

Microorganisms can have beneficial or problematic influences on humans. There are many more beneficial microbes than the problematic, pathogenic ones, but emphasis is applied on researching the pathogenic microbes. Today, we succeed in controlling the infectious agents significantly compared to the 20th century.

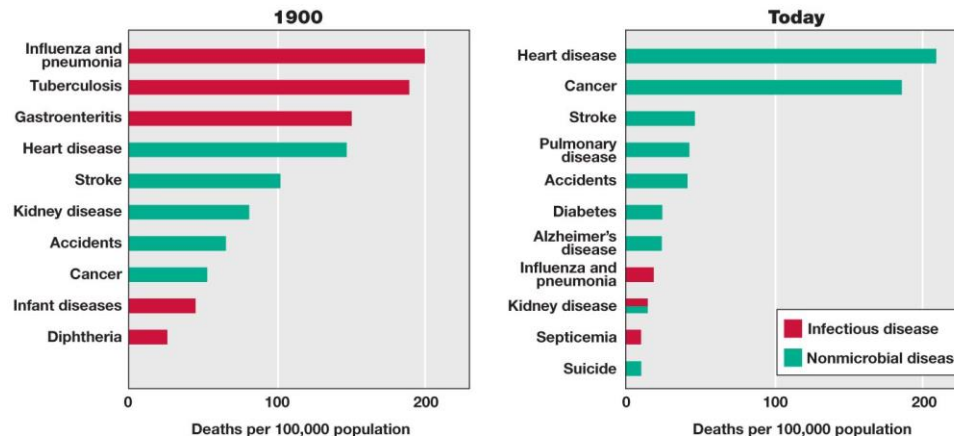


Figure 1.6: United States of America's (USA) death rates per 100,000 population caused by the leading infectious agents in 1900 compared to today (2019). There is a significant decrease in the population deaths caused by infectious microbial diseases.

Medicinally, microbes are widely used in the production of antibiotics, antifungals, enzymes, hormones such as insulin via biotechnological breakthroughs, and in the development of antibacterial bacteriophage treatments & new biotechnology procedures.

Agriculturally, some microbes are responsible for the nitrogen cycle where they play a role in nitrogen fixation and aid the growth and development of leguminous plants, they enable the degradation of cellulose in the rumen of ruminant animals, and regeneration of nutrients in the water and soil. Negative aspects involve around the pathogenesis caused to animals and plants.

In the food industry, microbes are predominantly responsible for the spoilage of foods which led to a demand in research of preservation methods, however, some organisms are responsible for the production of dairy products such as cheeses, yoghurts, sauerkraut, as well as beers, pickles and breads.

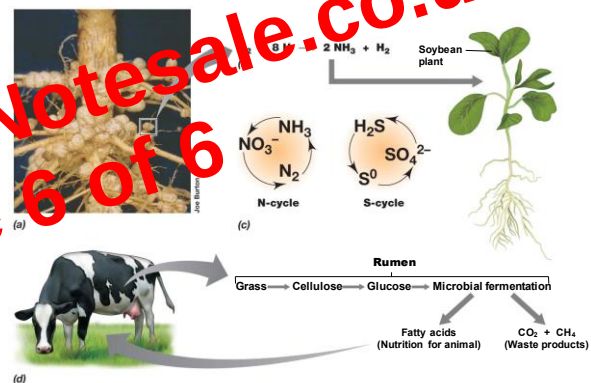


Figure 1.7: Nitrogen fixation process (a) and cellulose degradation process in the rumen of grazing animals.

Microbes are used to produce biofuels such as methane, ethanol and hydrogen, as well as for bioremediation – the process of cleaning pollutants.