POTENTIAL OF Coffea sp. AS A BIOINSECTICIDE: A SYSTEMATIC REVIEW ON THE CONTROL OF AGRICULTURAL, URBAN PESTS, AND VECTORS

PEDRO HENRYQUE DE CASTRO[1], HELOÍSA VITÓRIA FERREIRA DE JESUS[1], GUSTAVO MELO RIBEIRO[1], JÚLIA MUNDIN SOARES[1], INGRID MARCIANO ALVARENGA[2], LEONARDO BARBOSA KOERICH[1], JOZIANA MUNIZ DE PAIVA BARÇANTE[2], JULIANA MARIA TRINDADE BEZERRA[3], GRASIELLE CALDAS D'AVILA PESSOA[1*]

[1] Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, Brasil; [2] Universidade Federal de Lavras, Lavras, Minas Gerais, Brasil; [3] Universidade Estadual do Maranhão, São Luís, Maranhão, Brasil

*grasiellepessoa2016@gmail.com

Insects are the most diverse class in the animal kingdom, playing crucial roles in ecosystems. From an environmental health perspective, agricultural and urban pest insects, as well as vectors of pathogens, stand out. The control of these organisms typically involves insecticides, which over time have driven the selection of resistant populations. This phenomenon highlights the urgent need for new active compounds, with plant biodiversity being a promising field of research. In this context, the present systematic review aimed to answer the question: “What is known about the insecticidal effects of botanical derivatives from Coffea sp. on agricultural and/or urban pests?” The databases consulted included BVS, Google Scholar, PubMed, ScienceDirect, Scopus, and Web of Science. Only original articles published between 1920 and 2024 in English, Spanish, and Portuguese were considered. Search terms such as "Coffea, coffee, insecticide, bioinsecticide, bioassay, and insect," combined with Boolean operators AND/OR, were used. Of 3,273 studies initially selected, only 24 were included in this review. Of these, 7 (29.2%) investigated insecticidal effects on agricultural pests, 1 (4.2%) on urban pests, and 16 (66.6%) on vectors. Four Coffea species were used in various forms, including coffee grounds, fruit husks, roasted and green beans, and leaves. Tests on agricultural pests were conducted via ingestion (4 studies, 57.1%) and contact (3 studies, 42.9%). For urban pests, tests were ingestion-based (100%), while vector studies used World Health Organization bioassays (100%). Among the 24 evaluated studies, 13 (40.6%) demonstrated insecticidal effects of coffee derivatives, with 3 (23.1%) on agricultural pests and 10 (76.9%) on vectors. Based on a scoring evaluation, 14 studies (58.3%) were considered of moderate quality, mainly due to insufficient detailing of key points, warranting caution in interpreting the results.

FINANCIAL SUPPORT: UFLA, ICB/UFMG; CAPES; INCT-Entomologia Molecular; EMBRAPA-Café.
KEYWORDS: Insecticide; Coffea; Review.