Title: **An Improved Route Towards [5.5.5.6]dioxafenestranes**

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General abstract

Natural products are an important source of novel structure and biological activity and often form the basis for the development of new medicines and pesticides. Organic synthesis plays and important in this process from addressing supply to providing access to novel structures through semi-synthesis.

The [5.5.5.6]dioxafenestrane family of compounds, which feature four fused rings are attractive, and often challenging targets for synthesis. Some members of this family have displayed interesting biological activity but if they are to be fully explored, new synthetic methods towards these complex and varied molecules are needed.

Challenges observed in the first-generation synthesis of one such compound are addressed in this work. A faster, milder, more efficient and scalable approach has been developed, allowing supply issues in the broader synthesis to be addressed. Preliminary insights into absolute stereocontrol are also presented.

Popular science

With a growing global population, the need for new medicines and adequate food production are increasingly important considerations. Pesticides are widely used to increase the yields of the crops, and as a result the demand for more effective, selective and environmentally friendly pesticides is constantly growing. Natural molecules are often the inspiration for new pesticides and medicines.

The [5.5.5.6]dioxafenestranes are a family of small complex molecules which possess an intriguing chemical structure and display promising biological activity. New chemical tools are needed to make these and related compounds, if their properties are to be fully explored.

The chemical synthesis of key intermediates in the synthesis of a [5.5.5.6]dioxafenestrane has been investigated and improved. A faster, milder, more efficient and scalable approach has been developed, allowing large quantities of important compounds to be made quickly.