

Aeration and yeast extract requirements for kojic acid production by *Aspergillus flavus* link

ABSTRACT

Growth and kojic acid production by *Aspergillus flavus* Link 44-1 were studied at different levels of dissolved oxygen tension (DOT) using a 2-l stirred tank fermenter. In all experiments, agitation was fixed at 600 rpm and DOT was controlled at different levels by varying airflow rates. Single-phase DOT control at three different levels (30, 50, and 80% saturation) did not enhance kojic acid production when compared to fermentation without DOT control (13.5 g l⁻¹). The production of kojic acid in a fermentation with single-phase DOT control at 80% was comparable to that of a fermentation without DOT control. Decreased DOT levels below 80% reduced the production of kojic acid significantly although the biomass increased. When DOT was controlled at a very high level (80%) during active growth and then decreased to a low level (30%) during the production phase (i.e., two-phase DOT control), the production of kojic acid (28.9 g l⁻¹) was increased by about two times compared to a fermentation without DOT control; however, when yeast extract was added continuously in a fermentation with two-phase DOT control, active growth occurred during the production phase and the maximum accumulation of kojic acid was reduced significantly. High DOT during on active growth phase and no addition of yeast extract during the production phase were required to enhance kojic acid biosynthesis. The most effective control strategy for kojic acid production, therefore, was to control DOT at very high levels during active growth and not add a nitrogen source during the production phase while using low levels of DOT.

Keyword: *Aspergillus flavus* Link; Batch fermentation; Dissolved oxygen control; Fedbatch fermentation; Kojic acid