***Penicillium echinulatum* secretome analysis as described by Dr. Prade**

Dr. Rolf Prade, a current faculty member of Oklahoma State University's Department of Microbiology and Molecular Genetics, earned his Doctor of Philosophy in Biochemistry at of University of São Paulo in 1987. His research focuses on both analyzing the enzyme secretion potential of a variety of fungi and experimenting with the mass production of a selection of these analyzed enzymes using cell factories. Dr. Rolf Prade gave a in depth discussion on a recent piece of research that he and his colleague had done where the analysis of *Penicillium echinulatum* in terms of the different enzymes that it secretes for the degradation of lignocellulosic biomass.

Alternatives for fossil fuels has become an increased global priority and liquid fuel sourced from lignocellulose biomass can potentially contribute to meeting this demand1. This article "*Penicillium echinulatum* secretome analysis reveals the fungi potential for degradation of lignocellulosic biomass" shows how two forms of *Penicillium echinulatum* a wild type and a mutant hybrid secrete enzymes to degrade various carbon sources. The enzymes produced through this degradation were identified and concentrations of these enzymes were observed. The proteins found when the two *Penicillium echinulatum* strains digested the four carbon sources: cellulose, sugar cane bagasse (SCB), glucose, and glycerol1.

These carbon sources are meant to show a more clear-cut version of the kind of nature fungal degradation of lignocellulose, which is the most abundant material on earth1. The result of the analysis shows that both the wild and the mutant had over forty percent of the enzyme produced during the experiment were from the CAZy protein family1. This family is known for its lignocellulosic degrading properties. Through further analysis into CAZy family members and the evidence shown when comparing the performance of the of the fungi between the four carbon sources, both strains of *Penicillium echinulatum* have an abundant amount of glycoside hydrolases and a potential in biomass degradation of cellulose and hemicellulose1. The secretome of the mutant strain has the most specificity for cellulases and hemicellulases and this confirms that the mutant out of the two has the most lignocellulosic biomass degradation potential1.

Dr. Prade clarified that *Penicillium echinulatum,* in regard to the meta of his research at least, is not the most ideal fungal producer and that these secretome analyzes are made on all these different microorganisms to find genes interest that can be transferred into cells that have been bred to be enzyme factories. These lab friendly cells are used to maximize the efficiency of production for whatever potent enzymes these analyses uncover, thus making cheap and easily accessible alternative fuel made from degraded lignocellulosic biomass a step closer to reality.

References:

1. Schneider, W., Goncalves, T., Uchima, C., Couger, M., Prade, R., Squina, F., Dillon, A., & Camassola, M. (2016). *Penicillium echinulatum secretome analysis reveals the fungi potential for degradation of lignocellulosic biomass*.