

## Social marketing, a dissemination tool in the regeneration of petunia plants (*Petunia hybrida*) from cotyledons

### Mercadotecnia social, una herramienta de divulgación en la regeneración de plantas de petunia (*Petunia hybrida*) a partir de cotiledones

ESPEJO-MARTÍNEZ, Abraham†\* & ESPEJO-CRUZ, Abigail del Carmen

Universidad Autónoma "Benito Juárez" de Oaxaca.  
Universidad Politécnica de Valencia.

ID 1<sup>st</sup> Author: Abraham, Espejo-Martínez / ORC ID: 0000-0001-9888-4892, Researcher ID Thomson: F-9497-2019, arXiv ID Author: aem1, PubMed ID Author: aem1, CVU CONAHCYT ID: 478023

ID 1<sup>st</sup> Co-author: Abigail del Carmen, Espejo-Cruz / ORC ID: 0000-00018832-0428, Researcher ID Thomson: GVT-1252-2022, , arXiv ID Author: adespcru, PubMed ID Author: abigailespejo1, CVU CONAHCYT ID: 1160132

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#### Abstract

This document is the result of a bibliographic review of topics pertaining to biotechnology, specifically *in vitro* culture techniques and the application of the corresponding techniques. The development presents information related to the species and genera of some mainly ornamental plants, which were worked on and of which experiments carried out are mentioned along with their satisfactory results. Within these experiments, the regeneration of *Petunia hybrida* stands out, which the authors and business advisor discovered due to its speed of regeneration and represents an interesting potential research topic. The objective of the project was to apply viable *in vitro* culture techniques to the cloning, germination and regeneration of different ornamental species, such as several of the genus *Drosera* and *Phalaenopsis*, *Petunia* and *Capsicum*, obtaining satisfactory results, so that this document serves as a disseminator of these techniques through the use of social marketing.

Social marketing, Plant cloning, *In vitro* cultivation

#### Resumen

El presente documento es resultado de una revisión bibliográfica a temas pertenecientes a la biotecnología, específicamente en las técnicas de cultivo *in vitro* y a la aplicación de las técnicas correspondientes. El desarrollo presenta información relacionada a las especies y géneros de algunas plantas principalmente ornamentales, mismas que fueron trabajadas y de las cuales se mencionan experimentos realizados junto con sus satisfactorios resultados. Dentro de estos experimentos resalta la regeneración de *Petunia hybrida*, la cual sorprendió a los autores y asesor empresarial del mismo, por su velocidad de regeneración y representa un interesante potencial tema de investigación. El objetivo del proyecto fue aplicar técnicas de cultivo *in vitro* viables a la clonación, germinación y regeneración de diferentes especies ornamentales, tales como varias del género *Drosera* y *Phalaenopsis*, *Petunia* y *Capsicum*, obteniendo resultados satisfactorios, de manera que este documento funja como divulgador de estas técnicas mediante la utilización de la mercadotecnia social.

Mercadotecnia Social, Clonación vegetal, Cultivo *in vitro*

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\* Correspondence to Author (E-mail: aem@usa.com)

† Researcher contributing first author.

## Introduction

Human beings have a great capacity to adapt and transform environmental conditions to live better, even in the most adverse situations. These processes of knowledge transmission are passed on from generation to generation and constitute the main adaptation mechanism of the human species (Madariaga-Orozco and Sierra, 2000), which is why the dissemination of knowledge is considered intrinsic to the desire to share and preserve it.

In 1950, a proposal emerged in the United States to apply the principles of commercial marketing, used for the sale of goods and services, for the dissemination and acceptance of ideas and services, as well as to apply this technology to the solution of some social problems (Góngora, 2014). Programmes and campaigns focused on social marketing have been very successful based on research into the needs, beliefs and desires of the target audience and how they perceive them (Felipe and Morales, 2022).

Unlike the business sector that creates a product and then sells it, social marketing works in reverse: it starts from identifying needs, requests to promote a product that is often a new ideology or benefit resulting from behavioural change (Reyna, 2018).

The impact and capacity of social marketing is being applied with the aim of generating different behaviours. Importantly, there are still gaps that remain unexplored. Today, social marketing is extending into diverse contexts and new behaviours; which involves various actors being engaged to adopt novel technologies and different marketing theories (Quintero, Morales and Morán, 2018).

## *Petunia hybrida*

This is the scientific name for all commonly cultivated hybrids derived from crosses between *Petunia integrifolia* from Brazil and *Petunia axillaris* from Argentina, having their origin in these countries.

*Petunia hybrida* is a herbaceous, annual, perennial plant and can reach a height of 50 cm, while the lowest specimens measure approximately 15 cm. It has flowers of different colours, sizes, undulations and petal textures.

