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HONEYBEE STUDIES

- ROUND THE YEAR!



About the author

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Jigar is a senior officer, leading a team of Ecotoxicology. He has very good experience of conducting aquatic and terrestrial studies and has been actively involved in validation of Ecotoxicity studies. He is a member of Society of Toxicology, India. He has professional experience of more than 10 years in CRO industry.

About

80%

of all pollinations worldwide are done by honeybees (wild and domestic).

Among different honeybees, **Apis mellifera** contributes one-third of pollination. Bees are key regulators for terrestrial ecosystem conservation by influencing ecological relationships, maintaining genetic variation in the plant community, and floral diversity through pollination.



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The declining pollinator population affect the production of food directly. Pesticides' application in the environment is threatening pollinators to a great extent. Effects of pesticides are varied on bees such as acute and or chronic toxicity on adult and larvae honeybees. Acute exposure to pesticides can kill honeybees and their entire colonies - immediately or within hours of exposure. Due to contact exposure to pesticides, while foraging, the bees may die immediately without even getting the opportunity to return to their hive.



Alternatively, if the bee is back in its colony with contaminated pollen or nectar or simply carrying it on its body, potentially it is causing widespread death in its colony. Chronic pesticide exposure affects the bee's physiology and behaviour. Sublethal effects of pesticides include physiological effects impacting its enzyme activity and brain activity thus leading to impairment of olfaction, learning, and memory; and behavioural effects on the motor activity leading to alterations in navigation, orientation, and feeding behaviour. Reproductive effects may include reduced sperm viability in drones, thus causing poor mating for queens and disruption of ovary activation in the developing queen.

Environmental condition plays a very important role in the bees' survival. Particularly, the temperature is very important for internal as well as the external activities of honey bee colonies, thus impacting the behaviour of the bees. They rarely work when the temperature is below 13 °C or above 38 °C. They cannot fly when the temperature is below 13 °C. Deviation from this range can affect the developmental period of honeybees, immature stages, emergence rate, the colour of emerged bees, wing morphology, learning ability, adult brain, and disease prevalence.



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In India, Gujarat has a favourable climatic condition for apiculture. Jai Research Foundation (JRF) is situated on the bank of River Damam Ganga, Vapi in the southern region of Gujarat. Vapi and its surrounding areas in the district of Valsad (South Gujarat) are known for their fruit farming due to the favourable environmental conditions. The temperature is suitable for the survival of honeybees throughout the year. JRF maintains beehives in its compound. Our facility is surrounded by many crops and flowers throughout the year, ranging from various seasonal experiences to bees communities. Hence, our facility at the JRF provides honeybee studies throughout the year.



Studies on adult honeybee workers

(for acute oral and contact toxicity) are important parts of the environmental risk assessments. We offer the below-mentioned studies throughout the year.

Honeybees,
Acute Oral
Toxicity Test

Honeybee Larval
Toxicity Test,
Single Exposure

Honeybees,
Acute Contact
Toxicity Test

Honeybee,
Chronic Oral
Toxicity Test
(10-Day Feeding)

Honeybee Larval
Toxicity Test,
Repeated Exposure



References

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- OECD, 2016:** OECD Series on Testing and Assessment, Number 239, Guidance Document on Honey Bee Larval Toxicity Test following Repeated Exposure, ENV/JM/MONO(2016)34 (2016).
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