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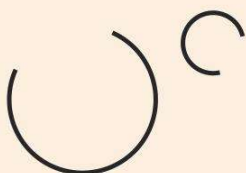
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### Development of LAMP Primers for the Detection of Pyrethroid Resistance Mutations in *Varroa destructor*

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*Varroa destructor* is one of the main threats to *Apis mellifera* L., directly affecting colony health and contributing to their global decline. Control of this mite is traditionally achieved using acaricides, with pyrethroids such as tau-fluvalinate and flumethrin being the most used, acting on voltage-gated sodium channels (VGSC). However, the intensive use of these compounds by beekeepers has led to the emergence of resistance, associated with mutations at residues 918 and 925 of the VGSC gene [1]. Traditional methods for detecting these mutations, such as PCR, TaqMan and RT-PCR, are effective but require expensive laboratory equipment. In this context, Loop-mediated Isothermal Amplification (LAMP) is a promising alternative, offering rapid and cost-effective detection without the need for thermal cycling [2]. LAMP is based on the use of a set of four to six primers, including two inner primers (FIP and BIP), two outer primers (F3 and B3), and optionally two loop primers (LoopF and LoopB), which are introduced to accelerate the amplification reaction [3]. This study aimed to develop specific LAMP primers, using the NEB LAMP software, for the detection of the main mutations associated with *Varroa destructor* resistance to pyrethroids in Portugal. The predictive efficiency, specificity, and thermodynamic properties of the designed primers were assessed using BLAST, eLAMP, and OligoAnalyzer tools, considering qPCR parameters. This work successfully identified specific primer sets, including loop primers, for the detection of the mutation at position 925, which may be used in future experimental validations for rapid diagnostic applications.

#### References

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