

INFORMATIONS FOR THE DEPARTMENT OF PHARMACEUTICAL SCIENCES

Laura Corte - Researcher from 1.9.2011



RESEARCH TOPICS

The scientific activity of Dr Corte has been carried out since 2003 in the University of Perugia. The researches were mainly focused on the biodiversity analysis of yeasts isolated from various food, natural, agricultural and industrial environments, with both microbiological and molecular approaches. To this vein was then added the study of computing methodologies able to evaluate, as objectively as possible, the amount of microbial and molecular data produced faster by the technologies gradually introduced in the industry. These bioinformatic studies have led to write several free and multiplatform packages and software. A branch of the biodiversity study has been the search for microbiological and molecular markers for traceability of agricultural Italian products, notoriously subject to high counterfeiting pressure, and the study of microbial biofilms. Interest in the physiological aspect has been extended in time to the use of metabolomics by FTIR. Such technology has been applied both to try to correlate metabolomics data with the molecular markers, and to estimate the level of stress induced in the cells by various microbial agents. This type of study has led to the idea of establishing a model system to assess, through bioinformatic analysis of the FTIR spectra, the effect of various agents on microbial cells (yeast and or bacteria) and human cells, so as to arrive to a system able to analyze the effects on the yeast to predict those caused to human cells.

Research Lines

The scientific activity of Dr Laura Corte has developed along the research lines outlined briefly below:

1. Study of the microbial diversity at different taxonomic levels, description of new species of yeast, selection of strains of interest in food and agriculture, and in industrial or applicable in environmental biotechnology;
2. Study of microbial biofilms: biofilm adhesion on different supports (stainless steel, nylon, polyethylene, ...) of single cultures and of co-cultures both in static and dynamic conditions;
- 3 . Development of molecular methods , definition of optimizing criteria for phylogenetic and taxonomic classification and identification to the species level and polyphasic characterization of the strains, microevolutive analysis.
- 4 . Metabolomics FTIR used for: i. cultures characterization; ii. evaluation of the level of stress induced by various chemical agents on microbial and human cells; iii. development of a model for metabolomic analysis of cellular stress to correlate the response of the yeast with those of human cells;
5. Metabolomic and microbiological analysis of biocides and biostatics effects of chemicals newly synthesized;

6 . Bioinformatic analysis in Q mode (analysis of taxa) and R (evaluation of descriptors) for optimizing the interpretation of biological data, through the development of algorithms and the development of specific software.

COORDINATION of RESEARCH PROJECTS

Rural Development Programme for Umbria 2007/2013 - Measure 124 "Native Yeasts for product innovation in the regional wine productive chain"	24 months	Scientific coordinator
Fondazione Cassa di Risparmio of Perugia - "Basic Research, 2010" – "Human health effects of exposure to nanostructured material: use of cell models for the study of nanotoxicity "(2010.011.0434)	36 months	Scientific coordinator

COLLABORATION

a. National

- Bari University (Italy) - Di.S.S.P.A.- Prof. M. Gobbetti and Prof. R. Di Cagno.
- Padova University (Italy)– DAFNAE – Prof. S. Casella and Prof. M. Basaglia.
- Piacenza University (Italy) - Cattolica Sacro Cuore – Microbiology Institute - Prof. P. S. Cocconcelli
- Polytechnic University of Marche - Ancona (Italy)- D3A – Prof. F. Clementi.
- CNR-ISPRA (Italy)– Dr. Francesco Grieco.
- CRA-RPS (Italy) – Dr.ssa Anna Benedetti.

b. International

- Centraalbureau voor Schimmelcultures – Utrecht – Bioinformatic Unit – Dr. Vincent Robert
- Tennessee State University – Nashville (TN) –Dpt. Biology – Prof. P. Ganter
- University of Lund (Sweden) – Prof. J. Pitskur

RESEARCH ARTICLES (2009-13)

