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THE EFFECTIVE METHOD OF DESTROYING THE CELL WALL OF CAROTENEPRODUSED YEAST XANTHOPHYLLOMYCES DENDRORHOUS *(PHAFFIA RHODOZYMA)*

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In industrial production there are many problems deals with the caroteneprodused yeast *Xanthophyllomyces dendrorhous (Phaffia rhodozyma)*. Their durable cell wall makes it difficult to release carotenoids which used in the production of food dyes and the bioavailability of cell components used as a feed additive and enterosorbents. The destruction of the cells is carried out by enzymatic hydrolysis, sometimes with the using of acids and alkali, or mechanical methods. These methods are cost and ecologically hazardous. They do not provide the complete destruction of cells, complicating the obtaining of cell walls preparations and impairs the carotenoids extraction from yeast biomass. Therefore the aim of our study was to develop an effective method of destruction of the cell wall of the yeast *P. rhodozyma*, which would be available and suitable for use in research laboratories and at the enterprises of microbiological industry.

The autoclaving of yeast *P. rhodozyma* (strain KNH 1) biomass as one of the methods of destroying of cell wall have been chosen. The culture of yeast was washed with distilled water after fermentation and centrifuging. The aqueous suspension and dried biomass were autoclaving at a pressure of 0.05 MPa and 0.07 MPa for 20 minutes and the initial titer of autoclaving suspension by the method of dilutions and sowing on Petri dishes with barley wort-agar was determined. Dishes withstand for 6-7 days in an incubator at 20° C and the percentage of cell survival was calculated.

The survival of cell from wet biomass of yeast after autoclaving at a pressure of 0.05 MPa was less than 0.001% and after autoclaving at a pressure of 0.07 MPa was less than 0.000001%. Instead the cell survival increased by 25% under the processing of dry biomass at a pressure of 0.05 MPa and by 0.00001% at a pressure of 0.07 MPa. The microscopy showed that yeast cells after autoclaving were dead, but not destroyed. Extraction of carotenoids from the yeast biomass was incomplete.

The next step of our research was to study a different method of yeast cell walls obtaining using a force low cavitator (National University "Lviv Polytechnic"). The cultivation was carried out for 4, 5 and 6 days on a shaker (200 rev/ min), 20º. The destruction of the yeast biomass was performed by cavitathion with water cooling capacity of 800 W and different resonant frequencies of vibrations ─ 30 Hz, 35 Hz, 37 Hz, 37.8 Hz, 39 Hz, 50 Hz in the presence of N_2 in the reaction medium (0.2 cm^3/s). Analysis of survival (%) and destruction (%) of cells was performed by sowing the titer of intact cells and treated cells under the different duration of ultrasonic cavitation on 5 % wort-agar medium.

The destruction of cells was find about 99.7 % in 30 Hz mode during 30 minutes and 99.9 % for 1 hour for 4-day culture. The destruction of cells was 99,6 ± 0,02% for the regime 37-37,8 Hz during 60 min for 5-day culture. The treatment of 39 Hz within 45 minutes was optimal for destruction of 6-day culture of yeast.

The duration of yeast biomass processing was reduced when bubbling N_2 in the reaction medium. For 5-day culture the destruction of cells was more than 99.7% for 37 Hz frequency in the presence of gas, while for 6-day culture under the same conditions and time the damage of 99.6% cell was observed. Extraction of carotenoids from the yeast biomass under all these regimes was possible.