SUMMARY

Bivalve molluscs are filter-feeding animals that, during their filtration process, may accumulate microorganisms potentially pathogenic for humans. Aim of this project is to better understand the relationship between animal production environment and animal health (expressed through indicators of the immune system), and apply these notions to purification, a crucial point of shellfish production chain. A production area in Lazio Region was selected and a sanitary survey was carried out to identify the different contamination sources, following indications and criteria expressed in EU Community documents. Following this activity, three representative sampling points were identified and shellfish samples to be used in project activities were taken from these points. These activities included the evaluation of hemocytes parameters, oxidation and amoebic activity, whose variations was studied in association to environmental variables and treatments normally applied in post-harvest stages (e.g. purification, finishing and storage under refrigeration). The variation of the hemocytes parameters was also evaluated during shelf-life of the product. Finally, on the basis of the data obtained in the previous tests, the variability and effectiveness of the purification processes towards pathogenic microorganisms (virus and *Vibrio*) was evaluated.

Overall, the evidence obtained in the analysis of the hemocytes response suggests that the measured parameters do not respond to minimum external variations such as those of purification processes and storage in refrigerated marine water, while, apparently, respond quickly to important external variations (particularly related to hypoxia/anoxia conditions) such as those of conventional storage conditions in refrigerators. Results in experimental purification of different shellfish species under standard conditions and in closed-circuit systems revealed that, even in the presence of a favorable physiological status and the substantial invariance of that status during the purification process, this process shows a limited efficacy for reducing viral contamination (Norovirus) and pathogenic microorganisms autochthonous of the marine environment (*V. parahaemolyticus*).

Based on the present study we suggest the use of hemocytes parameters, and especially the circularity parameter, in the monitoring of the homeostatic conditions of organisms during cold storage and in all situations involving hypo/anoxic stress. In relation to the limited efficacy of purification processes, it should be underlined that the proper assessment of environmental contamination sources in production areas and their appropriate management is to be considered a preferred strategy to ensure product safety.