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Meeting Review

Highlights of the 40th Annual Meeting of the Society for Industrial Microbiology[1]

Sarasota, Florida, traditionally a haven from the chill winter winds, proved to be a pleasant retreat for some 300 scientists, engineers, and exhibitors who gathered from all parts of the world to attend the 40th annual meeting of the Society for Industrial Microbiology held during 14–19 August, 1983.

The programme consisted of 17 sessions whose content reflected a wide range of research subjects. In spite of the diversity of topics presented, there was, I believe, an underlying theme to the meeting which reflected itself as the term 'Biotechnology'. With the rapid advances in the understanding of the genetic transfer systems present in various microbial genera, engineers and applied microbiologists are starting to write up shopping lists of desirable engineered traits they want in the micro-organism(s) involved in their process systems. Dr Arthur E. Humphrey, this year's Charles Thom Award recipient, emphasized in his lecture the necessity of the process engineer and the geneticist consulting early in the cloning process to assure optimization of the cloned micro-organism to the process system. Genetic engineering now being a reality is forcing many people to ask the question, 'What can genetic engineering do for me?'

Of particular interest to food microbiologists were two symposia that were devoted to current research underway with the lactobacilli and the yeasts with respect to their genetics, physiology, and utility. The lactobacilli symposium convened by Bruce M. Chassey (NIH, Bethesda, MD, USA) started off with an overview of the taxonomic and evolutionary positions of the lactobacilli (Otto Kandler, University of Munich, FRG) and the current methodologies used in identification. Dr Kandler also reviewed the use of lactobacilli as starter cultures for diary products and for the production of sauerkraut. Sauerkraut is traditionally the result of chopped cabbage being fermented by indigenous lactic acid bacteria. Experiments with cabbage inoculated with the homofermentative *Lactobacillus bavaricus* have resulted in a much milder sauerkraut, which consumers prefer. *Lactobacillus bavaricus* produces only L-lactate from glucose, whereas, the (D-) form, which many wild lactobacilli make, may be implicated as a cause of metabolic acidosis when ingested in large amounts.

Ingestion of lactic acid bacteria in cultured dairy products and in particular *L. acidophilus*, has long been thought to have a beneficial effect on human health and well being. Barry Goldin (Tufts University, Boston, MA, USA) reported on some interesting research where meat-fed rats receiving *L. acidophilus* supplements had a reduced frequency of colon cancer after having been administered a carcinogen. It is believed that the fecal flora produce enzymes that convert a precursor molecule to an active carcinogen. *L. acidophilus* supplements apparently decrease faecal enzyme activ-

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ity either through displacement or inhibition of the faecal flora. Studies with humans also indicated that *L. acidophilus* supplements decrease faecal enzyme activities.

Dairy, vegetable, and silage fermentations all utilize to some extent the lactobacilli as fermentation agents. Major improvements in strain performance are likely with genetic engineering techniques. However, this cannot be realized until the genetic transfer systems within this industrially important genus are understood. Working toward this goal is Bruce Chassy, who reported on the construction of gene libraries of the industrially important species of lactobacilli. He and his group are also working on finding a transformation system in the lactobacilli which to date has not been established. They have been successful in making protoplasts and a medium for regenerating of cell walls. However, transformation has not been demonstrated, probably because of DNA-ase activity associated with the cell membrane.

The importance of yeast, in particular the genus *Saccharomyces,* in the food and beverage industries is well known. Current knowledge about these microorganisms and their use in industry was the theme of a symposium convened by Graham G. Stewart and Inge Russell (Labatt Brewing Company, London, Ontario, Canada). Dr Stewart led off the symposium with a review of the industrially important yeasts and the traits they should possess to make them effective. The brewing industry, like so many others, is exploring the possibilities for strain improvement through genetic engineering. Techniques such as hybridization, mutation, spheroplast fusion, plasmid-mediated transformation, and liposome-mediated transformations are being used at the Labatt Laboratories to study genetic transfer systems in the brewing yeasts. Attempts are currently underway to use these methods to transform a brewing yeast with glycoamylase genes from another yeast. An engineered strain as such would have the ability to ferment dextrins and starch, which could improve the brewing process, in particular the production of the popular light beers.

Wine makers are now realizing the value of using yeast starter cultures to produce superior and consistent wines. Ronald Subden (University of Guelph, Ontario, Canada) reported on experiments using genetic engineering techniques to construct strains of yeasts capable of performing a malolactic fermentation in wines. The malolactic reaction (malic acid $\rightarrow$ lactic acid + CO_2) is one that is only performed by certain strains of lactic acid bacteria. This reaction is desirable in high-acid wines to decrease acidity, however, the lactic acid bacteria performing it do so slowly and inconsistently. Subden's approach is ultimately to clone the malolactic gene from the lactic acid bacterium *Leuconostoc oneos* into a wine yeast. To date, he has been able to construct an *Escherichia coli* plasmid vector containing the malolactic gene and transfer it into *E. coli.*

Classical selection techniques for obtaining superior microbial strains for industrial use are still commonly being used. Paul Bolen (NRLL, USDA, Peoria, IL, USA), using continuous culture as a selection technique, was able to select from a u.v. mutagenized culture of *Pachysolen tannophilus* mutants with double the specific growth rate on xylose, as compared to the parent strain. Agricultural crop residues in the USA are in the neighbourhood of 690 million tons annually, of which about 8–10% is xylose. Strains of *P. tannophilus,* capable of rapidly fermenting xylose to ethanol, will be of potential industrial importance.

In hope I have been able to convey some of the highlights of the meeting that would be of interest to food microbiologists.

The proceedings of the 40th Annual Meeting of the Society for Industrial Microbiological will be published in *Developments in industrial microbiology*, vol 25, and should be available in the summer of 1984.

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