TYMIRIUM® Technology: The Discovery of Cyclobutrifluram

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The damage caused by plant-parasitic nematodes leads to severe agricultural yield losses worldwide. To tackle the threat of nematodes, a discovery program was started at Syngenta which led to the development of TYMIRIUM® technology, a new nematicide and fungicide that obtained first registrations in 2022.

The active ingredient is Cyclobutrifluram, a chiral phenyl-cyclobutyl-pyridineamide, which displays broad spectrum efficacy against the plant parasitic nematodes and soil-borne diseases – particularly the *Fusarium* species.

We describe the discovery of this molecule from hit identification through lead exploration and lead optimization phases.

This includes the establishment of the nematicide screening platform together with the generation of a focused nematicide screening library, and the rapid identification of the mode of action for the lead series. Target identification using biochemical and genetic methods, allowed the development of an *in vitro* assay for SAR analysis and the development of homology models for structure-based design. This established a design and analysis toolbox for accurate molecular design coupled to synthesis. Our collaborative, multi-disciplinary approach led to the discovery of TYMIRIUM® technology.