1. Antonielli, L., V. Robert, **L. Corte**, L. Roscini, A. Bagnetti, F. Fatichenti and G. Cardinali (2010). "Searching for Related Descriptors Among Different Datasets: A New Strategy Implemented by the R Package "Dadi"." The Open Applied Informatics Journal **3**: 15-27.
2. **Corte, L.**, P. Rellini, L. Roscini, F. Fatichenti and G. Cardinali (2010). "Development of a novel, FTIR (Fourier Transform InfraRed spectroscopy) based, yeast bioassay for toxicity testing and stress response study." Analytical Chimica Acta **659**(1-2): 258-265.
3. Roscini, L., **L. Corte**, L. Antonielli, P. Rellini, F. Fatichenti and G. Cardinali (2010). "Influence of cell geometry and number of replicas in the reproducibility of whole cell FTIR analysis." Analyst **135**: 2099-2105.
4. Antonielli, L., **L. Corte**, L. Roscini, V. Robert, A. Bagnetti, F. Fatichenti and G. Cardinali (2011). "A Multidisciplinary Approach to the Microbial Species Concept: The Role of Bioinformatics in the Search of Detectable Discontinuities " The Open Applied Informatics Journal **5** (Suppl 1-M2): 3-10.

5. **Corte, L.**, L. Antonielli, L. Roscini, F. Fatichenti and G. Cardinali (2011). "Influence of cell parameters in Fourier transform infrared spectroscopy analysis of whole yeast cells." Analyst **136**(11): 2339-2349.
6. Pelliccia, C., L. Antonielli, **L. Corte**, A. Bagnetti, F. Fatichenti and G. Cardinali (2011). "Preliminary prospection of the yeast biodiversity on apple and pear surfaces from Northern Italy orchards." Annals of Microbiology **61**: 965-972.
7. Antonielli, L., V. Robert, **L. Corte**, L. Roscini, R. Ceppitelli and G. **Cardinali** (2011). "Centrality of Objects in a Multidimensional Space and its Effects on Distance-Based Biological Classifications" The Open Applied Informatics Journal **5**((Suppl 1-M3)): 11-19.
8. Cardinali, G., L. Antonielli, **L. Corte**, L. Roscini, A. Bagnetti, C. Pelliccia and G. Puddu (2012). "*Kazachstania ichnusensis* a diploid homothallic ascomycetous yeast from Sardinian lentisk rhizosphere." Int J Syst Evol Microbiol.
9. **Corte, L.**, L. Roscini, C. Zadra, L. Antonielli, B. Tancini, A. Magini, C. Emiliani and G. Cardinali (2012). "Effect of pH on potassium metabisulphite biocidal activity against yeast and human cell cultures." Food Chemistry **134**(3): 1327-1336.
10. Cardinali, G., **L. Corte**, L. Antonielli, L. Roscini and P. F. Ganter (2013). "*Candida coquimbensis* sp. nov., a link between Australian and Neartic/Neotropical *Phaffomyces*." Int J Syst Evol Microbiol.
11. Cifardini, G., B. A. Zullo, L. Antonielli, **L. Corte**, L. Roscini and G. Cardinali (2013). "*Yamadazyma terventina* Sp. Nov. a new yeast species of the *Yamadazyma* clade from Italian olive oils." Int J Syst Evol Microbiol.
12. **Corte, L.**, M. T. Dell'Abate, A. Magini, M. Migliore, B. Felici, L. Roscini, R. Sardella, B. Tancini, C. Emiliani and G. Cardinali (2013). "Assessment of safety and efficiency of nitrogen organic fertilizers from animal-based Protein Hydrolysates—a laboratory multidisciplinary approach." Journal of the science of food and agriculture.
13. Tiecco, M., G. Cardinali, L. Roscini, R. Germani and **L. Corte** (2013). "Biocidal and inhibitory activity screening of de novo synthesized surfactants against two eukaryotic and two prokaryotic microbial species." Colloids and Surfaces B: Biointerfaces.

COMMUNICATIONS (2009-13)

