

## **Gene silencing by microRNA in pineapple: discovery, involvement in the control of fruit development and its application as artificial gene regulators**

### **Abstract**

MicroRNAs (miRNAs) are a class of small RNAs, usually 19-24 nt in length, which are found endogenously within the cell and do not code for any protein. However, they participate in regulating the level of mRNA transcripts through cleavage or translational inhibition, creating an effect called gene silencing. MicroRNAs have been shown to be essential for major biological and physiological development in plants, including pineapple. A hundred and fifty-three miRNAs, regulating many aspects of plant growth, have been described in pineapple to date. Reports of the existence of this natural gene silencing system have led to the development of a similar system at a synthetic level. Artificial microRNA (amiRNA) is a unique custom-designed molecule of RNA, approximately 21 nt in length, with the sole function of silencing the expression of its target gene by mimicking the action of miRNA in the RNA interference (RNAi) pathway. In pineapple, target genes have not only been silenced using this technique but the silencing has occurred in a specific manner, i.e., the target genes were silenced without affecting the expression of other, unrelated genes. This technique has addressed the limitations of conventional breeding techniques, as amiRNA silencing can be performed rapidly and is time-consuming and occurs in a specific manner.