

Abstract

The neutral red assay (NRA) measures retention time of the neutral red dye in the hemocyte organelle, the lysosome, which can be correlated to the condition of a mussel under stressful circumstances. Shelf life and standard meat yield also provide an indication of mussel physiological condition. The objectives of this study were to evaluate mussel stress response, as assessed by the NRA and shelf life, in relation to (1) seasonal and environmental changes, (2) handling, (3) processing, and (4) post-harvest storage practices. Neutral red retention (NRR) levels (a measurement of stress response) and shelf life in mussels were reduced in late summer compared to early summer, and increased in autumn/early winter, indicating a seasonal pattern in NRR levels. NRR also showed a correlation to the reproductive cycle (spawning). Harvested mussels exhibited a decrease in NRR during extended air exposure (up to 8 hours), especially when held at air temperatures above and below air temperatures comparable to ambient water temperatures. NRR was altered in mussels that were washed and declumped compared to unprocessed mussels. However, the process of debyssing significantly decreased NRR in mussels. Mussels held under chilled or iced storage conditions displayed lower NRR levels compared to those of mussels held under wet storage. These results demonstrate that the NRA is a useful index of physiological stress response in mussels subjected to conditions under various culture conditions and practices. Researchers and growers to define conditions that are beneficial or detrimental to optimal mussel culture production can use the NRA.