

**TITLE:** INFLUENCE OF DIFFERENT PH AND AGITATION IN  $\gamma$ -DECALACTONE PRODUCTION BY TROPICAL YEASTS STRAINS

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**ABSTRACT:**

The lactones that have less than 12 carbon atoms produce aromas of great interest for the food industries. Among the lactones the  $\gamma$ -decalactone is the most used. It can be obtained by biotechnological processes by the microorganisms and thus be classified as natural. The pH and agitation of the medium may change the growth and production of  $\gamma$ -decalactone. The pH variation affects free lipases ionization of the substrate and oxygen may influence the activities of the enzymes of the peroxisomal  $\beta$ -oxidation pathway. The aim of this study was to evaluate the effects of pH and agitation on the growth and  $\gamma$ -decalactone production by tropical yeast strains *Yarrowia lipolytica* CCMA 0242 and *Lindnera saturnus* CCMA 0243. The yeasts were obtained from the Culture Collection of Agricultural Microbiology, Department of Biology at the Federal University of Lavras, MG. These yeasts were reactivated in liquid YEPG medium at 28 °C/48h. Following, 10% of initial inoculum was transferred to larger volumes until reaching a final volume of 200 mL and incubated at 28 °C/150 rpm for 18h. All content was centrifuged at 4 °C/ 6000 g for 5 min, cells were washed and added in YNB medium with 30% castor oil, incubated at 29°C, pH values (5 and 6) and agitation values (150 and 200 rpm) for 120h. Quantification of viable cells was done with a Neubauer chamber, using methylene blue.  $\gamma$ -Decalactone was extracted with diethyl ether and quantified by gas chromatography using a flame ionization detector (GC-FID). There was no statistical difference in the pH and agitation during *Y. lipolytica* CCMA 0242 growth. The population of *L. saturnus* CCMA 0243 (8.87 log cell/mL) was 1.6% higher at higher speed than the population obtained at lower speed (8.73 log cell/mL). The  $\gamma$ -decalactone production by *L. saturnus* CCMA 0243 was better at initial pH=5 while the production by *Y. lipolytica* CCMA 0242 was better at initial pH=6. The use of different agitation did not influence the production of  $\gamma$ -decalactone by yeasts. The production of  $\gamma$ -decalactone by *L. saturnus* CCMA 0243 (512.5 mg/L) was 2.38 times higher than by *Y. lipolytica* CCMA 0242 (214.8 mg/L). After 96 h of fermentation, the production of  $\gamma$ -decalactone by both yeast strains decreased. Under evaluated conditions, different pH during the conversion interfered with the production of  $\gamma$ -decalactone by yeasts strains evaluated. The strain *L. saturnus* CCMA 0243 can be considered an alternative producer of  $\gamma$ -decalactone in biotechnological processes.

**Key words:** microbial  $\gamma$ -decalactone, *Lindnera saturnus*, *Yarrowia lipolytica*

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