

# EVALUATION OF PECTIN METHYL ESTERASE ACTIVITY OF THREE STRAINS OF *T. VERSICOLOR* IN SYNTHETIC MEDIUM

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## Abstract

The study examined the growth and pectin methylesterase activity of *Trametes versicolor* 353, 1689 and 5094 strains when cultivated on Norcrans synthetic medium. It was found that strain *T. versicolor* 353 is characterized by the highest level of biomass accumulation. At the same time, the maximum pectin methylesterase activity was recorded in strain *T. versicolor* 5094, which indicates its potential for further research.

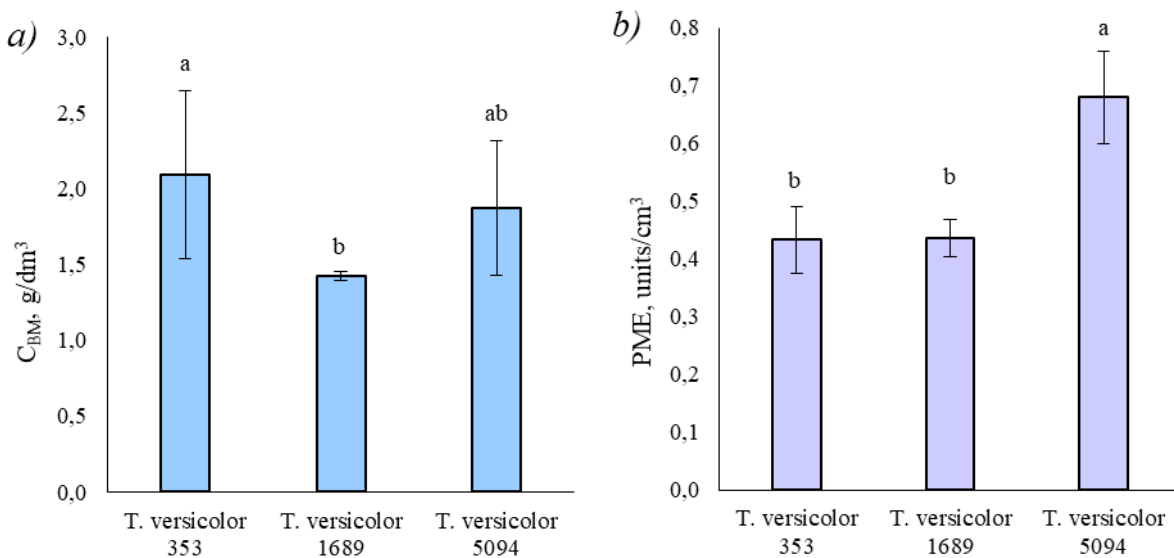
**Keywords:** *Trametes versicolor*, pectin methylesterase, culture liquid, biomass.

**Introduction.** Fruits are a valuable source of dietary fiber, minerals, and vitamins, and their processing for juice production has significant commercial value. However, the presence of pectic substances increases viscosity and causes turbidity, which negatively affects the organoleptic properties of the drink [1]. Centrifugation and filtration are often used to clarify juice, but these methods are not always effective in removing small particles that remain in suspension [2]. Viscosity reduction and turbidity removal can be achieved by pectinolytic enzymes (pectinesterases), which hydrolyze pectin compounds, converting them into a soluble form [3]. Recently, basidiomycetes have been actively studied due to their ability to decompose lignocellulosic biomass using extracellular enzymes. The presence of genes of the carbohydrate esterase (CE) family, in particular pectin methylesterase (CE8), which is involved in the degradation of pectin in the plant cell wall, has been confirmed in *T. versicolor*. The aim of the study was to investigate the synthesis of pectin methylesterase by *T. versicolor* strains in submerged culture on synthetic medium.

**Materials and methods.** The objects of the research were 3 strains of the species *Trametes versicolor* (L.) Lloyd: *T. versicolor* 353, *T. versicolor* 1689 and *T. versicolor* 5094, obtained from the Collection of Cap Mushrooms of the M.G. Kholodny Institute of Botany of the NAS of Ukraine (IBK). Cultivation was carried out on synthetic Norcrans medium. The initial pH was set at  $6,8 \pm 0,2$ , using 0,1 n solutions of KOH and HCl. Inoculation was carried out by adding three discs with a seven-day culture previously grown on agarized barley-malt extract. Cultivation was carried out in a static mode (without stirring) in flasks with a volume of 250 cm<sup>3</sup> with 50 cm<sup>3</sup> of nutrient medium at a temperature of  $(28 \pm 1)$  °C. After completion of cultivation, the mycelium was separated from the culture liquid by filtration and dried at 105 °C to constant mass ( $C_{BM}$ , g/dm<sup>3</sup>). Pectin methylesterase activity (PME, units/cm<sup>3</sup>) was determined in the culture liquid. The determination of pectin methylesterase activity was carried out according to the method given in [5]. Statistical analysis of the results was carried out using the Duncan method and Excel software (USA).

**Results and discussion.** The results obtained regarding the accumulation of biomass by the studied strains of *T. versicolor* and the activity of enzymes in the culture liquid are presented in Fig. 1. The biomass yield (Fig. 1. a) of all the studied strains

ranged from 1,4–2,6 g/dm<sup>3</sup>. The maximum biomass concentration was recorded for the strain *T. versicolor* 353 (2,1 ± 0,6 g/dm<sup>3</sup>). *T. versicolor* 5094 demonstrated biomass accumulation values close to *T. versicolor* 353 – 1,9 ± 0,4 g/dm<sup>3</sup>. At the same time, *T. versicolor* 1689 demonstrated the lowest value (1,4 ± 0,0 g/dm<sup>3</sup>), which is 32% less compared to *T. versicolor* 353.



**Fig. 1. Biomass yield (a) and pectin methylesterase activity (b) when cultivating *T. versicolor* strains in Norcrans medium.**

The value of pectin methylesterase activity in the culture fluid is presented in Fig. 1.b. *T. versicolor* 353, *T. versicolor* 1689 demonstrated almost identical values of the activity of the studied enzyme – 0,4–0,5 units/cm<sup>3</sup>. The highest level of pectin methylesterase activity was recorded for the strain *T. versicolor* 5094 – 0,7 ± 0,1 units/cm<sup>3</sup>. This value is more than 50 % higher than the activity recorded for other studied strains.

**Conclusions.** According to the results of the conducted studies, it was found that the use of the *T. versicolor* 5094 strain for obtaining pectin methylesterase is more appropriate, therefore it will be recommended for further research.

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