1. *Interested institution:*

University of Navarra – School of Sciences – Department of Environmental Biology

2. *Brief Description of the Group*

The **Plant Stress Physiology Group** (Department of Environmental Biology, School of Sciences, University of Navarra) has been interested in studying the ecophysiological responses of plants to several environmental constraints (including Climate Change). Drought and plant adaptation to low water availability has been one of the main aspects investigated by the group in diverse species. Productivity, photosynthesis (gas exchange), water status, chlorophyll fluorescence, chemical (macro and micronutrients), plant growth regulators and biochemical aspects are routinely measured. Special techniques have also been used in several studies by collaborating with other groups of the University of Navarra, national groups or international Centers. In the last years, several studies have been focused on the **accumulation** of secondary metabolites with antioxidant properties in crop plants exposed to different biotic (symbiotic associations) and/or abiotic (drought, high temperature, elevated CO_2, UV radiation) factors. More recently, the potential application of vegetable wastes for pharmacological purposes is been investigated. All the research work done by the Research Group including publications can be found in the Web:

http://www.unav.edu/departamento/ambiun/Grupo%20de%20Fisiologia%20del%20Estres%20en%20Plantas

3. *Please tick the areas of research (as established in Marie Sklodowska Curie Actions)*

☐ Chemistry (CHE)	☒ Environmental Sciences and Geology (ENV)
☐ Social Sciences and Humanities (SOC)	☒ Life Sciences (LIF)
☐ Economic Sciences (ECO)	☐ Mathematics (MAT)
☐ Information Science and Engineering (ENG)	☐ Physics (PHY)

4. *Research / Project Description*

Plants accumulate many secondary metabolites in their tissues, which are synthetized through metabolic pathways that are absent in animal cells. Some of those metabolites have important antioxidant capacity and protect vegetables against environmental (i.e., drought, high temperatures, UV radiation) and biotic (i.e., pathogens) stresses. Phenolic compounds are included in those secondary metabolites.

Some studies performed in our laboratory have demonstrated that the highest amount of phenolics is sometimes found in the oldest organs of plants (Baslam et al. 2013). However,

in the case of crops, the oldest parts of the edible organs are usually discarded for human consumption (this happens with many vegetables). In other cases (for example, grapes cultivation for wine production), the vegetative organs are not used as final products thus generating huge amounts of wastes which are not very adequate as fertilizers due their high content of phenolic compounds. The phenolic contents often are directly associated with antioxidant capacity and they can be modulated by biotic and abiotic factors (Torres et al. 2015).

Taking into account all these precedents, our objective is to test the potential application of vegetable wastes for pharmacological purposes including the evaluation of their *in vitro* antitumor effects against several cancers. Plants will be exposed to different biotic and abiotic factors that could modulate their potential cytotoxic activity.

Baslam M, Morales F, Garmendia I, Goicoechea N (2013) Nutritional quality of outer and inner leaves of green and red pigmented lettuces (*Lactuca sativa* L.) consumed as salads. Scientia Horticulturae 151: 203-111.

Torres N, Goicoechea N, Antolín MC (2015) Antioxidant properties of leaves from different accessions of grapevine (*Vitis vinifera* L.) cv. Tempranillo after applying biotic and/or environmental modulator factors. Industrial Crops and Products 76: 77-85.

5. *Who can apply?*

General requirements:

At the deadline for the submission of proposals (14/09/2016), researchers (*):

- shall be in possession of a doctoral degree or have at least four years of full-time equivalent research experience.
- must not have resided or carried out their main activities in the country of Spain for more than 12 months in the 3 years immediately prior to the abovementioned deadline.

Specific requirements: