

## **Louis Pasteur, benefactor of agriculture and food**

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In December 2022, the bicentenary of Louis Pasteur's birth is commemorated, and also the 150<sup>th</sup> anniversary of his election to the French Academy of Agriculture in 1872. He is famous all over the world for his discovery of the rabies vaccine. However, in the 1850-1880s, his research led to considerable improvements in food and livestock production. On December 14 an Académie d'agriculture de France symposium was dedicated to Pasteur's essential discoveries for making food healthier and curing animal diseases.

The communications of this symposium met two objectives: to shed light on Pasteur's thought process and to show the future of Pasteur's ideas. How and why did this chemist, who devoted his thesis to molecular dissymmetry, embarked on the study of fermentation, which led him to the microbiology of food? Professor of chemistry at the University of Lille (1854-1857), he was drawn into the study of fermentations at the request of the beet industry. He realised that each type of fermentation was due to a specific living microorganism that must be preserved from other competing fermentations. Through strict hygiene, the fermentation of beer and wine could be controlled. Pasteurisation made it possible to destroy undesirable microbes and preserve the treated foodstuff. This understanding of the fermentation process paved the way for the rationalisation of food preservation processes.

Some years later he had to accept research on silkworm disease. Difficult and patient observations (1863-1868) made him realise that the disease was already present in the eggs; he proposed a method of selecting silkworm seeds which was adopted and continues until today. He was thus drawn into the study of animal pathogens, diseases against which he invented vaccines by attenuating the microbe: chicken cholera and sheep anthrax in the 1870s.

A hard worker, he developed a methodology, handling products and materials, examining them under the microscope. By moving from one subject to another, he accumulated know-how. His discoveries were the result of a very rigorous scientific reasoning which allowed him to decide between the contradictory hypotheses formulated at the time, and to present a coherent theory on microbial life. Moreover, he knew how to train collaborators, attracting scientists from other countries.

The future of Pasteur's discoveries and hypothesis was also questioned during the symposium. The proof of the presence of microbes and the controversy of spontaneous generation led to the search for the emergence of life. The observation of the spread of anthrax in the soil gave rise to the study of soils. Pasteur also laid the foundations for biological pest control, which is in full development nowadays. Thanks to him, humanity entered the era of the domestication of microbes.

One of Pasteur's research main features was that he combined basic research and applied research for innovation and this is why his achievements were so beneficial to humanity.