



# IIT MADRAS

Indian Institute of Technology Madras

## Technology Transfer Office TTO - IPM Cell



### Industrial Consultancy & Sponsored Research (IC&SR)

## Enantio- and Diastereoselective Process For One-step Synthesis of Enantioenriched Pyrrolo[1,2-D][1,4]Thiazine-2-Carbaldehydes Core Using Chiral Organocatalyst

### IITM Technology Available for Licensing

#### Problem Statement

- Traditional Pyrrolo[1,4]thiazine synthesizing methods involve **multistep processes** having **multiple starting materials & harsh reaction conditions**, that contributes to **inefficiencies challenges** in obtaining **desired compounds**.
- Many methods depend on **expensive and toxic reagents, catalysts, ligands**, effecting overall synthesis cost, environment & safety concerns.
- Existing methodologies suffer from drawbacks like **high reaction temperatures, unwanted by-products generation** and **use of air-sensitive starting materials**.
- Hence, there is a need for a **more efficient & practical** synthetic approach, utilizing **easily accessible & inexpensive starting materials** to minimize the said challenges while promoting **streamlined-environmental friendly process** for obtaining chiral Pyrrolo[1,2-d][1,4]thiazine-2-carbaldehyde cores.

#### Technology Category/ Market

**Category:** Chemistry & Chemical Analysis

**Industry:** Medicinal Chemistry, agrochemicals, Organic Synthesis, pharmacy, materials science

**Applications:** Chiral Pyrrolo[1,2-d][1,4]thiazine-2-carbaldehyde cores Synthesis, new drugs production with improved therapeutic properties, development of nitrogen-containing heterocycles, in various other Chemistry fields like medicinal chemistry, organic synthesis, and catalysis.

**Market:** Chiral Chemicals Market size was valued at **USD 58.82 billion in 2021** and is predicted to reach **USD 149.95 billion by 2030** with a **CAGR of 9.8%** from **2022 to 2030**

#### Research Lab

**Prof. Govindasamy Sekar**  
Department of Chemistry

#### Intellectual Property

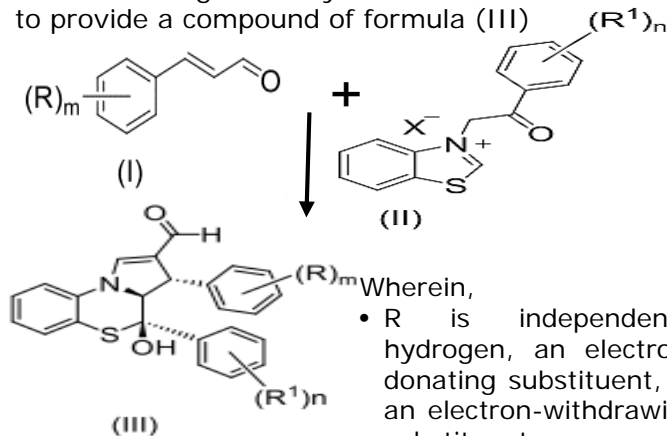
IITM IDF No.: **2421** | IP No.: **454952 (Granted)**

#### TRL (Technology Readiness Level)

**TRL-3: Proof of Concept**

#### Technology

The present disclosure relates to a **process** for **preparing** chiral pyrrolo[1,2-d][1,4]thiazine-2-carbaldehyde core (**Formula III**). The process comprises: reacting a compound of formula (I) with a compound of formula (II), in the presence of a chiral Organocatalyst, a base, and a solvent to provide a compound of formula (III)



- R1 is independently hydrogen, halo, alkoxy, or nitro.
- X is halo.
- m is independently 1 to 5.
- n is independently 1 to 5.

#### Key Features / Value Proposition

##### ❖ User perspective:-

- Synthesizes diverse chiral pyrrolo[1,2-d][1,4]thiazine-2-carbaldehyde cores for a range of applications.
- Precision in stereochemistry achieved through chiral Organocatalyst for enantiomerically pure products. Tailorable process for user-specific properties with different substituents.

##### ❖ Industrial perspective:-

- Designed for efficient production on an industrial scale. Optimized conditions minimize manufacturing expenses.

##### ❖ Technology perspective:-

- Advances in organic synthesis and asymmetric catalysis. Reproducible and consistent results for further research and development.
- Carefully selected catalysts, bases, and solvents ensure high-yield and selective synthesis.

#### CONTACT US

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