XVI Congreso Nacional de Biotecnología y Bioingeniería
21 al 26 de Junio de 2015 Guadalajara, Jalisco, México.
Guadalajara

EVALUATION OF XYLANASE PRODUCTION BY SCHIZOPHYLLUM SP., GROWN IN WHEAT STRAW THROUGH SOLID AND LIQUID STATE FERMENTATION.

Melanie Moreno, Omar Tovar, Magdalena Iracheta, Katiushka Arévalo*. Instituto de Biotecnología, Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León, Av. Universidad s/n, Cd. Universitaria, San Nicolás de los Garza, N.L., C.P. 66455.
karevalo01@hotmail.com

Key words: Schizophyllum, xylanase, zymogram.

Introduction. White rot fungi produce enzymes that break down lignin and cellulosic agro-wastes. These enzymes have recently been used in the brewing, baking, starch-processing, and biofuel industries.

In this work we measured the xylanase activity and made a zymography analysis from two native strains of the white-rot fungus *Schizophyllum sp.* Named RVAN 19 and RVAN 9, isolated from the northeast region of Nuevo León, México. They were grown in solid and liquid state fermentations during 5, 10, 15 and 20 days.

Methods. Fermentations were carried out in 250 ml Erlenmeyer flasks, with wheat straw and mineral solution as culture medium, they were inoculated with 3 mycelia fragments (7mm) and incubated at 30°C for 5, 10, 15 and 20 days. Enzyme crude extracts were obtained by filtration of the supernatants in the flasks. Xylanase activity was evaluated by measuring the quantity of reducing sugars released during 60 min (1). The enzymatic activities were conducted in triplicates and the data was analyzed through ANOVA (Analysis of Variance) and a posthoc Tukey analysis ($p \leq 0.05$), using SPSS (version 17.0) software. Zymography analysis was performed as described by Bey et al. (2011).

Results. The maximum value of xylanase activity in the liquid state fermentation was detected in RVAN 19 with 0.407 U/ml at day 15, and no statistical difference between fermentation days 5, 10 and 15 was detected. On the other hand, the maximum activity detected in solid state fermentation was also from RVAN 19 with 0.198 U/ml at day 5. Xylanase zymogram showed two bands in each of the samples from liquid fermentation, with molecular masses of 48.97 and 19.48 kDa for RVAN 19, and 48.97 and 18.85 kDa for RVAN 9. In the solid state fermentation samples, only one band appeared in each of the samples from solid state fermentation, with molecular masses of 50.23 kDa for RVAN 19 and 48.97 kDa for RVAN 9 (Fig 1). The molecular masses found in this work fit in the category of high molecular weight (43-50 kDa) and the low molecular weight xylanases like the ones produced from the fungi *Trichoderma* and *Aspergillus* (16-22 kDa) previously reported (3). Information related to *Schizophyllum sp*. isoenzymes was not found in the consulted literature, though the band pattern is similar to others like the one from white rot fungi *Pleurotus ostreatus* and the ascomycete *Penicillium oxalicum* (4).

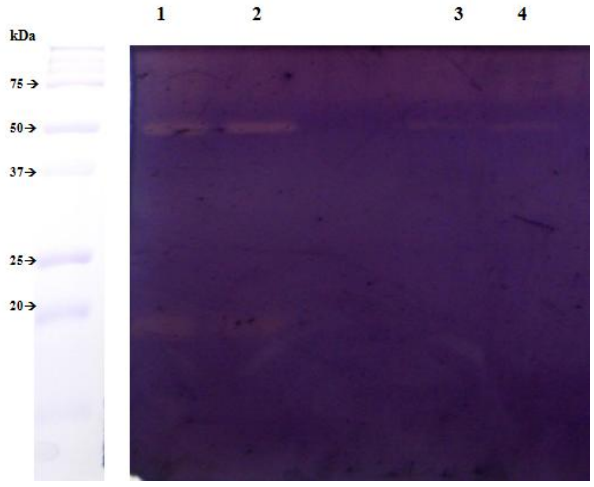

Fig. 1. Zymogram of Xylanase activity. Lanes 1 (RVAN 19) and 2 (RVAN 9): Liquid fermentation. Lanes 3 (RVAN 19) and 4 (RVAN 9): Solid fermentation. Molecular weight markers: Precision Plus Protein™Kaleidoscope™ standards (250-10 kDa).

Conclusions. The highest xylanase activity was shown at day 15 of fermentation with no statistical difference with days 10 and 5.
The molecular weight of the bands shown in the zymography is similar to the one from other fungi like *Trichoderma* and *Aspergillus*. Additionally the pattern of the bands detected in the xylanase zymogram agrees with other studies of white rot fungi like *Pleurotus ostreatus*.

Acknowledements. We are grateful to the installations and all the staff in the Biotechnology Institute from the Autonomous University of Nuevo León (Spanish: Universidad Autónoma de Nuevo León, UANL) that made this work possible.

References.

1. Quiroz R, Pérez N, Acosta L. (2011). *Biodegradation*. 22: 565-572.
2. Bey M, Berrin J, Poidevin L, Sigoillot J. *Microbial cell factories.(*2011).10: 113.
3. Anthony T, Chandra K, Rajendran A, Gunasekaran P. 2003. *Elsevier*. 32: 647-654.
4. Dwivedi P, Vivekanand V, Pareek N. 2011. *Elsevier*. 28:624-626.