

A REVIEW ABOUT INDUCED POLYPLOIDIZATION IN THE MEDICINAL SPECIES OF THE LAMIACEAE FAMILY

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1. INTRODUCTION

The Lamiaceae family contains more than 6000 species and most of them hold healing properties by a high content of essential oils used against nausea, anxiety, cancer, and other health issues.

To increase the quality and quantity of plant secondary metabolites, many breeding techniques were developed, and one of them is polyploidization (Fig. 1).

The aim of this study was to perform a review of polyploidy induction *in vitro* and *in vivo* on medicinal species from the Lamiaceae family

The obtained data was evaluated quantitatively and qualitatively according to:

- Part of the plant used.
- Antimitotic agent (type, exposure time and concentration).
- Polyploidization method used.

The common biochemical changes were also described, defining their benefits on the pharmaceutical use of the plant.

3. RESULTS

The induced polyploidization was performed upon 17 medicinal species of the Lamiaceae family *in vitro* (60%) and *in vivo* (40%) conditions. Data are summarized in the table 1.

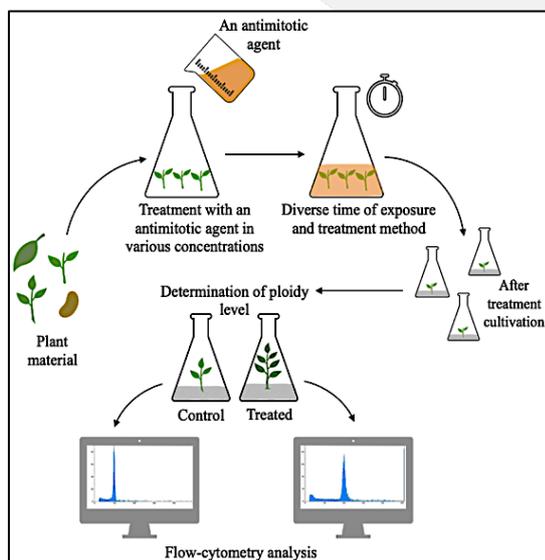


Figure 1: *In vitro* polyploidy induction procedure.

2. METHODOLOGY

Data was collected from scientific databases: Web of Science, Scopus and Science Direct, between 1996-2021.

Table 1: Evaluated data results extract.

	By number of studies	By efficiency
Plant part	seeds (8*)	leaf segment (39%)
Antimitotic agent concentration	Colchicine (16*) 0.0013 – 25.4 mM	Oryzalin (23.4%) 9.96 - 80 µM
time	Overnight - 30days	48h until 2 weeks
Used method	soaked in solution (11*) <i>in vitro</i> (12*)	inductive media (30%) <i>in vitro</i> (28.26%)
Determination method	flow cytometry (10*)	-

* Number of studies

The polyploids displayed:

- Multiple morphological and anatomical changes (e.g., increase in plant vigour).
- Biochemical profiles variations: higher quantity of secondary metabolites such as flavonoids or phenols.

4. CONCLUSIONS

This review could be beneficial for the Lamiaceae family plant breeding processes, since it offers a wide insight of procedures providing efficient polyploidization methods analysis for future experiments.