



EFFECT OF SAPONINS ON THE GROWTH OF *Saccharomyces cerevisiae* AND *Kluyveromyces marxianus* IN CONTINUOUS CULTURE

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Introduction. Saponins, are widely distributed in the plant kingdom and have been reported to possess a wide range of biological activities, such as the anti-yeast activity, that affect the growth in some yeast (1). Continuous culture has proved to be an efficient tool for studying the effect of different factors on the microbial metabolism and physiology (2).

The aim of this work is to investigate the effect of different saponin concentration from *Agave salmiana* and *Agave durangensis* on the growth of *Saccharomyces cerevisiae* and *Kluyveromyces marxianus* in continuous culture.

Methods. An extract of *A. durangensis* and *A. salmiana* leaves (3) and two yeasts strains a *S. cerevisiae* (AR5) and *K. marxianus* (SLP1) where used in this work. Continuous cultures were carried out in a 3L bioreactor with a 1.5L working volume of *A. tequilana* juice. Once the steady state was reach a pulse of saponin extract was made (0.75, 1.5 and 3 mg/mL). AR5 and SLP1 yeasts strains were fed at dilution rate (D) $0.21 \pm 0.006 \text{h}^{-1}$ and $0.12 \pm 0.001 \text{h}^{-1}$ respectively. Yeast cell population was determinate using the Neubauer's chamber and biomass was determined by measuring dry weight. Sugar concentration was measured with the DNS method at 540 nm (4).

Results. The cellular population, biomass concentration and sugar consumption were determined. As an example, the figure 1 showed the effect of *A. durangensis* saponin extract on AR5 yeast strain and figure 2 showed the effect of *A. salmiana* saponin extract on SLP1 yeast strain. An inhibitory effect on biomass production was observed with the two saponin extracts for both yeast strains. Nevertheless, *A. durangensis* saponin extract showed the highest effect (fig 1), while *A. salmiana* exhibited the lowest effect (fig 2). It can be noticed that SLP1 yeast strain (*K. marxianus*) was more resistant than AR5 (*S. cerevisiae*) when a pulse of 1.5 and 3 mg/mL was applied, this could be related to the cell wall and cell

membrane composition of *K. marxianus*. Since it has been found that *K. marxianus* yeast has more thermo tolerance and enzyme excretion capacity than *S. cerevisiae* (5).

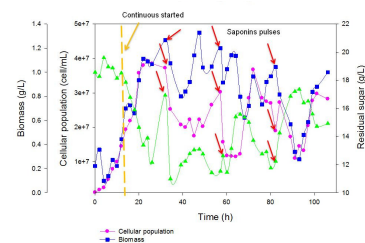


Fig 1. AR5 continuous culture with pulse of *A. durangensis* saponin extract at 0.75, 1.5 and 3.0 mg/mL

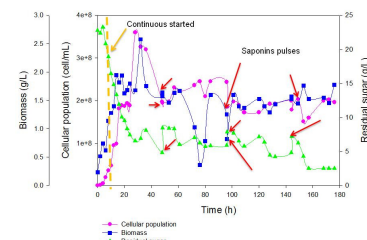


Fig 2. SLP1 continuous culture with pulse of *A. salmiana* extract at 0.75, 1.5 and 3.0 mg/mL

Conclusions. An inhibitory effect was observed in both yeast strains and *S. cerevisiae* strain was the most affected with both saponin extracts. However, *K. marxianus* was more resistant than *S. cerevisiae* this could be related to the cell wall and cell membrane composition of *K. marxianus*.

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