ABSTRACT

Mangrove crab (Scylla serrata) is a high-value fishery commodity with increasing global demand, but the larval stage often experiences low survival rates due to essential nutrient limitations and the instability of vitamin C, which is easily degraded during storage or application to aquatic media. This study aims to evaluate vitamin C encapsulation systems in asolectin-based liposome (CAL) and Caulerpa lentillifera polysaccharide (CLL) matrices as innovations to improve the stability and effectiveness of nutrients for mangrove crab larvae. The study was conducted in three stages. First, the isolation and characterization of C. lentillifera polysaccharides included analysis of functional groups, proximate composition, mineral content, and molecular weight. Second, vitamin C was encapsulated into CAL and CLL, then analyzed for encapsulation efficiency, release rate, particle size, and zeta potential. Third, the encapsulation formulation was applied as a nutritional supplement for S. serrata larvae for 17 days. The results show that C. lentillifera polysaccharides from Karawang have a yield of 16.6% with ulvan-type sulfated polysaccharides and a molecular weight of 20.1 kDa. Vitamin C encapsulation efficiency is high, at 96.97% in CAL and 96.59% in CLL. The vitamin C release profile in CAL was gradual and controlled, while CLL was higher and less controlled. The application of supplements increased the survival rate of larvae, by 2.21% (CAL) and 1.09% (CLL), respectively, and changes up to the 17th day of the megalopa stage. The control formulation experienced complete mortality on day 7. Encapsulation of vitamin C in liposomes and polysaccharides affects the survival and development of mangrove crab larvae, thus having the potential to be applied as an innovative nutritional supplement in S. serrata crab farming.

Keywords*: Vitamin C, liposomes, Caulerpa lentillifera, Scylla serrata*