**PhD:** Food Science and Technology

**Title:** Bacterial quorum sensingandeffect of microencapsulation

**Proposing supervisor:** Gianluigi Mauriello

**Objectives of the research project and interdisciplinary collaborations**:

The quorum sensing (QS) system is a rapidly developing field in which understanding of how bacterial cells communicate with each other and how they regulate their activities in bacterial sociality is gradually expanding. The knowledge on this system can be implemented in different contexts, from medical to biotechnological ones, for the industrial production of metabolites or for food processing. The result of the research project will be to identify the QS mechanisms between microorganisms of the same species and microorganisms of different species, with the aim of implementing strategies for the use of bacterial cultures, starter or non-starter, to improve the safety of food, promote biotechnological processes of food transformation and improve food shelf life. Furthermore, due to the known influence of spatiality in the expression of the QS, microencapsulation will be experimented as a system for its modulation.

**Innovation and originality of the project in relation to the state of the art**:

Although the quorum sensing (QS) system has been revealed since many years, it is believed that many specific mechanisms are still unknown and that many signalling molecules involved in these mechanisms are still to be clarified. Furthermore, the experiences of applying quorum sensing systems to food processing are mostly limited to the use of bacteriocin-producing strains. In fact, bacteriocins are molecules recognized as involved in some QS mechanisms. Finally, the use of microencapsulation as a modulation system for quorum sensing mechanisms is completely neglected in the current literature.

**Grant availability** (funds to support the research activities):

Some research projects in collaboration with private companies funded with about 150.000 € along three years of PhD program

**Collaborations with foreign institutions** (max 500 characters):

* AN-Najah National University (Palestine)
* Wageningen University (The Netherland)
* Chr-Hansen (Denmark)