

## Habilitation thesis commentary

The habilitation thesis named "Systematics of the genus *Enterococcus*" represents a collection of previously published scholarly works with commentaries. All these studies focus on different aspects of enterococci and show applicant's contribution to the general knowledge of taxonomy and ecology of the genus *Enterococcus*.

Bacteria of this genus represent ubiquitous organisms occurring in a wide variety of habitats (fresh and marine waters, soil, water and terrestrial plants, invertebrates as well as vertebrates) and are also a common and desirable part of human's gastrointestinal tract. They are also isolated from food, especially from meat, dairy and plant food fermentations, and they have a positive impact on organoleptic characteristics of these products. In contrast, enterococci produce a variety of virulence factors and reveal high intrinsic and acquired resistance to multiple antibiotics and frequently cause hospital-acquired infections in immunocompromised patients, in patients receiving surgery or in patients with severe underlying diseases. Due to their dual significance for humans, they represent an important bacterial group attracting the attention of clinical, food and environmental microbiology and biotechnology.

This habilitation thesis is comprised of 18 scholarly works (published between 1999 - 2017) contributing to the taxonomy, identification, ecology, clinical microbiology and our general knowledge of the genus *Enterococcus*.

Nine taxonomic works (studies 11.2, 11.6, 11.7, 11.8, 11.9, 11.11, 11.13, 11.14, 11.15) describe 12 novel *Enterococcus* species isolated from waters (fresh and marine), terrestrial plants and animal sources (dogs, birds, cattle, termites, mosquitos). All these novel species were described by using a polyphasic taxonomic approach implementing wide variety of phenotypic and genotypic characteristics and were validly named according to the International Code of Nomenclature of Bacteria. Other three studies deal with the application and evaluation of DNA fingerprinting (ribotyping, rep-PCR) and sequencing (*sodA* gene) methods for identification of enterococcal species (studies 11.3, 11.5, 11.12). Ecological aspects of the genus were investigated and described in three additional studies dealing with enterococcal isolates from waters, garden snails and coraciiform birds (studies 11.1, 11.4, and 11.17, respectively). The last three studies cover further aspects of the genus. Study 11.10 describes an investigation of *Enterococcus haemoperoxidus* and *Enterococcus moraviensis* strains in terms of their antibiotic resistance, urease production and bacteriocin production and susceptibility, that are of biotechnological and food microbiology interest. Study 11.16 reports small colony variant *Enterococcus faecalis* isolated from a relapsing endocarditis case thus contributes to our knowledge of clinical relevance of the genus. Remaining study 11.18 describes the occurrence of vancomycin-resistance genes in enterococci isolated from Australian gulls which contributes to our knowledge of the spread of antibiotic resistance genes in the environment.

Applicant's contribution in terms of content is given (as total percentage values) directly in the thesis part 11 containing commentary of individual studies. In terms of quality, the applicant's contribution is given below.

**Study 11.1.** The applicant conceptualized the study, performed 60 % laboratory experiments (biotyping), analysed and evaluated obtained results, wrote 70 % of the first draft of the paper and led work on paper revisions.

**Study 11.2.** The applicant conceptualized and directed the study, performed 25 % laboratory experiments (biotyping, partially tDNA-PCR and DNA-DNA hybridization), co-ordinated the experiments performed by the other co-authors, analysed and evaluated obtained results, wrote 60 % the first draft of the paper and led work on paper revisions.

**Study 11.3.** The applicant conceptualized and directed the study, performed 60 % laboratory experiments (ribotyping), analysed and evaluated obtained results, wrote 80 % of the first draft of the paper and led work on paper revisions.

**Study 11.4.** The applicant conceptualized and directed the study, performed 30 % laboratory experiments (biotyping, partially tDNA-PCR and DNA-DNA hybridization), co-ordinated the experiments performed by the other co-authors, analysed and evaluated obtained results, wrote 70 % of the first draft of the paper and led work on paper revisions.

**Study 11.5.** The applicant conceptualized, performed 70 % laboratory experiments (rep-PCR fingerprinting), analysed and evaluated obtained results, wrote 60 % of the first draft of the paper and led work on paper revisions.

**Study 11.6.** The applicant performed DNA-DNA hybridization and collaborated on the data analyses and on the paper revisions.

**Study 11.7.** The applicant conceptualized and directed the study, performed 30 % laboratory experiments (biotyping, rep-PCR fingerprinting), co-ordinated the experiments performed by the other co-authors, analysed and evaluated obtained results, wrote 70 % of the first draft of the paper and led work on paper revisions.

**Study 11.8.** The applicant conceptualized and directed the study, performed 30 % laboratory experiments (biotyping, rep-PCR fingerprinting), co-ordinated the experiments performed by the other co-authors, analysed and evaluated obtained results, wrote 60 % of the first draft of the paper and led work on paper revisions.

**Study 11.9.** The applicant conceptualized and directed the study, performed 30 % laboratory experiments (biotyping, rep-PCR fingerprinting), co-ordinated the experiments performed by the other co-authors, analysed and evaluated obtained results, wrote 70 % of the first draft of the paper and led work on paper revisions.

**Study 11.10.** The applicant collaborated on the data evaluation, wrote 15 % of the first draft of the paper and collaborated on paper revisions.

**Study 11.11.** The applicant conceptualized and directed the study, performed 40 % laboratory experiments (rep-PCR fingerprinting, ribotyping, partially biotiping), co-ordinated the experiments performed by the other co-authors, analysed and evaluated obtained results, wrote 70 % of the first draft of the paper and led work on paper revisions.

**Study 11.12.** The applicant collaborated on the conceptualization and direction of the study, collaborated on the data analyses and evaluation, wrote 15 % of the first draft of the paper and collaborated on paper revisions.

**Study 11.13.** The applicant collaborated on the conceptualization and direction of the study, partially co-ordinated the experiments performed by the other co-authors, collaborated on the data analyses and evaluation, wrote 10 % of the first draft of the paper and collaborated on paper revisions.

**Study 11.14.** The applicant collaborated on the conceptualization and direction of the study, performed 10 % laboratory experiments (rep-PCR fingerprinting), partially co-ordinated the experiments performed by the other co-authors, collaborated on the data analyses and evaluation, wrote 10 % of the first draft of the paper and collaborated on paper revisions.

**Study 11.15.** The applicant collaborated on the conceptualization and direction of the study, performed 15 % laboratory experiments (rep-PCR fingerprinting, ribotyping), collaborated on the data analyses and evaluation, wrote 25 % of the first draft of the paper and collaborated on paper revisions.

**Study 11.16.** The applicant performed 20 % laboratory experiments (rep-PCR fingerprinting, auxotrophy testing), collaborated on the data evaluation, wrote 15 % of the first draft of the paper and collaborated on paper revisions.

**Study 11.17.** The applicant performed 10 % laboratory experiments (rep-PCR fingerprinting), collaborated on the data analyses and evaluation, wrote 15 % of the first draft of the paper and collaborated on paper revisions.

**Study 11.18.** The applicant performed 10 % laboratory experiments (ribotyping), collaborated on the data analyses and evaluation, wrote 10 % of the first draft of the paper and collaborated on paper revisions.

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in Brno, November 19, 2020