Program for a twelve-month research fellowship

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Title: PHYTOCHEMICAL STUDY AND BIOACTIVITY DETECTION OF SEVERAL ITALIAN WILD FOOD PLANT SPECIES USED FOR THERAPEUTICAL PURPOSES

It is well known that many edible wild plants have both nutritional and therapeutic value due to the presence of biologically active compounds, so that they can be considered as food-medicines. The general aim of the present work is to study and characterize Italian wild food plants collected and used, in the past and still nowadays, for their human health benefits. Infusions and decoctions, which are the therapeutical preparations mainly associated to medicinal plants, will be obtained and digested by means of an *in vitro* oro-gastric and duodenal digestion, to detect how the plant extracts differ from the raw ones after a simulated human digestion. Phytochemical profile and biological activities of both digested and not digested preparations will be studied and compared.

The present twelve-month project will perform the following activities:

1. Identify the 4 most promising Italian species traditionally used and having beneficial health effects, by means of a wide and detailed bibliography research of all the Italian ethnobotanical published papers (2 months).
2. Collect plant samples from natural environment or from Bologna's Botanical Garden collection (1 month).
3. Test different methods for the extraction of bioactive compounds from various plant organs. Solvent-based extraction procedures (i.e. methanol, ethanol) and traditional hot-water preparation recipes (infusions and decoctions) will be performed. *In vitro* oro-gastric and duodenal digestion will be also tested (2 months).
4. Assess the phytochemical profile and bioactivities of the extracts via spectrophotometric techniques (total polyphenols, flavonoids, anthocyanin, antioxidant and anti-tyrosinase activity) (3 months).
5. Analyse the detailed molecular composition of selected samples by means of chromatography techniques, such as HPLC and UPLC/MS-MS (4 months).

Required Skills:

Applicants should preferably have:

- Experience in biochemical techniques dealing with extraction of plant matrices.
- Experience in general and analytical chemistry.
- Experience in chromatography techniques.
- Good knowledge of spoken and written English.

English synthesis

The aim of the project is to study and characterize infusion and decoction of Italian wild food plants traditionally used in the past for their beneficial human health effects. Plant preparations will be treated by means of an *in vitro* oro-gastric and duodenal digestion which simulate human digestion. Digestated

and not digested samples will be analysed and compared by means of spectrophotometric and chromatographic techniques. Both phytochemical characterization and bioactivity assessment will be performed.

Italian synthesis

Lo scopo del progetto è quello di studiare e caratterizzare infusi e decotti di diverse specie di piante selvatiche e edibili italiane, usati in passato per i loro effetti benefici sulla salute umana. Le preparazioni delle piante saranno trattate tramite un protocollo di digestione *in vitro* che simula le fasi della digestione umana. Entrambi i campioni, digeriti e non digeriti, verranno analizzati e confrontati per mezzo di analisi spettrofotometriche e cromatografiche. Saranno effettuate caratterizzazioni biochimiche e saggi di bioattività.