1. Buzzini, P., G. Cardinali, **L. Corte**, B. Turchetti and F. Fatichenti (2009). New approaches to yeast food microbiology. II Convegno Nazionale SIMTREA. Sassari.
2. Cardinali, G., **L. Corte**, L. Roscini and F. Fatichenti (2009). Analisi Metabolomica Di Idrolizzati Proteici. Vicenza.
3. **Corte, L.**, P. Rellini, L. Roscini, F. Fatichenti and G. Cardinali (2009). Metabolomic characterization of the growth curve in the yeast *Saccharomyces cerevisiae*. II Convegno Nazionale SIMTREA Sassari.
4. Rellini, P., L. Antonielli, **L. Corte**, F. Fatichenti and G. Cardinali (2009). Internal variability of the D1/D2 domain of rDNA in *Saccharomyces cerevisiae*. XXVIII Convegno Italiano SIMGBM. Spoleto (PG).
5. Rellini, P., L. Antonielli, **L. Corte**, F. Fatichenti and G. Cardinali (2009). Internal variability of the D1/D2 domain of rDNA in *Saccharomyces cerevisiae*. II Convegno Italiano SIMTREA. Sassari.
6. Roscini, L., P. Rellini, **L. Corte**, F. Fatichenti and G. Cardinali (2009). Metabolomic fingerprinting of *Saccharomyces cerevisiae* cells subject to different stressing conditions. II Convegno Nazionale SIMTREA. Sassari.
7. Roscini, L., P. Rellini, **L. Corte**, F. Fatichenti and G. Cardinali (2009). Metabolomic fingerprinting of *Saccharomyces cerevisiae* cells subject to different stressing conditions. XXVIII convegno Nazionale SIMGBM. Spoleto (PG).

8. Murdolo, G., L. Roscini, C. Tortoioli, M. Donati, L. Antonielli, **L. Corte**, F. Fatichenti, F. Santeusano, A. Falorni and G. Cardinali (2010). Biomolecular characterization of human adipocytes and undifferentiated precursor cells by Fourier Transform Infrared Spectroscopy (FTIR): a novel metabolomic approach, SIO, Roma.
9. Antonielli, L., **L. Corte**, L. Roscini, F. Fatichenti and G. Cardinali (2011). Multiple stressing bioassays of environmental-related mixtures: the case of hydrolyzed proteins. I Convegno Internazionale SIMTREA : Microbial Diversity 2011 - Environmental Stress and Adaptation Milan.
10. Antonielli, L., L. Roscini, **L. Corte**, F. Fatichenti and G. Cardinali (2011). Effect of pH on potassium metabisulfite biocidal activity against yeast cell cultures. I Convegno Internazionale SIMTREA : Microbial Diversity 2011 - Environmental Stress and Adaptation Milan.
11. **Corte, L.**, L. Antonielli, L. Roscini, F. Fatichenti and G. Cardinali (2011). Development of a novel, FTIR (Fourier transform infrared spectroscopy) based, yeast bioassay for toxicity testing and stress response study. I Convegno Internazionale SIMTREA : Microbial Diversity 2011 - Environmental Stress and Adaptation Milan.
12. **Corte, L.**, L. Antonielli, L. Roscini, F. Fatichenti and G. Cardinali (2011). On the influence of cell parameters in environmental stress detection by Fourier Transform Infrared Spectroscopy analysis of whole yeast cells. I Convegno Internazionale SIMTREA : Microbial Diversity 2011 - Environmental Stress and Adaptation Milan.
13. **Corte, L.**, L. Roscini, L. Antonielli, F. Fatichenti and G. Cardinali (2011). Characterization and Innocuity of hydrolyzed protein. Chiampo.
14. Cardinali, G., **L. Corte**, L. Roscini and F. Fatichenti (2011). Analisi Metabolomica Di Idrolizzati Proteici.
15. Cardinali, G., **L. Corte**, L. Roscini, D. Vu and V. Robert (2012). Novel algorithms to study the yeast species structure and discontinuity. ICY 2012: Yeasts for sustainable future, Madison (Wisconsin).
16. Roscini, L., **L. Corte**, L. Antonielli, C. Pelliccia, A. Larosa and G. Cardinali (2012). Effect Of Ph On Potassium Metabisulphite Biocidal Activity Against Yeast And Human Cell Cultures, III CONVEGNO NAZIONALE SIMTREA Bari.
17. **Corte, L.**, L. Roscini, E. Salvatore, E. Pietta, S. Gazzola, P. S. Cocconcelli and G. Cardinali (2013). Cooperative Biofilm Formation Of *Enterococcus faecium* And *Trichosporon faecale* On Stainless Steel In Static And Dynamic Conditions. II Convegno Internazionale SIMTREA : Microbial Diversity 2013 - Microbial Interactions in Complex Ecosystems. Torino.

LEARNING ACTIVITY Academic years 2013-14

***Microbial genetics and biotechnology* (Module of Microbiology course) -Degree in BIOTECHNOLOGY (1th years – 2nd semester)**