

TITLE: BIOCONVERSION OF AGROINDUSTRIAL RESIDUES FOR PROTEIN PRODUCTION BY *YARROWIA LIPOLYTICA* QU69

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ABSTRACT:

As the population grows there is an increasing demand for food and, as a consequence, for alternative sources of protein food. Heterologous proteins are extracted from microbial biomass and can be employed as nutritional supplement. They can be obtained from a great variety of substrates, as agroindustrial residues, enabling their production in different regions, at any weather condition, requiring little amount of water or space. *Yarrowia lipolytica* is classified as GRAS; it can naturally secrete proteins. This yeast presents a high growth rate and biomass yield and it can be grown in diverse substrates at low cost. *Yarrowia lipolytica* was used to add nutritional value to different agroindustrial residues by means of bioconversion. Submerged fermentation was employed in a NaNO₃ 1%, KH₂PO₄ 0,1%, MgSO₄.7H₂O 0,05% medium supplemented with 5% agroindustrial waste as a carbon source and 1mL inoculum. The yeast was cultured in GYP Agar at 28°C for 48h and suspended in saline solution to final concentration of 2 x 10⁶ CFU mL⁻¹. The process was performed on a rotary shaker (150 rpm) at 30°C for 9 days. After the fermentation process, the biomass was centrifuged and the pellet was dried in a hot air oven at 100°C for 24 h. Nitrogen was measured in order to determine the protein content in the residues and biomass according to Kjeldahl method. The results are presented in Table 1.

Table 1 – Protein contents in agroindustrial residues before and after 9 days of submerged fermentation

Carbon source	% Residue protein*	% Biomass protein*	% Protein gain
Orange pulp	6.1 ± 0.3	17.1 ± 5.8	180
Potato skin	14.1 ± 0.5	17.1 ± 2.4	13
Banana skin	5.4 ± 0.2	15.2 ± 1.0	181
Sweet potato skin	3.6 ± 0.3	22.5 ± 1.9	525
Orange peel	4.6 ± 1.0	12.4 ± 0.7	130
Cassava peel	8.0 ± 0.3	28.9 ± 0,1	261
Passion fruit peel	5.8 ± 0.2	8.9 ± 0.4	53
Melon peel and seeds	11.6 ± 0.3	13.7 ± 6.7	15
Banana stem	4.2 ± 0.6	12.0 ± 3.8	186

*Data are mean values of triplicate analysis ± standard deviation.

The results of this study indicate that using submerged fermentation to produce biomass from *Yarrowia lipolytica* QU69 would add nutritional value to agroindustrial residues and could be an alternative to increase non-conventional food availability.

Keywords: Yeasts, nutritional value, non-conventional food