

Cracking the Chemical Code: Total Synthesis and the Absolute Stereochemistry of *Pellaea stictica*'s Pheromone

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Deciphering the intricate chemical language of organisms remains a paramount challenge in chemical ecology. Pheromones, as key signals, offer valuable clues about species behaviors. *Pellaea stictica*, an insect notorious for its hard-to-find pheromone, is a prime example of this. This insect is a neotropical soybean pest with a significant presence in Brazil. This talk focuses on the systematic approach employed to identify *Pellaea stictica*'s pheromone molecule as 2,4,8,13-tetramethyltetradecan-1-ol. Through extensive analysis of male extracts via GC/MS, GC/FTIR, microderivatizations, and synthetic efforts, the correct structure was determined. Subsequently, total synthesis was conducted to establish the absolute stereochemistry definitively. Utilizing a multi-step stereoselective synthesis strategy alongside thorough NMR analysis and chiral column gas chromatography, the natural pheromone was confirmed as (2*R*,4*R*,8*R*)-2,4,8,13-tetramethyltetradecan-1-ol. These findings shed light in opportunities for the development of pest control tactics. Moreover, our results significantly enhance our comprehension of the chemical ecology within the fascinating Pentatomidae family.