## Taxonomy

Kingdom: Plantae

Division: Magnoliophyta

Class: Magnoliopsida

Order: Solanales

Family: Solanaceae

Subfamily: Petunioideae

Genus: *Petunia*

Species: *Petunia hybrida*

## Uses

As for its use, this plant is widely cultivated on terraces and balconies, and also on lawns as it has a great decorative value and is very attractive.

Its leaves are dark green, oval-shaped, alternate, elongated and entire. It is provided with single or double, funnel-shaped flowers, which can be of various colours: red, violet, blue, white, yellow, purple or shaded, which bloom from spring to autumn, so they rarely survive the winter.

There are several types of this species, which are described below:

### - Multiflorous

These are shrubby plants which develop a large number of comparatively small flowers.

### - Grandifloras

They have fewer but larger flowers which tend to be more susceptible to rain damage.

### - Nana Compacta:

These are small, uniform plants that are more resistant to bad weather and are well suited for pots and planters.

- Pendula or Surfinia

These are varieties with a pendulous and expansive habit, perfect for growing in hanging baskets or window sills, they are also widely used to cover areas of soil in the garden.

### Methodology to be developed

For this experiment, the plant material used was obtained by prior germination of seeds of the species under in vitro conditions.

To the base culture medium for this experiment, 0.4% naphthaleneacetic acid and 0.8% 6-benzylaminopurine per litre of medium were added, which was called NB 1.0 2.0.

The pair of cotyledons was removed from 32 plants of this species in a switched-on laminar flow cabinet using sterile forceps and scalpel. Subsequently, they were placed in NB 1.0 2.0 medium and the flasks were closed with their lids and placed in the respective conditions of the culture chamber.

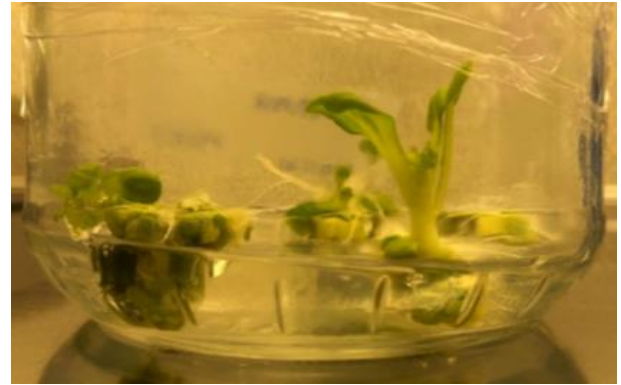
Approximately two weeks after the process described above, culture medium with lower concentrations of naphthaleneacetic acid (0.008%) and 6-benzylaminopurine (0.08%) was prepared and named NB 0.01 0.1.

After 28 days, the explants were removed from the NB 1.0 2.0 medium in a laminar flow cabinet with sterile forceps and as much as possible was removed from the NB 1.0 2.0 medium. The explants were then embedded in NB 0.01 0.1 medium, ensuring that the underside of the cotyledon was in direct contact with the medium and returned to culture chamber conditions.

The success of the experiment would be considered if the explants gave rise to shoots, and these to applicative meristems, with which, after a few days, plants would be obtained.

### Results

The first phase of the experiment lasted 28 days, starting on 27 June and ending on 25 July.



**Figure 1** Petunia cotyledon explants in NB 1.0 2.0 at 28 days

Source: Own elaboration

After this period, the second phase lasted 4 days, ending on 29 July.



**Figure 2** Petunia explant after 28 days

Source: Own elaboration

Of the total of 64 cotyledon explants required for the experiment, 64 seedlings were obtained in potential development for future cloning in culture medium and subsequent acclimatisation.



**Figure 3** Petunia explant 2 in NB 0.01 0.1 after 32 days  
Source: Own elaboration

### Concluding remarks

Petunias need a good sunny location to grow successfully. They look pitiful after heavy rain (prolonged bad weather and strong winds can cause irreparable damage), so it is best to place them in sheltered locations.

They need a lot of water, especially in summer, and even more so when in full sun, and withered leaves should be removed often, as this affects their appearance considerably.

Between June and September, a few drops of liquid fertiliser for flowering plants should be added to the irrigation water every two weeks, once the blossoms have formed (the flowers should not be wet).

The flowers wither when the autumn frosts arrive, at which time the plants are in poor condition. This is the time when they are discarded, to be replaced by new plants the following season.

Propagation of Petunias by seed should be done in March. The seeds are placed in a tray of moist compost and covered with a layer of compost. They are then placed in a propagator or wrapped in a plastic bag at a temperature of 18 to 21 °C.

When the seedlings are large enough to be handled without risk, they are transplanted into permanent containers, but at the same temperature, and finally taken outside in May or early June, when the risk of frost has passed.

### Conclusions

Social marketing is an elementary tool in the dissemination of knowledge for social purposes so that a greater number of people have the knowledge at their disposal and are able to put it into practice.

Nowadays, there are tools such as culture media and laboratories where the necessary experiments can be carried out for the reproduction of plants as alternative measures for their conservation and propagation in such a way that their existence is maintained.

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