

Panida Thongpradis 2014: Characterization of Yellow Pigments and Glucoamylase Production of Mutants and Fusants Derived from *Monascus kaoliang* KB9 Yellow Mutant and White Mutant. Master of Science (Microbiology), Major Field: Microbiology, Department of Microbiology. Thesis Advisor: Professor Busaba Yongsmith, Dr.Eng. 159 pages.

*Monascus kaoliang* yellow mutant (KB20M10.2) can produce the innovative single yellow pigments absorbance at 370 nm, anticholesterol agent or monacolin K and antioxidant or phenolic compounds but it shows slow growth and low glucoamylase. Improvement of yellow pigment producing *Monascus* sp. KB20M10.2 had been carried out by techniques of protoplast mutation and protoplast fusion between slow-growing yellow mutant and fast-growing non-monacolin K producing white mutant. As a result, 2 UV mutants (U2.3 and U2.5) and 16 fusants (F7, F10, F19, F20, F21, F26, F27, F31, F35, F36, F38, F39, F41, F43, F45 and F47) have been selected to further studies on their physiological fermentation using solid as well as submerged cultures. The results showed protoplast mutants (U2.3 and U2.5) and fusants (F7 and F10) could grow and produce glucoamylase and pigments higher than *M. kaoliang* KB20M10.2. While fusant F43 produced pigment lower than *M. kaoliang* KB20M10.2 but showed its highest growth and glucoamylase activity among these 6 strains used.

The optimal conditions for solid fermentation on broken-milled rice were studied. The results showed that 38% initial moisture, initial pH 5 and 35 °C incubation temperature were the best conditions for growth, glucoamylase and yellow pigment production of various *M. kaoliang* strains used. In addition, at low temperature about 23-26 °C *M. kaoliang* showed multipeak absorbance at 320, 370 and 500 nm.

Moreover, *M. kaoliang* protoplast mutants and fusants produced monacolin K and antioxidant compounds. Protoplast mutants U2.3 and U2.5 could produce monacolin K while U2.3 U2.5 F7 and F10 had antioxidant activities and total phenolic compound higher than *M. kaoliang* KB20M10.2

Ready-to-use product of fermented rice was examined for subsequent processing of storage stability. The results showed that the amount of pigments in fermented rice were quite stable by steaming at 100 °C 20 min for growth inactivation, drying at 60 °C overnight and storing in the room temperature or the refrigerator (2-4 °C).

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Thesis Advisor's signature