438k Influence of Moderate Electric Field Frequency on the Growth Kinetics of *Lactobacillus Acidophilus*

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The effect of frequency and electric field strength on diffusion enhancement from cells is of considerable interest. Moderate Electric Fields (MEF) applied across microbial growth media may potentially have an effect on the permeability of the cell membrane.

The objective of this study was to investigate the effects of MEF, at different frequencies, on microbial growth kinetics of a selected microorganism, *Lactobacillus acidophilus* OSU 133. Therefore, the influence of MEF on the early, exponential and stationary phase of the fermentation and its impact on bacteriocin (Lacidin A) production was investigated.

The following treatments were compared: conventional (for 40 hrs), MEF (1 V/cm, for 40 hrs), and combinations of MEF (1 V/cm, for first 5 hrs) and conventional (for 35 hrs) fermentation at various levels of frequency (45, 60, 90Hz). In all experimental conditions temperature was set at 30^{o}C, since this had been previously identified as most beneficial from the standpoint of lag phase reduction. Additionally, fermentations were done at 37^{o}C. Two replicate experiments for each condition were conducted.

MEF treatments at 30^{o}C produced a shorter lag phase than conventional fermentation. There was no significant difference in the bacteriocin production under conventional and combination treatment. Less bacteriocin production was observed under MEF fermentation compared to other treatments. There was no significant change in the maximum specific growth rate, biomass production and pH change under the different experimental conditions.

Based on these observations, the fermentation process can be accelerated by applying MEF at the early stage of growth without significant change in the final biomass and bacteriocin production. This method will add some economic benefits to the fermentation process by enhancing the growth of the cells at the early stage of fermentation and decreasing the fermentation operation time.