

Agricultural Biotechnology

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V(A). Planned Program (Summary)

1. Name of the Planned Program

Agricultural Biotechnology

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

| KA Code | Knowledge Area | %1862 Extension | %1890 Extension | %1862 Research | %1890 Research |
|---------|---------------------|-----------------|-----------------|----------------|----------------|
| 206 | Basic Plant Biology | | | | 100% |
| | Total | | | | 100% |

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

| Year: 2007 | Extension | | Research | |
|---------------|-----------|------|----------|------|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 0.0 | 0.0 | 0.0 | 1.8 |
| Actual | 0.0 | 0.0 | 0.0 | 1.0 |

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

| Extension | | Research | |
|---------------------|----------------|----------------|----------------|
| Smith-Lever 3b & 3c | 1890 Extension | Hatch | Evans-Allen |
| | 0 | 0 | 190536 |
| 1862 Matching | 1890 Matching | 1862 Matching | 1890 Matching |
| 0 | 0 | 0 | 133844 |
| 1862 All Other | 1890 All Other | 1862 All Other | 1890 All Other |
| 0 | 0 | 0 | 49177 |

V(D). Planned Program (Activity)

1. Brief description of the Activity

The initial studies are focused on Tryptophan monooxygenase (TMO) from *Agrobacterium tumefaciens*. The objectives of this research proposal on "Structural and Mechanistic studies of Tryptophan monooxygenase from *A. tumefaciens*" are to characterize the TMO enzyme from *Agrobacterium tumefaciens*. It is a plant pathogenic organism responsible for the crown gall disease in the plants, results in compromised growth and results in decrease in the agricultural yield. None of the basic enzyme parameters like substrate affinity constants or reactions rates for the TMO of *A. tumefaciens* have so far been established. And also no structural information of any TMO is yet available. Because of its role in the tumorigenesis in plant, the regulation of IAA synthesis is of interest. Studies on the structure and catalytic mechanisms of TMO will help in developing inhibitors. Such inhibitors will prevent the formation of galls on the infected plants and there by block the deleterious effects of the infection and increase the agricultural yield. Novel information on the structure function relationships of TMO could be used to increase the yield of crops. This project includes cloning, expressing, and characterizing the TMO, understanding the kinetics of enzyme on substrate specificity and catalysis, identifying the critical protein sequence on activity, and designing novel inhibitors. Recent results indicates, for the first-time the TMO from *A. tumefaciens* has been cloned.

2. Brief description of the target audience

Plant physiology researchers
 Biochemists
 Agriculture biotechnology companies

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

| | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|-------------|-----------------------------------|-------------------------------------|----------------------------------|------------------------------------|
| Year | Target | Target | Target | Target |
| Plan | 0 | 0 | 0 | 0 |
| 2007 | 0 | 0 | 0 | 0 |

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year Target

Plan: 0

2007: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

| | Extension | Research | Total |
|-------------|------------------|-----------------|--------------|
| Plan | | | |
| 2007 | 0 | 0 | 0 |

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

Scientific presentations/publications

| Year | Target | Actual |
|-------------|---------------|---------------|
| 2007 | 0 | 0 |

V(G). State Defined Outcomes

| O No. | Outcome Name |
|-------|--|
| 1 | Improve plant photosynthesis % |
| 2 | Developing isolation and cloning methodology for TMO |

Outcome #1

1. Outcome Measures

Not reporting on this Outcome for this Annual Report

2. Associated Institution Types

3a. Outcome Type:

3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|------|---------------------|--------|
|------|---------------------|--------|

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---------|----------------|
|---------|----------------|

V(H). Planned Program (External Factors)

External factors which affected outcomes

Other (Other research findings)

Brief Explanation

The current/used available technologies applied in the isolation and cloning methodology of TMO are particularly difficult. A great deal of time resource was invested.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

Retrospective (post program)

During (during program)

Evaluation Results

Key Items of Evaluation