

Substrate and salinity influence on seed germination and seedling growth of *Chelidonium majus* L.

Iva Doycheva

Institute of Biodiversity and Ecosystem Research,
Bulgarian Academy of Sciences, Sofia

SOFIA UNIVERSITY
ST. KLIMENT OHRIDSKI



FACULTY OF BIOLOGY
SOFIA UNIVERSITY

Kliment's Days
2020



Fig. 1. *Chelidonium majus* L.
(Breitkopf & Härtel, 1901)

Introduction

Salinity affects plant growth, development, physiological and biochemical processes. As a result, it can suppress germination and severely limit plant growth and productivity.

Chelidonium majus L. is a widespread medicinal perennial species, which is cultivated in some countries in Central and Eastern Europe (**Fig. 1; 6**).

The aim of the study was to investigate *Ch. majus*'s sensitivity, seed germination ability and seedling growth on substrates supplemented with different concentrations of NaCl and the influence of the type of the substrate itself on the toxic effects of salinity.



Fig. 2. *Ch. majus* L. seedlings cultivated on water agar (above) and filter paper (left).

Materials and methods

The sterilized seeds were germinated on filter paper moistened with distilled water and water agar both supplemented with 50, 100 or 150 mM NaCl (**Fig. 2**).

Results and discussion

NaCl didn't have a strong impact on seed germination. But the type of the substrate influenced the germination percentage and the effect of NaCl when the seeds germinated on agar (**Fig. 3**).

Therefore, seed germination on filter paper was from 85.00% to 95.00%, which differed greatly from the seed germination on agar which was from 20.00% to 62.50% for the different concentrations of NaCl.

