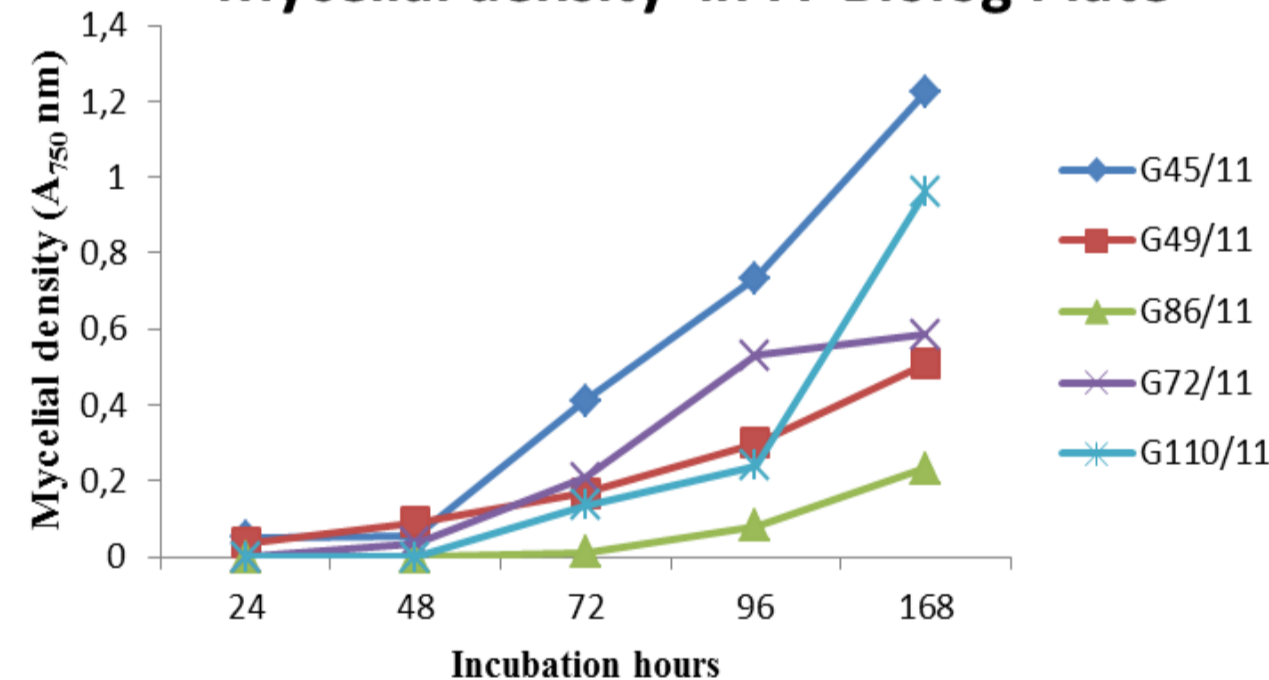
Metabolic characterization of microorganisms isolated from organic waste was done using BIOLOG™ system. The Biolog FF MicroPlate was applied for rapid characterization of filamentous fungi based on their abilities to utilize 95 discrete substrates. The metabolic pattern of particular guilds group (carbohydrates, amino acids, amines and amides, carboxylic acids, polymers and miscellaneous) was assessed for all microorganisms. For the detection of extracellular cellulase production 2% of cellulose agar plate and Gram's iodine was used [1]. The zone of clearance around the colony were observed and measured (Qc values). Filter paper activity (FPase) for total cellulase activity in the culture filtrate was determined according to the standard protocol [2].

