**Insects as a tool for solving growing plastic and microplastic problem: A review to solve anthropogenic pollution**

Archita Bhagawati1, \*Dr. Ratul Kumar Borah1

1Department of Entomology, College of Agriculture, AAU

\*Corresponding author email:

[archita.bhagawati.amj21@aau.ac.in](mailto:archita.bhagawati.amj21@aau.ac.in)

Insects are the most dominant group of species on earth occupying a wide range of habitat and performing different ecological function from acting as a herbivore and carnivore to feeding on the detritus. Out of the ecological functions, the key ecological functions the insects perform in the natural ecosystems are ecosystem cycling, pollination, predation/parasitism and decomposition. Over the last few decades, anthropogenic litter has increased in a dramatic manner both in the aquatic and terrestrial ecosystem out of which plastics occupies approximately 60-80% of the total anthropogenic pollution. Micro plastics (MPs) are plastic particles which size ranges from 1 µm to 5 mm. MPs has both primary and secondary sources of origin. Primary source comprises polythene (PE), polypropylene (PP) and polystyrene (PS) particles used in the cosmetic and medical products, while fragmentation of plastic debris through physical, chemical and biological process results in the origin of secondary micro plastics. MPs could pose a serious pollution threat and a long-time negative effect to soil, sediments and freshwater ecosystem including the human bloodstream. Recently, past studies have found out the low-grade silk derived from silkworm, which is no longer promising to the textile industry to weave fabric can be used as an excellent tool to combat the added micro plastics in food, paint and cosmetics. Microencapsulation with the silk-based coating will be eco-friendly as silk is non-toxic and dissolvable in the body. Studies using ultraviolet-visible light show that microencapsulating a common herbicide (saflufenacil) in silk fibroin greatly reduces its burst release from 25% to 0.8%. Additionally, honeybee due to their morphological structure, foraging range, pollen collection behaviour and worldwide distribution has always been used for environmental monitoring from acting as an indicator for air quality to active samplers for microplastics in the recent years. This review further highlights how different insects contribute to the plastic degradation, but there is a research gap and more study should be conducted on the role and physiological processes of different insects in order to end the issue of plastic and microplastic problem.

Keywords: **Microplastics, plastics, insects, anthropogenic pollution, natural ecosystem**

**References:**

1. Liu, M., Millard, P. E., Urch, H., Zeyons, O., Findley, D., Konradi, R., & Marelli, B. (2022). Microencapsulation of High‐Content Actives Using Biodegradable Silk Materials. *Small*, 18(31), 2201487.
2. Edo, C., Fernández-Alba, A. R., Vejsnaes, F., van der Steen, J. J., Fernández-Piñas, F., & Rosal, R. (2021). Honeybees as active samplers for microplastics. *Science of the Total Environment*, 767, 144481.
3. Bilal, H., Raza, H., Bibi, H., & Bibi, T. (2021). Plastic biodegradation through insects and their symbionts microbes: a review. *Journal of Bioresource Management*, 8(4), 7.