# Microbiology of dairy and meat food

# PROF. VANIA PATRONE

***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

The aim of the course is to give the students a thorough knowledge on the role of microorganisms in the production of dairy and meat food. At the end of the course, students will gain insight into the major sources of microbial contamination in dairy and meat products, the microbial processes involved in the manufacture and preservation of these foods of animal origin, and will understand the selection criteria for starter cultures. Students will be able to analyze critically all those factors regulating the growth and survival of microorganisms in dairy and meat food, and to select the most effective approaches to exploit the pro-technological potential of microbial cultures as well as to control spoilage microorganisms. Lastly, students will acquire additional knowledge on microbiological analysis on organisms relevant for dairy and meat products.

***COURSE CONTENT***

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| Composition and microbiological characteristics of raw milk. Effect of storage and processing on milk microbiota and the quality of dairy products. Microbiology of cream and butter. Microbiological aspects of fermented milks. Cheese-making: principles of production and principal microorganisms involved in the manufacture and ripening of cheese. Starter microorganisms and secondary cultures. Bacteriophages in the dairy environment. Microbiology of specific cheese varieties: soft and hard cheese, bacterial internal –surface ripened, mould-ripened. Microbial cheese spoilage and control methods. | 3 |
| Fresh meat: composition and microbiological aspects. Conservation techniques and related microbiological problems. Main alteration processes. Non-fermented meat products: microbiological and technological aspects. Fermented meat products: principal microorganisms involved in the manufacture and ripening. Starter cultures. | 2 |
| PRACTICALS: practical experience in laboratory and dairy and meat product factories | 1 |

***READING LIST***

Marth E.H., Steele J.L., Applied dairy microbiology, Marcel Dekker Inc., 2001.

Toldrá F, Hui Y. H., Astiasaran I., Sebranek J., Talon R., Handbook of Fermented Meat and Poultry, Wiley Blackwell, 2014.

E-books and \*.pdf documents will be indicated during the course and uploaded to Blackboard.

***TEACHING METHOD***

The teaching method is mainly based on classroom lectures where course topics will be covered along with several applied examples. Lectures will be delivered to students by means of PowerPoint presentations that will be uploaded by the instructor to blackboard. These resources are integral part of the course educational material. Practical experience will be performed during laboratory sessions; major analytical methods for microbiological quality control will be applied by students working in small groups of 2-3 persons. A written laboratory report should be presented before sitting the final exam. In addition, field visits to dairy and/or meat products factories will be arranged to enhance classroom learning by making real food production world connections.

***ASSESSMENT METHOD AND CRITERIA***

The exam will be held in written or oral form at the choice of the candidate on the topics developed during the theoretical and practical lectures in the classroom and in the laboratory/production factories. Each candidate receives a minimum of three general questions. Score will reflect the effective knowledge of the subject and good overall handling of the matter as well as the ability to make connections between different topics.

***NOTES AND PREREQUISITES***

Lesson frequency is not mandatory, but highly recommended. Students are asked to possess basic knowledge on applied agri-food microbiology.

***OFFICE HOURS FOR STUDENTS***

Prof. Vania Patrone is available to meet students at the Department for Sustainable food process (ex Istituto di Microbiologia). To schedule a meeting, students should email the professor for an appointment.