



Transferring Galanthus's stress resistance genes to other plants

Simay Ayden ^{*1}, Furkan Ayaz ^{1,2}

¹Mersin University, Biotechnology Department, Türkiye, 21140940006@mersin.edu.tr

²Mersin University, Biotechnology Research and Application Center, Türkiye, furkanayaz@mersin.edu.tr

Cite this study: Ayden, S., & Ayaz, F. (2022). Transferring Galanthus's stress resistance genes to other plants. 5th Advanced Engineering Days, 139-140

Keywords

Snowdrop
Galanthus
Transgenic plants

Abstract

Drought has become a huge problem in changing climatic conditions. Now drought-resistant plants can grow, while other plants are disappearing. Snowdrop flower is a plant that does not need much water to grow and can grow in harsh environmental conditions. We can transfer this resistance gene of the snowdrop to other plants, and in this way, we can grow the plants that are needed for the increasing population, regardless of environmental conditions. At the same time, by using this gene in the production of valuable and high-priced plants, we can make it durable and thus contribute to the country's economy. In this proceeding, we are briefly discussing the possibility of utilization of Galanthus's stress resistance genes for better crop growth and yield.

Introduction

Snowdrop flower grows in Romania, Albania, Austria, Belarus, Bulgaria, Turkey, Czechoslovakia, Greece, Hungary, Italy, Poland, Sicily, Spain, Germany, Switzerland, Ukraine, Yugoslavia, and France [1]. They are easy to grow. In addition to being an ornamental plant, it also provides the treatment of Alzheimer's disease and the snowdrop lectin protects other plants against insect pests [1]. The flowers bloom from late January to March, the optimum flowering period is mid-February: the fruits ripen in June and shed their seeds [2]. Many studies have been done on snowdrops. The first of these was to produce transgenic rice using the lectin found in snowdrops and provide protection from insects [3]. Another study is the use of galantamine found in snowdrops in the treatment of Alzheimer's disease [4].

Results

In order to transfer genes in plants, we first isolate the piece of DNA we want to transfer. Then we insert this piece of DNA into a suitable vector and we get recombinant DNA [5]. We can transfer recombinant DNA to plants in 3 ways [5].

1. Via viruses
2. By biolistic, micro-injection, electroporation
3. We can transfer it via Agrobacterium.

Snowdrop is a plant that can withstand harsh winter conditions and can grow in an arid environment. We can produce a transgenic plant by transferring the gene that makes it resistant to another plant. And so we can produce plants that need less water.

Ornamental plant exports in Turkey contribute very little to the economy compared to other countries [6]. We can grow valuable ornamental plants with the endurance genes of the snowdrop. In this way plants will be more resistant, will grow with less water, and will not need the sun to grow, and we can export more.

Conclusion

We can use the features of the snowdrop, which enable it to bloom in harsh winter conditions and need less water, not only in ornamental plants, but also in plants that are the main food source for humans [3, 4]. In this way the production efficiencies of the economically important plant species can be increased with less cost. Future studies should be conducted to examine the effectiveness of such methods to find the best working genes to increase the stress resistance in strategically important plants for human consumption.

References

1. Gardens, K. R. B. (2016). World checklist of selected plant families. 2016- 04- 14]. <http://apps.kew.org/wcsp/Retrieved>.
2. Church, A. H. (1908). *Types of floral mechanism: a selection of diagrams and descriptions of common flowers arranged as an introduction to the systematic study of angiosperms* (Vol. 1). At the Clarendon Press.
3. Sudhakar, D., Fu, X., Stoger, E., Williams, S., Spence, J., Brown, D. P., ... & Christou, P. (1998). Expression and immunolocalisation of the snowdrop lectin, GNA in transgenic rice plants. *Transgenic Research*, 7(5), 371-378.
4. Tewari, D., Joshi, T., & Sah, A. N. (2021). Galanthus nivalis L.(snowdrop). In *Naturally Occurring Chemicals Against Alzheimer's Disease* (pp. 301-315). Academic Press.
5. https://acikders.ankara.edu.tr/pluginfile.php/112005/mod_resource/content/0/BAH%C3%87E%20B%C4%B0TK%C4%B0LER%C4%B0NDE%20B%C4%B0YOTEKNOLOJ%C4%B0-14.%20HAFTA.pdf
6. ITC, (2020). Ticaret Bakanlığı, Dış Ticaret Verileri (2009, 2016, 2017, 2018, 2019)