USNIC ACID AS A POTENTIAL BIOCONTROL AGENT AGAINST TOMATO MOSAIC VIRUS: EFFECT ON VIRAL DISTRIBUTION IN TOMATO PLANTS

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INTRODUCTION

Tomato mosaic virus (ToMV) causes significant yield losses in tomato crops. Due to the stability of the virus and limited antiviral treatments, environmentally friendly control strategies are required. Usnic acid, a lichen secondary metabolite, exhibits promising antiviral and plant-protective properties

AIM OF THE STUDY

To analyze the distribution of ToMV in different organs of tomato plants.

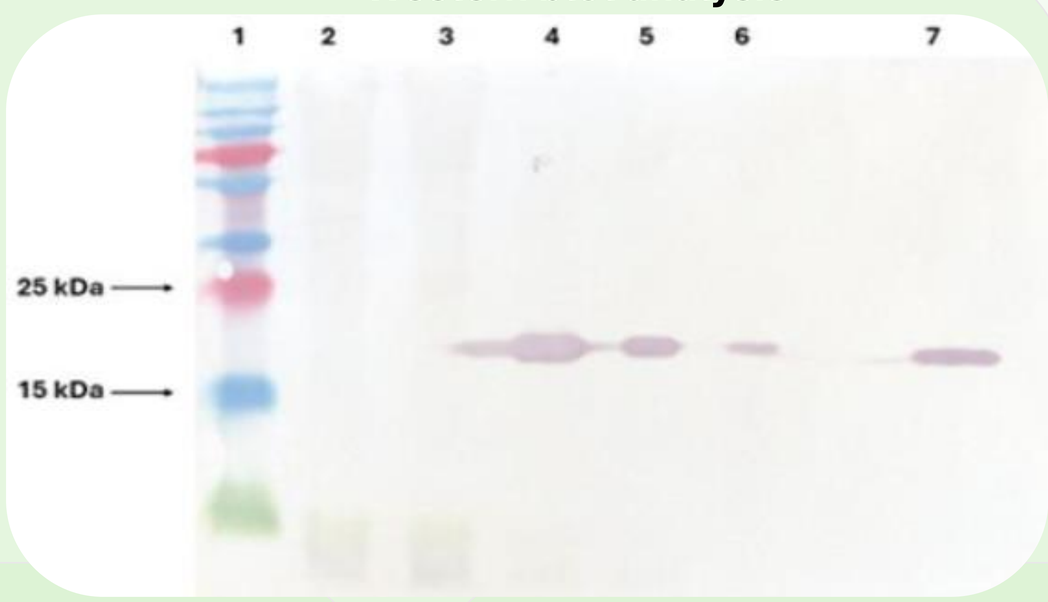
To evaluate the inhibitory effect of usnic acid (2 µM and 20 µM) on viral accumulation and movement

To assess changes in photosynthetic pigments in infected and treated plants.

RESULTS

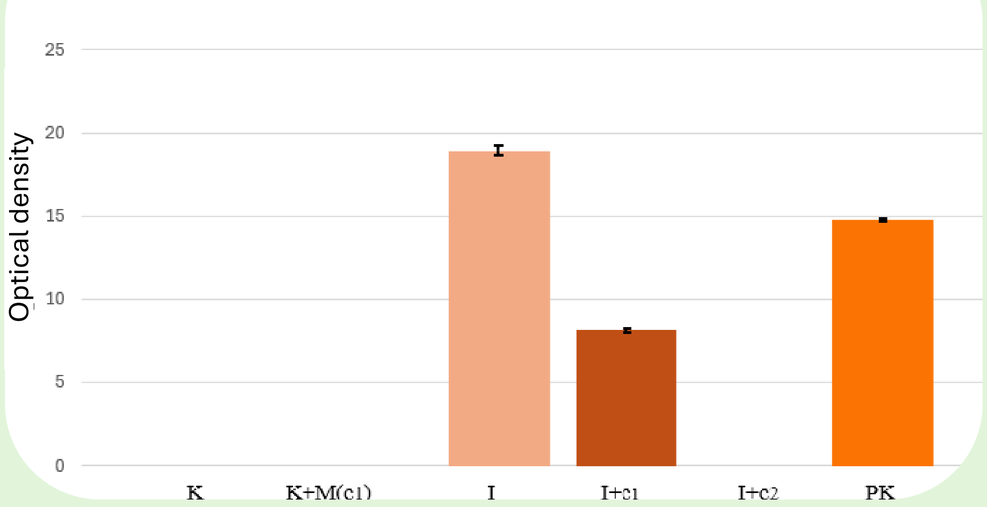
- CP protein detected in infected plants
- Reduced CP accumulation after usnic acid treatment
- Strongest inhibition observed at 20 µM

Western blot analysis



CP protein accumulation in tomato stems during IV. sampling.

