

TAGUCHI METHOD IN BIOPROCESS ENGINEERING: *Case Studies*

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Case Study 3: Optimization of Coenzyme Q10 Production in Bioreactor

*Maizirwan Mel, Mohd Ismail Abdul Karim and Fairin Huda
Faivdullah*

1. Introduction

Ubiquinone is present in every cell in human's body and also in lipoproteins. Every cell has the ability to synthesize CoQ10 generally. CoQ10 has a potent of antioxidant and cellular energizer. CoQ10 plays an important role in the body as a first-rate antioxidant. A second well-documented action is reduction of free radicals, which could cause damage to structural lipids or proteins in membranes (Crane et al., 1993). CoQ10 is a naturally occurring molecule that resembles the chemical structure of Vitamins K and E. CoQ10 biochemically functions much like vitamin E in that it participates in anti-oxidant and free radical reactions. CoQ10 can protect DNA, increase the immune system and help to prevent premature aging by neutralizing free radicals.

CoQ10's role in creating cellular energy is very important in human's body. Human's body creates energy by burning fuel from foods eaten and oxygen taken, process known as oxidation. This all happens within the cells in the mitochondria. It is a vital electron and proton carrier which supports ATP synthesis in the mitochondrial inner membrane. The second function is to direct proton movement to establish a proton gradient across the membrane that can be coupled to ATP production (Mitchell, 1991).