ÚLTIMOS AVANÇOS NO USO DE RNA DE FITA DUPLA COMO UMA FERRAMENTA PARA PROTEÇÃO VIRAL EM PLANTAS DE TOMATE
LATEST ADVANCES IN THE USE OF DOUBLE-STRANDED RNA AS A TOOL FOR VIRAL PROTECTION IN TOMATO PLANTS

Jonas Rafael Vargas [1]; Bárbara Mavie Camargo de Sousa [4]; Dorian Yest Melo Silva [6]; Yanca Francine Martins [5]; Wandressa de Souza Pereira [4]; Maicon Segalla Petronio [7]; Erich Yukio Tempel Nakasu [3]; Alice Kazuko Inoue-nagata [2]

[1]Bolsista pós-doutorado. Brasília, Distrito Federal, Brasil. Embrapa Hortaliças; [2]Pesquisadora. Brasília, Distrito Federal, Brasil. Embrapa Hortaliças; [3]Analista. Brasília, Distrito Federal, Brasil. Embrapa Hortaliças; [4]Bolsista iniciação científica. Brasília, Distrito Federal, Brasil. Embrapa Hortaliças; [5]Bolsista graduada. Brasília, Distrito Federal, Brasil. Embrapa Hortaliças; [6]Bolsista mestrado. Brasília, Distrito Federal, Brasil. Universidade de Brasília; [7]Diretor científico. Araraquara, São Paulo, Brasil. N&P desenvolvimento, pesquisa e inovação

Resumo:
Lately, great attention has been diverted to elucidating the mechanisms underlining plant gene silencing and the action of non-coding RNA in plants. Concomitantly, knowledge about the interactions between plants and pathogens has evolved greatly, bringing to the spotlight the importance of double-stranded RNA (dsRNA) as a tool to generate or improve resistance against plant pathogens. Plant viruses are responsible for important losses in the yield of several commodities. Viruses are very diverse, and to date, no products available in the market allow effective control of viral infections. The use of dsRNA molecules as a tool is based on the plant gene-silencing pathways (GS). After being topically applied, the dsRNA can activate GS, which uses it as a template for synthesizing small RNAs, leading to the degradation of specific RNA molecules present in the plant cell. The GS acts as a natural way for plants to control the expression of their own genes and, in the case of dsRNA, specific targets such as virus genomes or transcripts. Aiming to generate a product using dsRNA as an active ingredient, our research group is working to better understand the mechanism of GS triggered by the dsRNA while using different ways of application and delivery, and testing different approaches to improve its efficiency and range of action. Therefore, we conducted different experiments working with tomato mosaic virus and tomato plants. We tested the protective capacity of our dsRNA at a dosage of 200 µg against different inoculum dilutions; analyzed the effects of methyl jasmonate and salicylic acid in conjunction with dsRNA; and examined dsRNA nanoencapsulation for its effects on the efficiency and longevity of protection. As major results, we observed that our current dsRNA dosage, when applied naked, has a limited window of protection. The use of plant hormones combined with naked dsRNA application does not offer any significant improvement in protection, while the nanoencapsulation of our dsRNA was able to significantly enhance not only the efficiency (from 60% to 80% of protection) but also the longevity of protection, guaranteeing 60% protection after 5 days of dsRNA application. Although the results we found may vary with different viruses, they stand as important steps on our path to a reliable and robust final product, and they also support the notion that dsRNA nanoencapsulation is a viable and potent tool for use in plant disease management in the near future.
Palavras-chave: DsRNA; Chitosan; Virus; Nanoencapsulation; Plant hormone