



## THEME 2 - UREASE AND NITRIFICATION INHIBITORS

Theme 2 is aimed at the design and synthesis of new compounds that enable inhibition of urease and ammonia monooxygenase (AMO) to overcome the problems with the current commercially available urease and nitrification inhibitors, such as low stability, difficult handling, and highly variable performance.

### GOALS

- To develop new compounds that inhibit urease and ammonia monooxygenase (AMO) better than current commercial inhibitors to improve nitrogen use efficiency.
- To tailor the new generation of inhibitors to different soil conditions across Australia.
- To ensure that the eventual degradation of the inhibitors in soil will not lead to any additional environmental problems in Australian Agriculture Industry.



### THE OPPORTUNITY

- Modifying the structure of the current commercially available inhibitors could lead to better performing materials.
- The enzyme urease can be targeted in several ways to block its activity
- The enzyme AMO has copper in its active site; developing compounds that can effectively bind to the metal centre may lead to potent inhibitors

### INDUSTRY OUTPUT

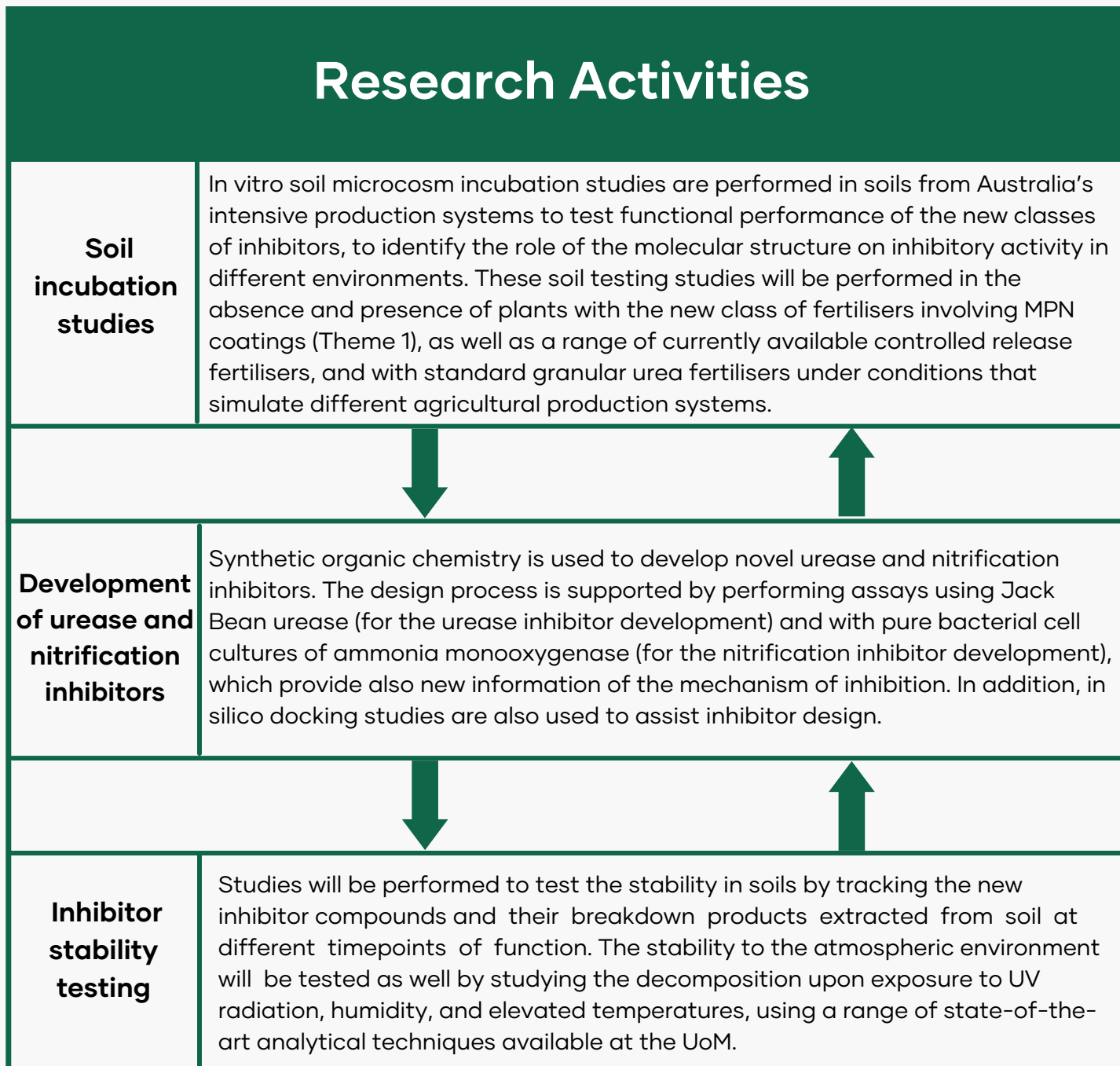
New long-lasting urease and nitrification inhibitors tailored for intensive agriculture, which will reduce the needed quantity of N fertiliser to achieve the same yield, thereby increasing environmental sustainability by decreasing pollution of the atmosphere and waterways.

### OUR PARTNERS



## RESEARCH ACTIVITIES

The development of next-generation inhibitors involves the design and synthesis of new compounds, testing of their performance in in vitro soil incubation studies in both the absence and presence of plants, and examining their stability through tracing in soils and degradation studies. The three work packages are closely intertwined, and results obtained in each of these will feedback and feedforward in an iterative fashion, as shown in the table below.



### Research Team



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### PhD Candidates

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