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Effect Of Plant and Seasonal Diversity on the Chemical Composition of Pollen Grains in Honeybee Colonies

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ABSTRACT: Laboratory experiments were conducted at the College of Agriculture / University of Basrah to study the effect of vegetation and seasonal diversity on honeybee activity and the chemical composition of pollen grains during the period of November 2023 to the May 2024.

When analyzing the chemical composition of pollen grains, the average protein content was 20.9%, fat 5.5%, total carbohydrates 54.4%, ash 1.8%, and moisture 17.4%, with significant differences observed between the components of the different readings. Fourier Transform Infrared Spectroscopy (FTIR) technique was used to detect the active groups in pollen grains mixed with honey. Many active compounds appeared during the months of the study: November, December, January, February, March, April, and May, belonging to various chemical groups including (O-H), (C-H), (CH2), (C=O), (CH3), and (OH) and other groups in varying proportions for the months mentioned.

INTROUCTION

Pollen is an important food source as it contains proteins, amino acids and micronutrients necessary to feed bee colonies. Worker bees collect it on their hind legs in a structure called a pollen basket and transport it to the hive, where it is stored and processed to make bee bread, which is used to feed the larvae. This integrated behavior reflects a mutually beneficial relationship, as the plant receives pollination, while the bees receive essential food resources (Roulston and Goodell, 2011).

Pollen and nectar play a crucial role in attracting pollinating insects, including honeybees, to flowers. Both pollen and nectar are key attractants for pollinators, promoting pollination and ensuring the survival of plant species. This relationship between plants and pollinators is part of a mutually beneficial evolutionary relationship between organisms, where each party benefits from the process (Morales and Calvino-Cancela, 2022).

Pollen and nectar, produced by flowering plants to attract pollinating insects, are vital elements and not merely byproducts of the plant. They constitute strategic tools that play a crucial biological role in enhancing the interaction between the plant and pollinators, as pollen provides the protein food necessary for the growth and reproduction of insects, especially honeybees (Nicolson and Human, 2013).

Pollen contains a wide range of active chemical compounds that directly affect honey quality. It is rich in sugars, proteins, amino acids, essential vitamins and minerals, as well as antioxidants such as phenolic compounds. These compounds play a significant role in enhancing the nutritional value of honey and improving its medicinal properties. Furthermore, variations in pollen sources lead to significant differences in the chemical composition of the honey produced (Topitzhofer *et al.*, 2019).