

THE ALCOHOL TEXTBOOK

FIFTH EDITION

A reference for the beverage, fuel and industrial alcohol industries



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Editors

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INTRODUCTION

Since publication of the fourth edition of *The Alcohol Technology* in 2001 (Pilgrim *et al.*, 2001), when 68 fuel alcohol plants in the United States produced some 2.7 billion US gallons of ethanol, the alcohol industry has experienced overwhelming and unprecedented growth. As this fifth edition of *The Alcohol Technology* is being completed in late 2009, the production capacity of fuel alcohol from 180 manufacturers in the US is 13.5 billion US gallons (51.5 billion litres), with 2.4 billion additional gallons (9.1 billion litres) in construction or expansion and will commence production in 2009. In 2005, the fuel alcohol industry manufactured more than 75% of the world's fermentation ethanol, while potable and industrial alcohol accounted for less than 13 and 2%, respectively. These latter two percentages will continue to drop as many new fuel alcohol distilleries come onstream around the world.

Global production worldwide has been estimated to exceed 1.2 billion litres (31 billion US gallons) in 2008, with the biggest increases expected to be in the US and Brazil (FO Lichy, 2007). This figure may be revised, however, due to extremely high fuel prices in the US, the drop in gas prices in late 2008, as well as high grain and sugar prices worldwide. Since these high alcohol prices have induced a shift towards ethanol, price-sensitive new projects may be curtailed or put on hold. Time will tell. Chapters 2 and 3 examine the status of fuel and beverage ethanol production around the world.

FUEL ALCOHOL

In this relatively short period of time since the emergence of ethanol production in 1990, what have we learned about alcohol processing and the emerging technology that have defined the evolution of this industry? This new world knowledge is being approached in the modern spirit of ethanol production as engineering, computer-aided design and build new factories.

Feedstocks

The broad range of available substrates available for ethanol production is reviewed in Chapters 4 through 6. Although sugar is king in Brazil and other countries and corn is king in North America, an increasing and easily processed source of starch or sugar can be used to produce this form of alternative liquid fuel. Considerable expansion of ethanol production is expected in Brazil and in other Latin American countries, each of which could be expected. Interestingly, Brazil appears to have plenty of unproductive land available for planting large amounts of corn sugar. Consideration must also be taken with an encroachment of all of the Amazon and other ecologically important areas of the country.

In North America over the last few years, industry has seen corn prices skyrocket to over US\$3.01 per bushel. Prices have eased but remain higher and