

# URUGUAY

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*Traditional medicine usage of Pitanga's leaves for medicinally valuable infusions is directing the search for potential chemotherapeutic agents against colon cancer*





## AUTHORS

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## SETTING THE SCENE

The Oriental Republic of Uruguay is located in the temperate zone of the Southern Hemisphere of South America and has its coasts on the Atlantic Ocean and the Rio de la Plata. It has a territorial surface of 176,215 km<sup>2</sup> and 120,684 km<sup>2</sup> of territorial sea, plus the jurisdictional waters of rivers and lagoons. It is bordered on the north, northeast and east by the Federative Republic of Brazil, and to the west and northwest by the Argentine Republic.

Uruguay is located in an area of biogeographic transition on the South American continent, with an important matrix of the Pampean Province and intrusions of the Chaquena and Paranaense Provinces. The confluence of these biogeographical regions gives rise to natural fields interspersed with wetlands, different types of native forests (creek, riverside, mountain, park and palm groves), and important extensions of water such as coastal lagoons. For this reason, despite its surface and subtropical position, it houses an important biological diversity, both ecoregional and ecosystemic, and specific



genetic. Uruguay has an important diversity of species, many of them of global importance in ecological, economic and social terms.

From a geographical point of view, Uruguay represents a terrestrial and marine ecotone of value in terms of biological diversity. Due to the fact that it is a transition zone, even though it is outside regions of high species richness, it has the importance of being the southern limit of the distribution of many species. The degree of knowledge of Uruguay's biodiversity is very irregular, while some groups are relatively well known, others have only just begun to be studied. At the moment, the registered native species are: 2,400 vascular plants; 140 continental mollusks; 226 freshwater fish; 48 amphibians, 71 reptiles, 453 birds and 114 mammals. In the Rio de la Plata and the marine front, 113 species have been identified. The country still needs to estimate the number of native insect species or microorganisms. In Uruguay, genetic resources are accessed with the purpose of developing pharmaceutical, cosmetic, food/beverage, agriculture and phytosanitary products.





## Biodiscovery case

In developing countries medicinal products prepared from plants are often used at the primary care level as well as in traditional medicine. Compounds present in vegetables, fruits, spices and medicinal plants such as resveratrol and turmeric have been shown to have anticarcinogenic properties. These compounds have effects on cellular and molecular processes underlying the etio-pathogenesis of cancer such as inflammation and cell proliferation. In Uruguay, the native species *Eugenia uniflora* (Myrtaceae), popularly known as Pitanga has a wide use in traditional medicine. The natives used it extensively according to the testimony of José Sánchez Labrador, an eighteenth-century missionary. It is frequent to find this shrub in the countryside and gardens of houses in the cities. It is used as an ornamental plant, it has bright green leaves with repellent properties and its small and edible fruit is of various colours, yellow, red and purple. In Uruguay the fruit is well known and popular as an addition in alcoholic beverages (cane with Pitanga). But also, in the popular medicine of Uruguay, the leaves of Pitanga are used for the preparation of infusions with carminative, antidiarrheal and anti-inflammatory properties. Due to its effect on the digestive tract and the high incidence of colon cancer in Uruguay, a research group from CENUR Litoral Norte of the Universidad de la República has proposed the study of Pitanga as a potential source of anticarcinogenic agents.

Studies carried out by the group of researchers from CENUR (Keszenman, Ferragut, Sánchez, Severi and Cedano) have shown that leaf extracts of *E. uniflora* (obtained by the researchers Vignale and Lombardo from the Faculty of Agronomy, Salto) present antiproliferative and cytotoxic effects. In addition, preliminary results suggest a potential immunomodulatory effect through its interaction with signalling pathways of the immune response. Although the bioactive principles present in the extracts of *E. uniflora* are not yet known, their quantitative chemical characterization (by Professor Dellacassa of the Faculty of Chemistry) will allow to identify substances with potential effects on the cellular events mentioned. From these *in vitro* results it has been proposed to undertake the *in vivo* determination of the potential chemotherapeutic preventive effect of leaf extracts of *E. uniflora* on the induction of colon tumours using a model of chemical carcinogenesis in rats. These studies will allow the scientific-technological development of a chemotherapeutic or preventive agent for colon cancer from a natural product of traditional use.



## EYEWITNESS STATEMENT



Please provide a higher resolution photo of Adrian Mamberto

*“I must say that, even though I am a person of urban origin, I have always believed that the remedy for physical discomfort, such as heartburn, must be found on the ground in which you live. Those days on which this brief account is based, the burning heat in my stomach that was afflicting me was increasing. In spite of the uneasiness caused by this malaise, my gaze settled on a large solitary bush where a benteveo bird ate greedily his berries.*



*I thought, how curious that this bird was eating fruits of pitanga, because it is a bird that feeds on invertebrates and some small vertebrates, and yet there it was, eating fruit. My dream instinct dictated to me that it might well be a signal for me to recognize the shrub my grandparents recounted that their grandparents used to heal digestive ailments. Surely the bird also suffered from heartburn and with its primal instinct was taking the right medicine as our ancestors did. The fact is that I approached the bush and remembered the old teachings and experiences, took a few leaves of pitanga and chewed slowly. Nearby, there was a white-flowered ceibo, I sat down, I finished swallowing the mixture of vegetable fibres which the leaves had become when mixed with the saliva. I felt my breathing grow calmer, the burning heat became only a memory, my sense of belonging to the earth flowed like a crystalline stream from the bottom of my soul. I have never lost appreciation for the gift of the pitanga and, as in the time of yore, its leaves are always present for that “tecito” that comforts me.”*

