



Ectopic expression of *Arabidopsis thaliana* Na⁺(K⁺)/H⁺ antiporter gene, *AtNHX5*, enhances soybean salt tolerance

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ABSTRACT. Drought and salt stresses are the two major factors influencing the yield and quality of crops worldwide. Na⁺(K⁺)/H⁺ antiporters (*NHXs*) are ubiquitous membrane proteins that play important roles in maintaining the cellular pH and Na⁺(K⁺) homeostasis. The model plant *Arabidopsis* potentially encodes six *NHX* genes, namely *AtNHX1* to *6*. In the present study, *AtNHX5*, a comparatively less well-studied *NHX*, was cloned and transferred into a soybean variety, Dongnong-50, via *Agrobacterium*-mediated cotyledonary node transformation to assess its role in improving salt tolerance of

the transgenic plants. The transgenic soybean plants were tolerant to the presence of 300 mM NaCl whereas the non-transgenic plants were not. Furthermore, after NaCl treatment, the transgenic plants had a higher content of free proline but lower content of malondialdehyde compared to the non-transgenic plants. Our results revealed that that *AtNHX5* possibly functioned by efficiently transporting Na⁺ and K⁺ ions from the roots to the leaves. Overall, the results obtained in this study suggest that soybean salt tolerance could be improved through the over expression of *Arabidopsis AtNHX5*.

Key words: *AtNHX5*; Soybean; Na⁺(K⁺)/H⁺ antiporters; Salt tolerance