EFFECTS OF DENSE PHASE CARBON DIOXIDE ON PHYSICAL AND CHEMICAL PROPERTIES OF CHRYSEOBACTERIUM SP. LV1 FROM LITOPENAEUS VANNAMEI

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Dense phase carbon dioxide (DPCD) is one of the non-thermal processing technologies and widely used to inactivate microorganisms and enzyme. Chryseobacterium sp. LV1 is one of the dominant bacteria from Litopenaeus vannamei. In order to provide the reference for processing shrimp by DPCD, Chryseobacterium sp. LV1 was subjected to DPCD treatment and physical and biochemical properties were determined, such as pH by pH-meter, the extracellular protein content by Lowry method, the leaking of intracellular nucleic acid by ultraviolet-visible (UV) spectrophotometer, protein composition by SDS-PAGE electrophoresis, 15 enzyme activities by API ZYM. When Chryseobacterium sp. LV1 was treated by DPCD at 45℃ or 55℃ and 15 MPa for 30 min, changes of physical and biochemical properties were as follows: pH of bacterium suspension decreased from 6.97 to 5.58 and 5.56. The extracellular protein content increased from 78.69 µg/mL to 151.91 µg/mL and 157.40 µg/mL because cellular membrane permeability was changed and intracellular small molecular proteins were exuded. The UV absorption value increased in the range of 200-400 nm and the absorption value of supernatant was twice as the non-treatment at 260 nm because of the leaking of intracellular nucleic acid. The soluble proteins decreased and the insoluble proteins increased. Alkaline phosphatase from Chryseobacterium sp. LV1 was not inactivated and other 14 enzymes were inactivated. These results showed that Chryseobacterium sp. LV1 can be inactivated by DPCD because of the changes of the physical and biochemical properties. When Chryseobacterium sp. LV1 was subjected to DPCD at 45℃ or 55℃ and 15 MPa for 30 min, a 5-log reduction of aerobic bacterial count was achieved.