TAGUCHI METHOD IN BIOPROCESS ENGINEERING: *Case Studies*

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Case Study 2: Process Optimization of Lactic Acid Production in Fermenter

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1. Introduction

Lactic acid is an organic acid which is widely used in the industrial applications. In the recent years, the interest towards lactic acid recovery from fermentation broth has been increased due to the demand of purely or naturally produced lactic acid. World demand for lactic acid is estimated as $150 million (100,000 tones) per year. This acid can be used as a preservative and acidulant in foods, as a controlled delivery of drugs in pharmaceutical agents, as a precursor for production of polymer in plastic industries and as an important chemical in leather tanning and textile dyeing (Stanbury and Whitaker, 1984). About 50 % of the market is in food and beverage applications which are a mature and stable market (Shuler and Kargi, 2002).

The production of lactic acid is influenced by the operating parameters of the fermentation process in the bioreactor such as operating temperature, sample pH, agitation speed of the impeller, and the dissolved oxygen level. These parameters give significant effect on the growth and metabolic production of lactic acid. Many studies had been performed to optimize these parameters in order to produce the