

Influence of different modifications of a yeast propagation system on yeast performance



Narathip Thonggok, Boonrawd Brewery, Bangkok, Thailand

Introduction:

The optimization of yeast propagation systems is one of the subjects permanently under discussion in the brewing scene. Systems with agitators to assure homogeneous mixing during aeration have been used but also concepts with circulation pumps for aeration and homogenization are on the market for many years now. The following results should give some insights into the quality of yeast produced with the two aforementioned concepts of propagation plants installed and running parallel in a large scale brewery.

System A	System B
2 tank system with 15 hl and 150 hl tank, respectively.	2 tank system with 15 hl and 150 hl tank, respectively.
Aeration and mixing by agitator	Aeration and mixing by circulation pump

Table 1: Details of yeast propagation systems

Results: Propagation

During the second step (150 hl) System B delivers 100 mio. cells/ml within 40 hours whereas in System A only 70 mio. cells/ml are produced (figure 1) but vitality (extract reduction, alcohol formation and pH reduction) of both systems were not significant different. Yeast concentration in the Krausentank with yeast from System B reached 80 mio. cells/ml within 40 hours whilst with System A only 60 mio. cell/ml. The main reason for this is assumed to be a quicker sedimentation of yeast produced with System A. (Figure 2)

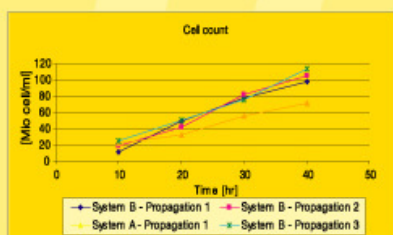


Figure 1: Yeast cell count from second propagation tank

Fermentation

Both yeasts from the different propagation systems show no significant difference in terms of fermentation performance. However, yeast harvested from fermenters pitched with yeast from system B shows a higher concentration and more volume compared to yeast harvested from the other fermenters (system A). Interestingly this yeast (A) shows a higher viability after being cropped from the fermenters.

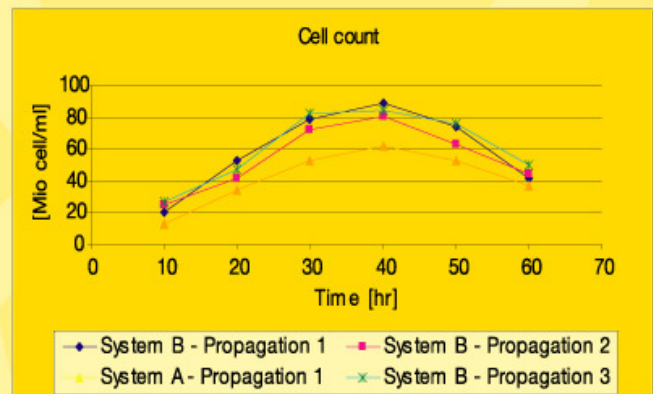


Figure 2: Yeast cell count in Krausentank

System	Cropped volume [hl]	Cell count [Mio. cell/ml]	Non - Viable cells [%]	Solid Content [%]
A	71	2175	1.3	61.5
B	82	2386	1.5	70.7

Table 2: parameters of cropped yeast

Summary: Propagation

No differences could be found in the first step of propagation regarding biomass production, time and vitality. This is mainly due to in small propagators and even distribution of air and biomass can be achieved by any of the two concepts but quite different in the second step of propagation. Here the system with aeration in the circulation pump delivers more biomass.

Fermentation

The yeast cropped from the first fermentation pitched with yeast from System A shows a higher viability which might be related to shear forces created by the circulation pump. On the other hand volume of the cropped yeast and solid concentration are higher with System B.