

Introduction to Session 3

Applied Biological Research II

R. MARK WORDEN¹ AND CHRISTOPHER J. RIVARD²

¹*Michigan State University;*
and ²*National Renewable Energy Laboratory*

This session on applied biological research offered a variety of interesting papers organized into three thematic areas. The first area, isolation and development of improved microorganisms, began with H. G. Lawford and J. D. Rousseau, who have explored the sensitivity of a genetically engineered, ethanol-producing strain of *E. coli* to pH and acetic acid. This organism converts xylose to ethanol in nearly theoretical yields. Next, S. P. Tsai et al. described their screening strategies for improved strains of lactic acid producers. Their multilevel screening protocol has resulted in several promising strains.

The metabolic properties of microbes of commercial importance have been characterized in three other papers. M. G. Tadros et al. described the effects of light intensity on the growth of *Spirulina maxima* cultivated in continuous culture. They showed that both photosynthetic efficiency and the cells' carbohydrate content may be manipulated by controlling light intensity. E. Bon and C. Webb described the relationship between glucamylase production in *Aspergillus awamori* and nitrogen availability. These results help elucidate the effect of nitrogen in product expression in industrial fermentations. E. A. Grulke presented a kinetic model of *Phanerochaete chrysosporium* in mycelial pellet culture. This model, and the accompanying experiments, illustrated the complexity of this organism's life cycle.

The final two papers described interesting bioreactor applications of microbes. Huang et al. reported feasibility studies of an on-line, microbial sensor for biomass concentration. This sensor operates by measuring bioluminescence from recombinant cells carrying *lux* genes. On a more traditional note, A. E. Ghaly et al. gave results of a pilot-scale bioreactor for production of ethanol from cheese whey. A kinetic model was used to interpret data.