

# Enantioselective Synthesis and Activity of All Diastereoisomers of (E)-Phytal, a Pheromone Component of the Moroccan Locust, *Dociostaurus maroccanus*

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**ABSTRACT:** The Moroccan locust, *Dociostaurus maroccanus* (Thunberg, 1815) (Orthoptera: Acrididae), is a polyphagous pest capable of inflicting large losses in agriculture under favorable environmental and climatic conditions. Currently, control of the pest relies solely on the application of conventional insecticides that have negative effects on the environment and human safety. In the search for a more rational, environmentally acceptable approach for locust control, we have previously reported that (Z/E)-phytal (1) is a male-produced candidate sex pheromone of this acridid. This molecule, with two stereogenic centers at C-7 and C-11, has four different diastereomers along with the Z/E stereochemistry of the double bond at C-2. In this paper, we present for the first time the enantioselective synthesis of the four diastereomers of (E)-phytal and their electrophysiological and behavioral activity on males and females. Our results demonstrate that the (R,R)-phytal is the most active diastereomer in both assays, significantly attracting females in a double-choice Y olfactometer, and confirming the previous chromatographic assignment as component of the sex pheromone of the Moroccan locust.

**KEYWORDS:** Moroccan locust, *Dociostaurus maroccanus*, sex pheromone, phytal, (2E,7R,11R)-3,7,11,15-tetramethylhexadec-2-enal, enantioselective synthesis, electrophysiology, behavioral activity

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