



# Bio Exploration: Novel methodology for the identification of Valuable Natural Products Derived from Mediterranean Flora

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## Introduction

The Mediterranean region with its unique geology and climate is one of the world's major centers of plant diversity housing approximately 25,000 species, about half of which are endemic to the region. Over centuries, the local population has been using natural materials as medicines for the treatment of a number of diseases. The natural products sector, including herbal medicines, teas, cosmetics and perfumes, has become a fast growing industry worldwide.

The **Bio-Xplore project** focuses on the identification of commercially valuable natural compounds derived from the flora of the Mediterranean area, with the final aim of protecting the natural resources while creating new sources for local industrial development and job opportunities.

## Materials and methods

Different parts of the plants have been collected and analyzed: roots, underground organs, shoots, stems and twigs, wood, bark, leaf, inflorescence, flower, fruit, seed, aboveground organs or entire plant.

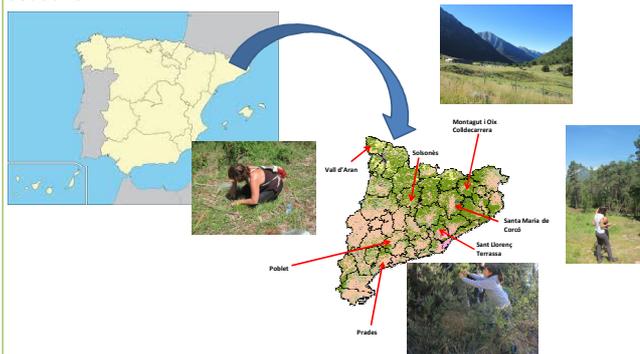


Picture 1: Flowers collected



Picture 2: Fruits collected

Plants from a variety of areas in Catalonia (Spain) have been explored during spring, summer and autumn of 2012, and the differences in plant activity has been compared between the seasons:



Picture 3: Zones of Catalonia where samples were collected

The plant extracts and their properties have been analyzed by using The Global Institute for BioExploration (GIBEX) Methodologies. Twelve different methodologies were applied to find the following activities: antibacterial, antifungal, glucosidase, glucosidase inhibitor, protease, protease inhibitor, roundworm lethality, anthocyanine, antioxidant, Protozoa lethality, and Planaria regeneration and lethality.

## Results

560 plant extracts were analyzed; the parts of the plants that were collected are showed in the following figure:

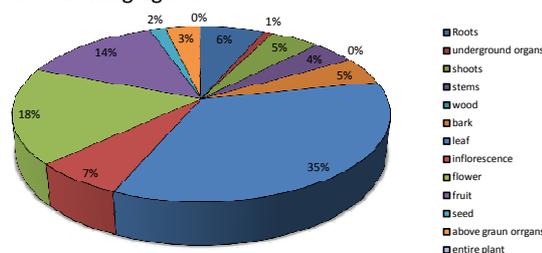


Figure 1: Parts of the plants collected and transformed to extracts for the activities analysis.

As shown in the figure, , leaves (35%), flowers (18%) and fruits (14%) are the most represented plant parts. The 9 remaining different plant parts, together represent 26% of the total number of samples collected.

Every biological activity analyzed was recorded and categorized according to a value scale. The results obtained are represented in figure 2; results are simplified as "activity or no activity":

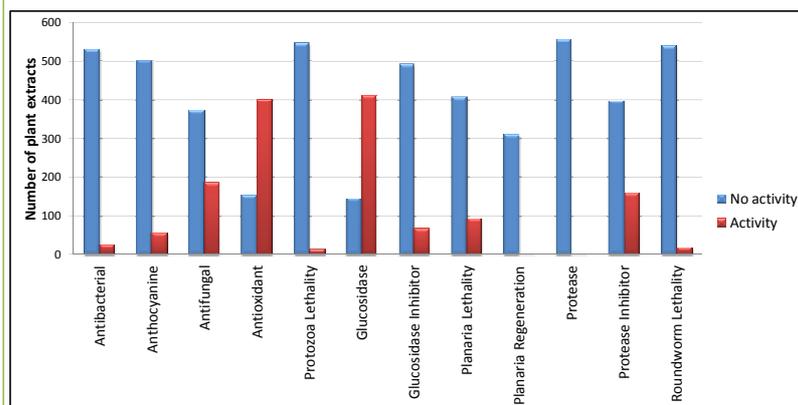


Figure 2: Results of the extracts' activity for the 12 properties evaluated.

The results show that antioxidant and glucosidase are the most common activities in these samples. This could be explained because antioxidant activity is usually located in leaves, the most collected part of the plant. On the other hand, plants need glucosidase to metabolize starch, stored in leaves, into carbohydrates. Antifungal, antibacterial and protease inhibitor activities, are less common than antioxidant and glucosidase, but they are important activities which can be used as natural treatments for fungal and bacterial diseases, or as new antiviral drugs. Other activities which were also tested, despite being less represented in the plant extracts, are no less important for use in natural therapies.

## Conclusions

The Mediterranean zone, in this case Catalonia, has a variety of plants that have demonstrated different biological activities which can be considered as potential "green compounds" for use in different industries including pharmaceuticals, cosmetics and food.