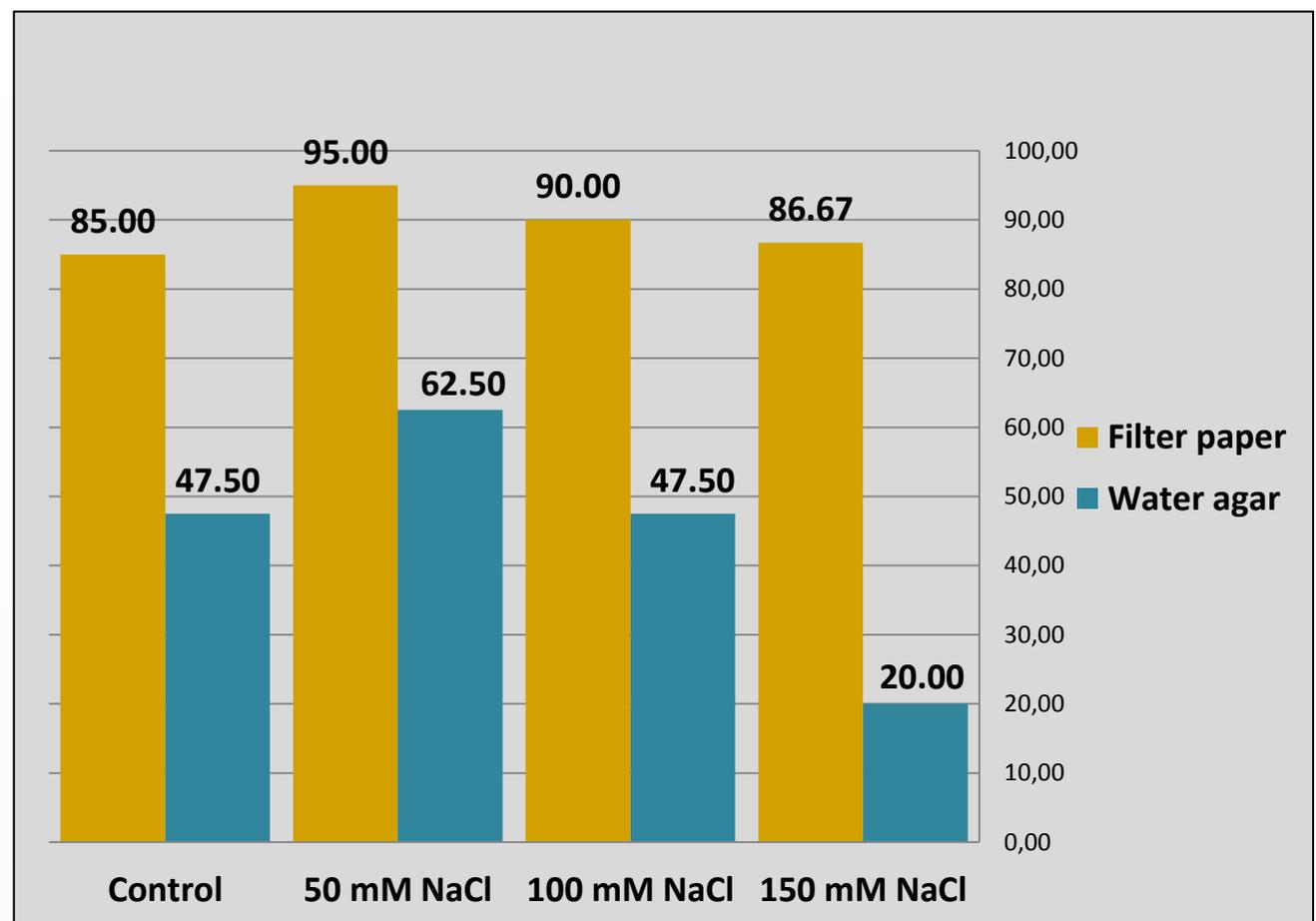


Fig. 3. Seed germination (%) on filter paper and water agar.

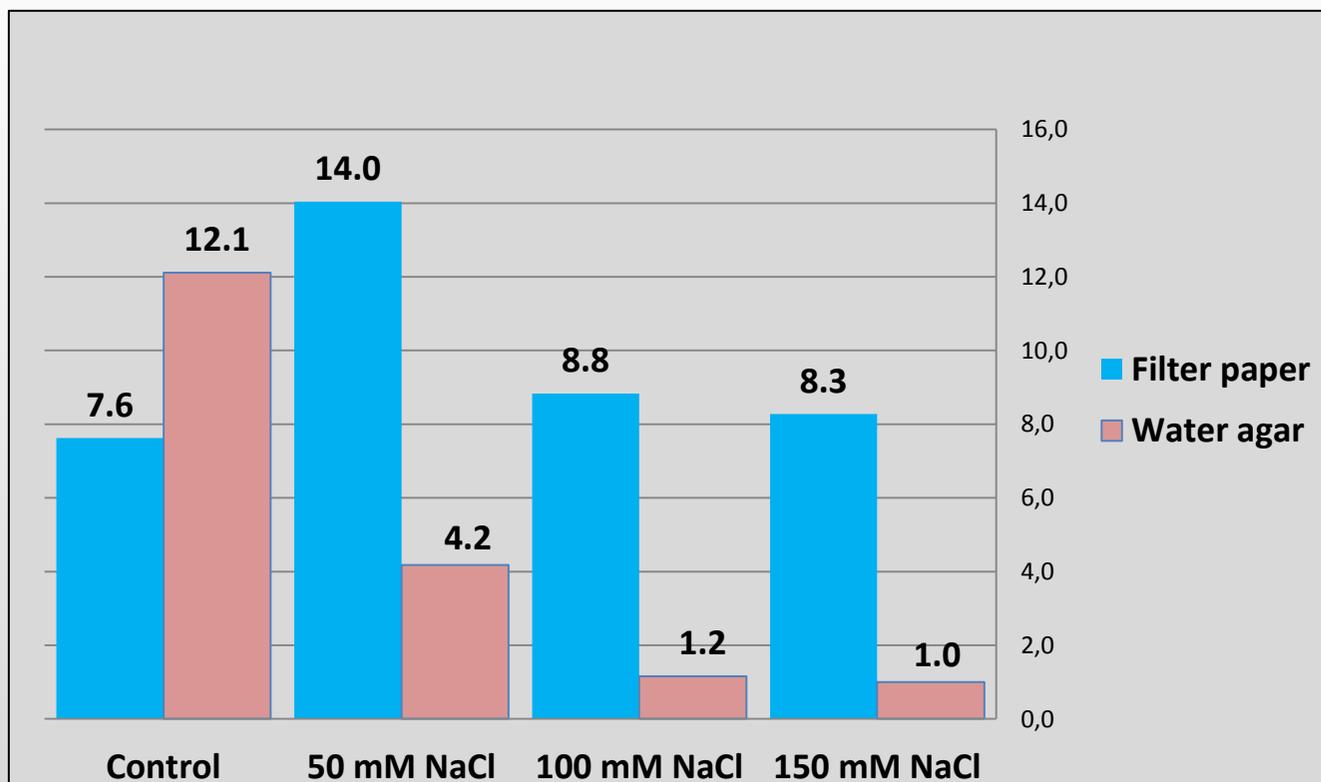


Fig. 4. Mean root length (mm) on the studied substrates.

The influence of NaCl on the primary root growth depended to a great extent on the type of the substrate. The reducing impact of NaCl on root length was present on agar, whereas it was absent on filter paper (**Fig. 4**). This, however, was not established in relation to the hypocotyl growth.

