**PhD: Food Science**

**Title: Innovative strategies to counteract phenolic instability and loss of longevity of red wines.**

**Proposing supervisor: ANGELITA GAMBUTI**

**Objectives of the research project and interdisciplinary collaborations** (max 1000 characters):

Wine longevity is strictly related to the evolution of a complex mixture of phenolic compounds extracted from grapes that undergoes numerous reactions just after the crushing of grapes and through all the winemaking and aging phases. In last years, in almost all viticultural word’s area, a lower aging potential of red wines due to an unbalanced phenolic composition of grapes owing to climate changes effects, was detected. The direct effect of these changes in grape phenolic compositions are the instability of color and of colloidal equilibrium with a dramatic loss of sensory and commercial quality of obtained red wines.

The aims of the PhD project are:

1. the understanding of biochemical reasons of the appearance of phenolic instability in national and international red wines
2. to determine the risk factors for phenolic instability associated to specific grape cultivars;
3. to individuate strategies to counteract the phenolic instability of red wines by avoiding the use of exhogenous chemical additives.

The realization of the project requires a multidisciplinary approach and will involve, in addition to the enology, competences of organic chemistry, microbiology and physics to individuate sustainable techniques to produce and treat wines against phenolic instability.

**Innovation and originality of the project in relation to the state of the art** (max 1000 characters):

The project is innovative in that the risk factors associated with the problems of phenolic instability and loss of longevity of red wines will be identified through a thermodynamic and kinetic study of the reactions that occur between the various classes of phenolic compounds present in wine and the factors that affect them. In addition, sustainable strategies based on physical and biochemical methodologies will be used in winemaking to solve these criticalities taking into account the compositional specificities of the main national and international wine grape varieties.

**Grant availability** (funds to support the research activities):

Biolaffort grants.

**Collaborations with foreign institutions** (max 500 characters):

LAFFORT R&D laboratories in Bordeaux (France). Laboratório Associado para a Química Verde, Departamento de Química e Bioquímica, Faculdade de Ciências, Universidade do Porto and at the Department of Viticulture and Enology, University of California, One Shields Avenue, Davis, CA, USA, Dipartimento di Scienze e Tecnologie Agrarie, Alimentari Ambientali e Forestali (DAGRI) dell’Università degli Studi di Firenze