COMPARATIVE ANALYSIS OF GROWTH PARAMETERS AND CULTIVATION OF THE SACCHAROMYCES CEREVISIAE S288C YEAST STRAIN IN VARIOUS MEDIA

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The aim of the study is to investigate the optimal conditions for the cultivation and proliferation of the yeast strain Saccharomyces cerevisiae S288c.

Materials and methods. The object of this study was the yeast strain Saccharomyces cerevisiae S288c. This strain was cultivated in standard Sabouraud nutrient medium as well as in nutrient media prepared from vegetable and food processing waste. The growth dynamics of the yeast cells were analyzed using microscopic and spectrophotometric methods.

Research results. At the initial stage of the study, Saccharomyces cerevisiae S288c yeast cells were cultured in Sabouraud medium. The growth dynamics of the yeast were measured at 12-hour intervals by determining the optical density at a wavelength of 600 nm using a spectrophotometer. Based on the obtained OD600 values, a yeast growth curve was constructed. Cell morphology was observed using light microscopy.

Based on the obtained results, a growth curve for the S. cerevisiae S288C strain was constructed. The active phase of logarithmic growth was observed within the time interval from 12 to 60 hours. After 72 hours, the culture entered the stationary phase, followed by a decline in optical density, indicating the onset of the degradation phase (table 1).

Table 1 Growth dynamics of the yeast S288c on Sabouraud nutrient medium

Time (hours)	Optical density (OD600)
0	0.08
12	0.22
24	0.55
36	0.91
48	1.2
60	1.35
72	1.4
84	1.32
96	1.25

The morphology of fungal cells was analyzed in stained preparations. Within the first 12 hours, a small number of round cells were observed. During the period from 24 to 48 hours, active budding of the yeasts was observed, and the cells formed aggregates. At 72 hours and later time points, an increased number of vacuolated and disintegrating cells was recorded.

After activation of the S288c strain of yeasts in Sabouraud medium, it was re-inoculated into nutrient media prepared from potatoes, beets, and food waste, and a comparative analysis of cell growth in different nutrient media was conducted. Optical density (OD600) was measured every 12 hours at a wavelength of 600 nm (table 2).

Table 2 Determination of optical density (OD600) using a spectrophotometer

Time (hours)	Potatoe	Beet	Food waste
0	0.09	0.08	0.1
12	0.2	0.17	0.22
24	0.51	0.45	0.54
36	0.9	0.82	0.93
48	1.22	1.11	1.3
60	1.37	1.26	1.41
72	1.4	1.29	1.43
84	1.35	1.21	1.4
96	1.3	1.15	1.35

In the medium prepared from food waste, the cells maintained morphological integrity until the end of the experiment, whereas in the media prepared from beets and potato tubers, signs of cell wall destruction were observed after 72 hours (Figure 1).

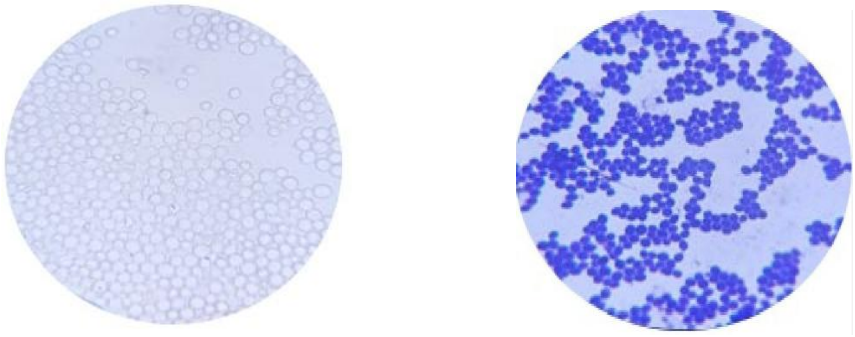

Figure 1. Microscopic analysis of the S288c strain of yeast

Conclusion

The results indicate that nutrient media prepared from all studied types of plant products can be used for the cultivation of the S288c yeast. The highest growth indicator, with a maximum OD600 of 1.43, was achieved in the medium prepared from food waste. This is associated with the rich chemical composition of the waste mixture, which contains various micro- and macroelements.