Substrate utilisation in FF Biolog plate

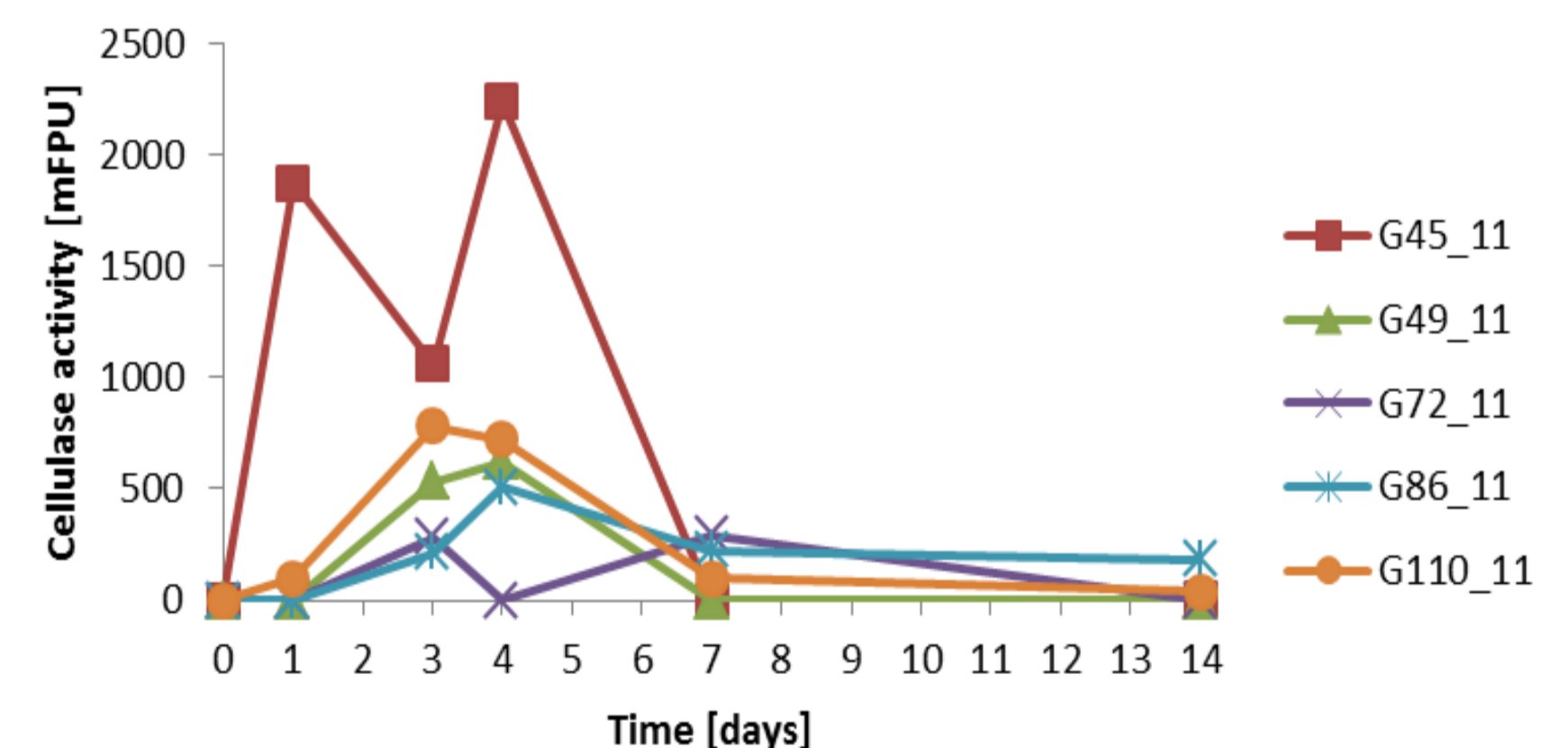


Results of cluster analysis for selected strains based on metabolic profiles

Mycelial density in FF Biolog Plate



Cellulolytic activity of selected fungal strains isolated from organic waste



Fungal species	Strain number	Potential cellulolytic activity – Qc values				
		Incubation time (h)				
		24	48	72	96	120
<i>Penicillium sp.</i>	G45/11	0.0	0.0	0.0	0.0	2.0
<i>Byssoschlamys nivea</i>	G49/11	4.0	1.6	1.5	0.0	0.0
<i>Penicillium camembertii</i>	G72/11	12.1	1.9	4.8	0.0	4.3
<i>Aspergillus fumigatus</i>	G86/11	5.8	0.0	2.3	5.3	12.0
<i>Botryotinia narcissicola</i>	G110/11	1.6	1.2	2.3	2.2	2.1

RESULTS

Individual fungal strains varied in their ability to attack various substrates. In general, a correlation was found among substrate utilization, cellulolytic zone on agar plates (Q coefficient) and the ability to filter paper decomposition. Tested strains have potential in degradation of cellulolytic compounds, which could be useful in the first stage of methane fermentation process. The obtained results also confirm the usefulness of the proposed methods in the assessment of fungi metabolic diversity through analysis of biochemical data.

REFERENCES

1. Kasana R.C., Salwan R., Dhar H., Dutt S., Gulati A., 2008. A rapid and easy method for the detection of microbial cellulases on agar plates using Gram's iodine. *Curr. Microb.*, 57, 503-507.
2. Ghose, T.K. 1987. Measurement of cellulase activities. *Pure & Appl. Chem.* 59: 257-268.