Opuntia spp.: Superfood of the Future and its Biotechnological Potential

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Editors

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Preface

Opuntia spp. is a cactus popularly known as nopal in Mexico. Due to its characteristics, it is typically found in arid and semi-arid regions. Currently, 300 species of the genus Opuntia are known, approximately 100 of which are present in Mexico, and about 40% of these originate from the Chihuahua Desert.

The Opuntia group comprises remarkable plants typically diverse in their environmental growth habits. Creeping and shrub species are forms bristled with branches; a tree is formed when older cladodes change into cylindrical shapes. Most of them have spines, which is quite a cactaceous feature; however, some spineless examples have also been recorded. Mostly, they produce true leaves, but only the young shoots of these plants have such short-lived leaves. A prickly pear is a shrub-like plant, woody in trunk and branches, composed of cladodes. These cladodes are referred to as nopalitos when they are young and succulent, and as pencas when mature.

It is known that in the past, Opuntia species were propagated by seeds or vegetatively using rooting offsets or grafting. However, these methods are not useful for propagation on a large scale. For mass production of endangered and economically valuable cacti, in vitro culture techniques such as somatic embryogenesis, and plant regeneration via indirect or direct organogenesis are applied.

Still a major staple food in traditional Mexican cuisine, nopal (Opuntia spp.) is generally consumed as a vegetable in salads, while its prickly pear is eaten as a fresh fruit. Opuntia ficus-indica is the most widely cultivated species of Opuntia. Its fruits typically have a pulpy, sweet flesh with colors ranging from white-grayish and yellow to orange, red, or purple. Depending on the variety, the fruit contains varying amounts of pulp and usually has a thin skin.

Nopal offers an extensive portfolio of products and by-products that promise great benefit to many, especially those who are living in regions experiencing water scarcity.

Dra. Sandra Pérez Álvarez

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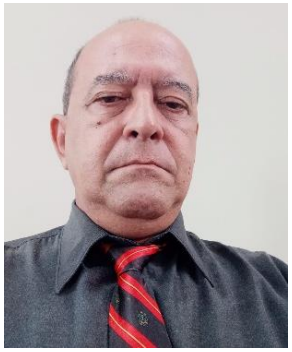
About the Editors

Dra. Sandra Pérez Álvarez is Titular Professor at Faculty of Agricultural and Forestry Sciences of the Autonomous University of Chihuahua. She got her university degree in 1993 as Agronomic Engineer at the Agrarian University of Havana, Cuba, and her master degree in Plant Pathology in 2001 at Zhejiang University in China. In 2009 she graduated as Doctor in Agricultural Science at the Agrarian University of Havana, Cuba. She is the author or co-author of more than 60 scientific articles, 4 books and 21 book chapters, all of them in the area of agriculture.



Dr. Eduardo Fidel Héctor Ardisana (Havana, Cuba, 1962) is Agronomy Engineer (1984) and PhD in Agricultural Sciences (1996). From 1984 to 1998, he led research in Biotechnology, Genetic Breeding and Plant Physiopathology at the National Sugar Cane Research Institute (INICA) of Cuba. From 1998 to 2015, he was a principal professor at the Agrarian University of Havana (UNAH), Cuba, where he held the responsibilities of Vice Dean of Research and Postgraduate Studies and later Dean of the Faculty of Agronomy. He has served as an international advisor in Ecuador, Mexico, Venezuela, and Suriname. Based in Ecuador since 2015, he has continued to combine his research in biotechnology with teaching and attending postgraduate programs. Since 2017 he has been a Senior Professor at the Technical University of Manabí. He is the academic coordinator of the Master's program in Biotechnology, mention in Plant Biotechnology, based at the Postgraduate School and the Faculty of Agronomic Engineering of that university. He has directed more than 15 master's and doctoral theses and is the author or co-author of more than 100 scientific articles, books and book chapters, more than half of them in the area of plant biotechnology.

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