Results and discussion (continued)

NaCl reduced the hypocotyl length in all applied concentrations and on both substrates. The reducing effect of NaCl on hypocotyl growth rose with the increase in the concentration (**Fig. 5**).

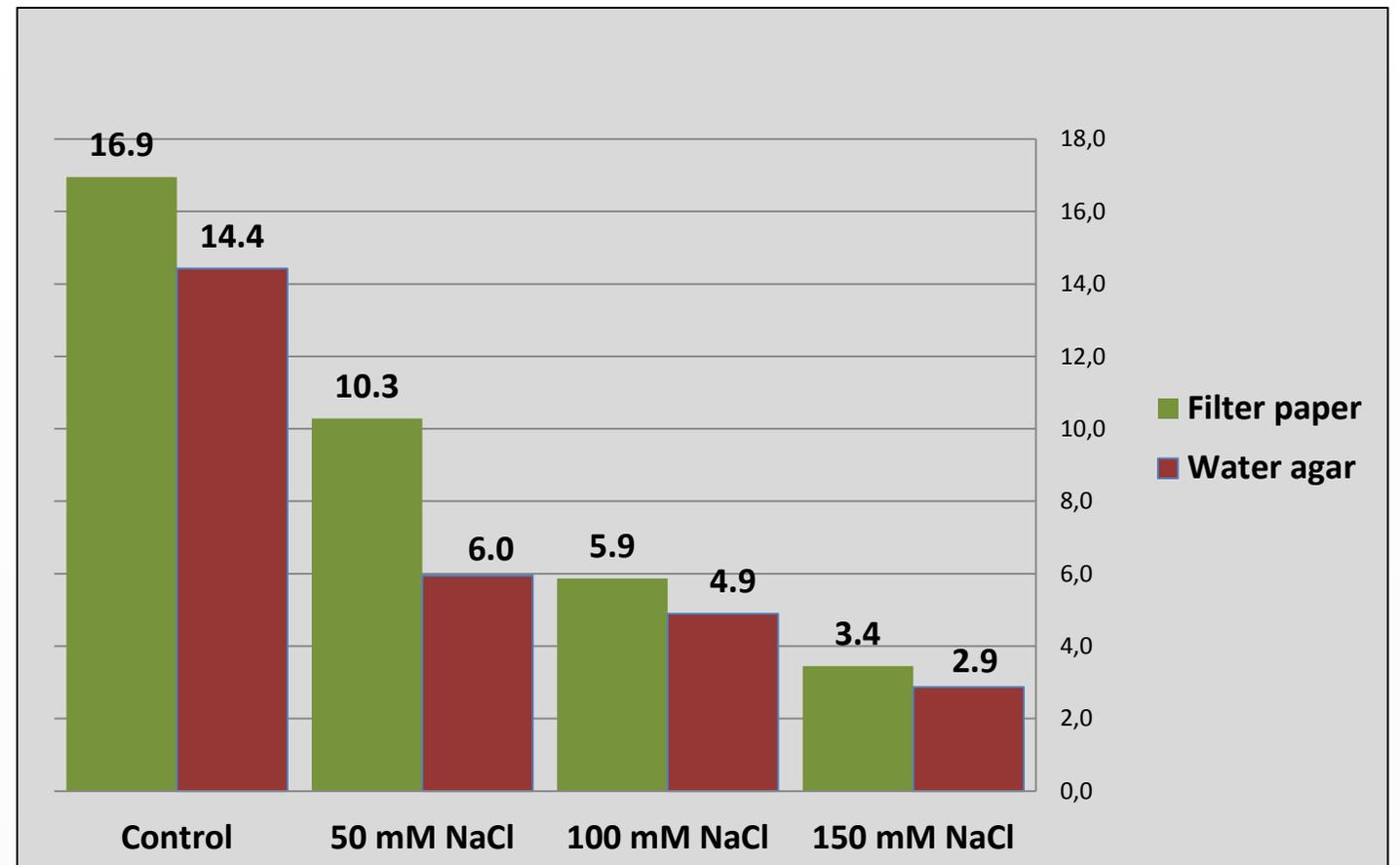


Fig. 5. Mean hypocotyl length (mm) on both substrates.

Conclusions

The results showed that the type of substrate influenced seed germination more than NaCl in the investigated concentrations. However, as far as the length of the primary roots and hypocotyls was concerned, NaCl suppressed their growth in both substrates, especially of roots, where its reducing effect was strengthened by the substrate.



Fig. 6. *Chelidonium majus L.*
in blossom

Acknowledgements: This research was supported by the Bulgarian National Science Fund, Bulgarian Ministry of Education and Science (Project КП-06-M26/4 from 01.12.2018).