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(54) Title: METHODS FOR INCREASING THE PRODUCTION OF ETHANOL FROM MICROBIAL FERMENTATION

(57) Abstract: A stable continuous method for producing ethanol from the anaerobic bacterial fermentation of a gaseous substrate containing at least one reducing gas involves culturing a fermentation bioreactor anaerobic, acetogenic bacteria in a liquid nutrient medium; supplying the gaseous substrate to the bioreactor; and manipulating the bacteria in the bioreactor by reducing the redox potential, or increasing the NAD(P)H TO NAD(P) ratio, in the fermentation broth after the bacteria achieves a steady state and stable cell concentration in the bioreactor. The free acetic acid concentration in the bioreactor is maintained at less than 5 g/L free acid. This method allows ethanol to be produced in the fermentation broth in the bioreactor at a productivity greater than 10g/L per day. Both ethanol and acetate are produced in a ratio of ethanol to acetate ranging from 1:1 to 20:1.



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