Quantification analysis

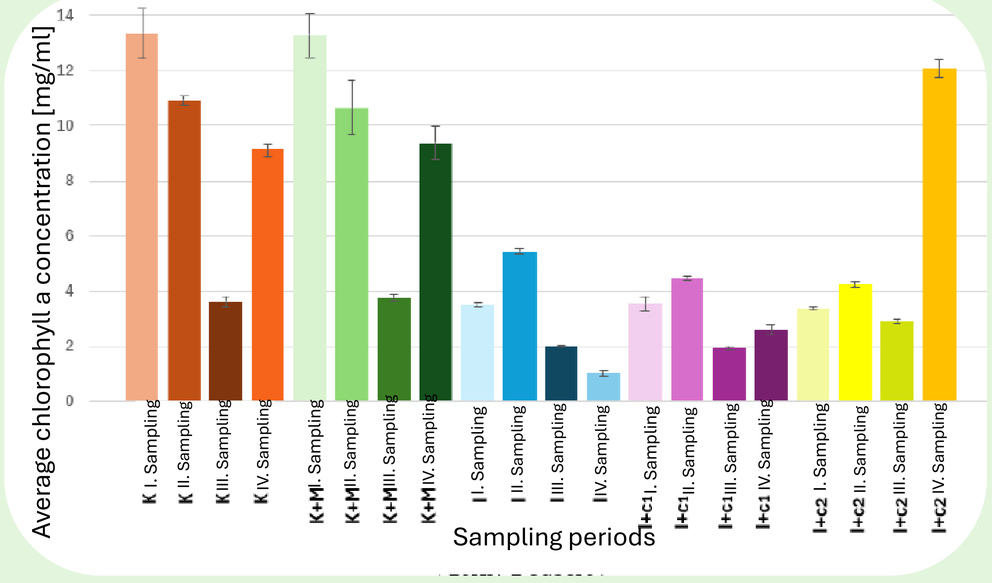


Quantification of CP protein intensity.

- Significant reduction of CP protein intensity
- Significant antiviral effect at 20 µM (I+c2)

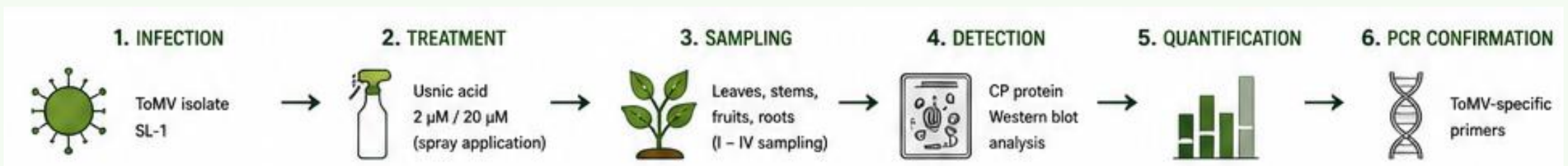
Photosynthetic pigments

- Viral infection reduced chlorophyll content
- Usnic acid partially alleviated physiological stress



Changes in chlorophyll a content in infected and treated plants.

METHODOLOGY



KEY FINDINGS

Usnic acid significantly reduced ToMV accumulation in all analyzed organs.

At 20 µM, no CP protein was detected during II. sampling.

Usnic acid shows potential as an environmentally friendly biocontrol agent against ToMV.

Usnic acid alleviates the negative impact of infection on photosynthetic pigments.

CONCLUSION

Usnic acid effectively reduced ToMV accumulation and systemic spread in tomato plants, particularly at 20 µM concentration. The results highlight its potential application as an environmentally friendly antiviral strategy against tobamoviruses.

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