

BORON STIMULATES YEAST GROWTH

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Sacchromyces cerevisiae (yeast) is a single-celled eukaryote that has been successfully applied to elucidate molecular mechanisms involving elements, such as copper and iron. This has been possible because they are essential nutrients for growth and metabolism and their intracellular trafficking is similar in yeast and mammals. We report here that a boron deficient growth media slows the growth and limits the stationary population size of yeast in liquid culture.

YPD growth media was prepared and passed through an Amberlite column to remove the boron. The deficient media (NB) was prepared by the addition of ultrapure water (<0.2ppb B) to achieve its final concentration. The supplemented media (B) was prepared by the addition of boric acid to achieve a final concentration of 500ppb B. As early as the lag phase, we observed a significant difference in the rate of growth between yeast grown in boron-depleted growth media and boron-supplemented media. At the point where the growth difference became statistically significant each culture was split into two groups. One was maintained in media of the same concentration and the other group was transferred to the other level of boron. The four groups were as follows: 1) NBNB: unsupplemented throughout 2) NBB: unsupplemented and then supplemented with 500 ppb of boron, 3) BNB: initially supplemented with 500 ppb of boron and then transferred to unsupplemented media, BB: supplemented with 500 ppb of boron throughout the experiment. Repletion of yeast grown in the boron deficient media with 500ppb boron stimulated their growth during the log phase of growth. In the stationary phase, three of the groups (NBB; BNB & BB) leveled-off at the same population size while the fourth group, the yeast grown in boron-deficient YPD throughout the experiment (NBNB) leveled-off at a significantly lower population size.

These results demonstrate that boron is required for optimal *S. cerevisiae* growth. In tandem with previous reports in fish, these data argue that boron is essential for eukaryotic organisms.