

THESIS INFORMATION

Title : Research on selecting *Rhodotorula* have synthesis ability of beta-carotene on solid state media to supplement for laying hens

Major : Food and Beverage Technology

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Abstract:

By using solid state fermentation, we change rich and cheap material in Vietnam into nutrient material with high biological activity, improve productivity and quality poultry products. The specific subject to be studied is the yeast *Rhodotorula* sp.3 isolated from rice leaf surface. We carried out the experimental surveys on both lab mice and laying hens to evaluate the safety and the effect of bio-products when adding it to animal feed. Bio-products from *Rhodotorula* sp.3 (called β CR) can increase egg productivity and quality.

Main results:

With the initial objectives, after the research period we have achieved the following results as:

1. Chose strain MN12 (*Rhodotorula* sp.3) of that had isolated from rice leaf surface in Tan An, Long An. *Rhodotorula* sp.3 has the ability to synthesize biomass enrich carotenoid pigments especially beta-carotene and phytase activity by solid state culture method.

2. Determined method for treatment yeast cells in solid state media (by freezing- thawing- ultrasound) to extract beta-carotene into yeast cells.

3. Determined the optimal parameters for solid state culture yeast *Rhodotorula*, and examined synthesis growth of biomass, phytase, beta-carotene and total carotenoids at the optimal nutritional supplements and solid state fermentation conditions.

4. Established the process of collecting bio-products from *Rhodotorula* by solid state fermentation technique with broken rice as the main substrate. We have already analyzed the nutritional compositions of β CR products.

5. After testing the safety of bio-products on lab mice, we applied β CR bio-products as a nutritional supplement source into feed and tested on industrial hens *Isa Brown* to increase egg productivity and quality.

6. Established the equation expresses the interrelation between total carotenoid content in feed and the egg productivity of hens in the stage of egg productivity of hens is high and stable.

Science contributions of the thesis

- Isolating and selecting the strains of yeast *Rhodotorula* has synthetic ability carotenoids with high beta-carotene content, biomass and phytase by solid state culture.
- Optimizing nutritional supplements and solid state culture's conditions on the main substrate as rice and soybean residue and with the objective function as beta-carotene content. We also proposed the process for collecting bio-product with high nutrient value from the yeast *Rhodotorula* by solid state culture techniques.
- Testing on industrial laying hens and the result is that bio-products can increase productivity and quality of eggs.
- Finding out the equation of the interrelations between total carotenoid content in feed and egg productivity of *Isa Brown* hens.

Suggest for the continued studies

The optimal results of solid state fermentation of yeast *Rhodotorula* in thesis were conducted in laboratory scale. In fact, solid state fermentation at industrial scale will depend on other factors, in which the aeration is a very important role. Therefore, we suggest the research should be continued on the following topic:

- Investigate the pigments from *Rhodotorula* sp.3 in the food and pharmaceutical products for human consumption.
- Raising the density of the bio-products to reduce the rate of additional food and experimental study on poultry and other animals that need pigments such as drought fish, salmon, shrimp, ... in large-scale in order to step by step commercialize products.
- Investigate the effect of the aeration in solid state fermentation of *Rhodotorula* at industrial scale to bring products from the laboratory into industrial production.

Results from above studies will be useful to contribute to providing enough standards food for poultry and for development of national economy in the future.

Advisors

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