**PhD:** Food science

**Title:** Phenolic compound-protein interactions: physiological effects and implications in food design

**Proposing supervisor:** ProfPaola Vitaglione (BIO/09)

**Objectives of the research project and interdisciplinary collaborations**:

Improving individual health and wellbeing by supplying sustainable healthy foods and diets globally is one of the goals to be addressed by United Nations by 2030. Shifting from animal based to plant-based food productions and providing individuals with nutritionally adequate diets are mandatory steps to reduce environmental impact of food systems and prevent non-communicable chronic diseases.

In this context, the objectives of the project are to study the interactions between phenolic compounds and proteins occurring in food because of processing and reformulation, and to unveil their physiological effects by *in vitro* and *in vivo* approaches. Food/beverage model systems with animal/plant protein isolates/hydrolysates will be developed and studied to unveil the formation dynamics of bioactive peptides which will be also monitored in biological fluids along with markers of effect.

The project involves collaboration between research groups with expertise in human physiology, nutrition and food technologies.

**Innovation and originality of the project in relation to the state of the art:**

Dietary phenolic compounds exert many physiological effects in the body through several mechanisms taking place in the gastro-intestinal lumen or in the bloodstream/peripheral organs after absorption. These effects are highly influenced by the chemical form of the molecules and their interactions with other food components. Among possible interactions, those between phenolics and proteins are chemically described as soluble and insoluble complexes. Phenolic compound-protein complexes are naturally present in cereals and legumes and can be formed in food products at different extent depending on the formulation and the processing. While controversial results exist in the respects of the bioaccessibility of phenolic compounds when present as complexes with proteins, their impact in the formation of bioactive peptides upon digestion is largely under investigated and will be addressed in this project using both *in vitro* and *in vivo* approaches.

**Grant availability**:

* PON Fondo per la crescita sostenibile, Sportello Agrifood DM 05/03/2018: PASTA FUNZIONALE PROBIOTICA, 180 k€
* PON Fondo per la crescita sostenibile, Sportello Agrifood DM 05/03/2018: SURGELATI, PREBIOTICI, PRECOTTI IN FORNO, 180 k€

**Collaborations with foreign institutions**:

* Prof Vural Gökmen, Food Engineering Department, Hacettepe University, Ankara, Turkey.
* Dr Chris Gill, Ulster University, Nutrition Innovation Centre for Food and Health, School of Biomedical Sciences, Coleraine, UK.