

## PhD in AGRIFOOD AND ENVIRONMENTAL SCIENCES

### CALL 2026 – CYCLE 42

**Tentative title:** Microbiological, Phylogenetic and Functional Characterization of Wild and Historical Brewing Yeasts

**Acronym:** Yeast Hunting

**Co-funding body:** Eurac Research – Institute for Mummy Studies

**Registered office:** Viale Druso 1, 39100 Bolzano

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**Supervisor 2:** Frank Maixner ([eurac](#))

#### **Context / Synthetic description of the project**

**Overview:** This PhD project aims to explore and revive historical yeast biodiversity associated with South Tyrolean brewing infrastructures from the late 19<sup>th</sup> to early 20<sup>th</sup> century. The project is based in the concept of “yeast hunting,” which seeks to recover and characterize wild and domesticated yeast strains that disappeared following the introduction of pure culture techniques. Through systematic outdoor sampling of historical brewery sites, surrounding environments, and preserved materials, the project will isolate diverse yeast populations. These isolates will undergo microbiological cultivation, molecular and genomic characterization, and phylogenetic analysis to reconstruct their evolutionary relationships and functional traits. By integrating microbiology, genomics, and applied fermentation, the research will provide insights into yeast domestication, biodiversity, and ancient (historical) fermentation practices. Ultimately, the project will contribute to both basic microbial ecology and applied biotechnology, with potential applications in fermentation industries through the development of novel or reconstituted mixed cultures (“Stellhefen”) that reflect historical brewing traditions.

This PhD is part of the project „Renaissance of historical beer culture in South Tyrol - "Yeast hunting in South Tyrolean brewery infrastructures from the late 19th to the early 20th century" funded by the Autonomous Province of Bolzano/ Bozen South Tyrol in the framework of the program „Research Südtirol/Alto Adige“ 2024. **CUP D53C24006580003**

#### **Project goals (bullet points; max 100 words):**

- Isolate yeast strains from historical brewery infrastructures and surrounding environments
- Characterize microbial diversity using microbiological and genomic approaches
- Reconstruct phylogenetic relationships and domestication patterns of yeast strains
- Identify functionally relevant traits for fermentation and mixed culture systems
- Contribute to the understanding and revival of historical yeast biodiversity

#### **Methodologies (bullet points; max 100 words):**

- Outdoor sampling under sterile conditions from historical sites and natural habitats
- Cultivation and isolation using selective and enrichment media
- Microbiological and phenotypic characterization of isolates
- DNA extraction, PCR, and whole-genome sequencing
- Comparative genomics and phylogenetic analysis of yeast populations
- Screening for fermentation-relevant traits and mixed culture development

**Keywords (max five):** Yeast diversity; Ancient yeasts; Yeast domestication; phylogenetics; fermentation