

A high level of contamination of Irish honey by insecticides has been confirmed by researchers from Dublin City University and Trinity College Dublin – more than 70 per cent of samples tested contained at least one neonicotinoid compound.

Neonicotinoids are the most widely used group of insecticides globally, and are classified as “plant protection products”. In the EU their use has been restricted due to concerns about risks to bees and other non-target organisms.

Of the 30 honey samples tested almost half (48 per cent) of samples contained at least two neonicotinoids.

The proportion and concentration of neonicotinoids in honeys from both agricultural and urban habitats, compared with semi-natural or other land covers, suggests exposure of bees to neonicotinoids can potentially occur in a variety of environments, the researchers warn.

At the time of sampling for this study, their use was still approved in Ireland for certain agricultural crops. An EU ban on most neonicotinoids was announced in 2018, but subsequent decisions by 11 countries allowed for emergency use.

Neonicotinoids are systemic pesticides. Unlike contact pesticides, which remain on the surface of the treated parts of plants (eg leaves), they are taken up by the plant and transported internally to leaves, flowers, roots and stems, as well as pollen and nectar.

“Given that these compounds have been shown to have adverse effects on honey bees, wild bees, and other organisms, their detection in honey is of concern, and potential contamination routes should be explored further,” said Dr Saorla Kavanagh, who led the research and is currently working at the National Biodiversity Data Centre.

Consistent

Dr Blánaid White of DCU’s school of chemical sciences said the findings were consistent with others from outside Ireland, “and neonicotinoids unfortunately seem to be ubiquitous in honeys worldwide”.

“It’s reassuring that residues do not exceed safe levels, but it is an important warning that neonicotinoids should not be reintroduced into Irish environments, as they could potentially cause health or environmental concerns.”

Prof Jane Stout of TCD's school of natural sciences said the results suggested bees and other beneficial insects were at risk of exposure to contaminants in their food across a range of managed habitats –not just in agricultural settings.

“And even though we found residues at low concentrations, prolonged exposure to sub-lethal levels of toxins can cause effects that are still not fully understood by scientists or regulators. Therefore we shouldn't relax restrictions on their use.”

Hive sites

The research published in Environmental Science and Pollution Research identifies for the first time the presence of clothianidin, imidacloprid and thiacloprid in Irish honey from a range of hive sites across a range of land-use types.

Residue levels were below the admissible limits for human consumption according to EU regulations, and thus pose no risk to human health. However, the average concentration of one compound (imidacloprid) was higher than concentrations shown in other studies to induce negative effects on honey and bumble bees.