**ADRIAN MAMBERTO**, Bachelor of Arts, specialized in Art Restoration



## In fine focus: SDGs implemented by the biodiscovery case

The purpose of the project presented here is to search for new chemotherapeutic and preventive agents for cancer from the study of natural products used in Latin American traditional medicine. The bioactive principles identified will be incorporated into prevention and treatment protocols currently used to address the problem of increased cancer incidence, particularly colo-rectal cancer. We should point out that in Uruguay, this type of cancer occupies the third place of incidence and mortality in men, and the second in women, being the most frequent digestive neoplasm. The incidence rate in the country is 29.5 new cases per year per 100 thousand inhabitants.

The development of the project will be directly related to SDG 3 - ensure a healthy life for all and at all ages and more specifically to goal 3.9 which aims to “strengthen the capacity of all countries, particularly developing countries, in the subjects of early warning, risk reduction and risk management for national and global health”, through its contribution to new preventive-therapeutic approaches for colo-rectal cancer. The project will also collaborate in advancing SDG 9, specifically target 9.b whose purpose includes “supporting the development of national technologies, research and innovation in developing countries, including ensuring a regulatory environment conducive to industrial diversification and addition of value to basic products, among other things”. In effect, this project will contribute to strengthening the national biotechnological innovation capacities,



and concomitantly, to the valuation of native genetic resources. Finally, it will contribute to advancing the achievement of SDG 15; more specifically to target 15.6 “to promote fair and equitable participation in the benefits derived from the use of genetic resources and promote adequate access to those resources, as internationally agreed”. Given that the project is being executed by a public institution and will generate a biotechnological innovation that can bring benefits both for the national population and internationally in the treatment of a disease of high global incidence, it can be said that it will promote a fair and equitable participation of the benefits of this innovation process.





## Legal and political enabling environment for ABS and the Nagoya Protocol

Uruguay ratified the CBD through Law No. 16.408, on 27 August 1993, and the Nagoya Protocol (NP) on ABS, by Law No. 19,227, on 24 June 2014.

In 2016, the National Environment Directorate (DINAMA) of the Ministry of Housing, Territorial Planning and Environment (MVOTMA) published the National Strategy for the Conservation and Sustainable Use of Biological Diversity of Uruguay 2016–2020, which, in its goal 16, establishes that by 2018, agreements will have been reached for the development of the national regulatory framework for access and conservation of

genetic resources, in harmony with the international agreements and treaties assumed by the country. As part of reaching this goal, in April 2017 the execution of the UNDP-GEF Global ABS Project “Strengthening of Human Resources, Legal Frameworks and Institutional Capacities for the Implementation of the Nagoya Protocol” began; with the purpose of: (i) Strengthening the legal, institutional and political capacities for the design and implementation of the national ABS legal framework; (ii) Strengthening the trust between suppliers and users of genetic resources to facilitate the identification of biodiscovery initiatives; (iii) Improving the capacity of local communities and family farmers in the implementation of the Nagoya Protocol and (iv) Implementing of a community of practice and a South-South cooperation framework on ABS.

Within the framework of the UNDP-GEF Global ABS Project, the MVOTMA approved Ministerial Resolution No. 1844/017, on 30 November 2017. This Resolution - published in Official Gazette No. 29.844 on 12 December 2017, establishes a provisional regime of access to genetic resources in the country, designating the Biodiversity Division of DINAMA as the competent authority to manage the requests for access to genetic resources in Uruguay. In addition, through the Resolution of the National Directorate of the Environment R/DN/0165/18 of 4 June 2018, two forms for requesting access to genetic resources were approved, one for applications for non-commercial research purposes, and another for those with commercial purposes.





## MESSAGE FROM AN SDG ADVOCATE

*“The world is moving towards a much more robust and comprehensive concept of development that emphasizes sustainability and inclusion. The SDGs represent an unprecedented global consensus to align efforts in the coming years around a truly ambitious agenda for people and the planet. It is an agenda that aims to leave no one behind and to transform the world, the way we live, consume, produce, work and do business. But above all, the new agenda puts on the table the dependencies and interrelationships that exist between the different dimensions of development and the need to address problems in all their complexity with multidimensional views. In this sense, it highlights the importance of this initiative and the opportunity it offers to contribute to the aforementioned SDG issues (SDG 3 Health and well-being, SDG 15 Life of terrestrial ecosystems and SDG 9 Industry, innovation and infrastructure), to which the SDG 1 End of poverty could be added. It is an initiative that aims to work on these issues not only at the national level to generate benefits for the health of the population,*



*but also at the territorial level in the search for benefits for local communities and the use of traditional knowledge of the native flora, in this case especially for pitanga, which has always been used for different curative uses.”*

**FLAVIO SCASSO**, Programme Analyst in the Area of Sustainable Development, UNDP Uruguay