Trends and Prospects of Microbiome Research at the South African Rhizobium Culture Collection (SARCC)

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Presentation Outline

1. The South African Rhizobium Culture Collection (SARCC)
2. SARCC utilization in Biological Nitrogen Fixation (BNF)
   2.1. Development of commercial inoculants
   2.2. BNF research for forage & indigenous legumes
3. Microbiome research for abiotic stressed legumes
   3.1. Example of detected beneficial trait (ACC-deaminae)
   3.2. Example of detected beneficial trait (Siderophore)
4. Concluding Summary & Recommendations
1. **The South African Rhizobium Culture Collection (SARCC)**

- The inception of research on BNF at the ARC-PPRI dates back to the 1960s
- The establishment of the South African Rhizobium Culture Collection (SARCC) as a genetic resource, an integral part of the SA legume industry.
  - Main source of legume rhizobium inoculant strains.
  - Significant economic and social benefits (commercial & subsistence), the collection supports research in *Biological Nitrogen Fixation (BNF)* & Microbiome research

- SARCC cultures obtained from various sources: *field collections*, international sources (*overseas culture collections, universities, client deposits etc.*).
The South African Rhizobium Culture Collection (SARCC)
2. SARCC Utilization in Biological Nitrogen Fixation

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\begin{align*}
\text{N}_2 + 8 \text{H}^+ + 8 \text{e}^- & \xrightarrow{\text{nitrogenase}} 2 \text{NH}_3 + \text{H}_2 \\
16 \text{Mg-ATP} & \rightarrow 16 \text{Mg-ADP} + 16 \text{P}_i
\end{align*}
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FeMo-cofactor