

Health implications of antibiotics

- Allergic reactions to consumers
- Causing cancers
- Reproductive and birth defects
- Antibiotic resistant bacteria in consumers

Bacterial pathogens in honey

The bacterial pathogens affecting honey are; *Bacteridium*, *Streptococcus*, *Clostridium* spp., *Achromobacter*, *Citrobacter*, *Enterobacter*, *Erwinia*, *Escherichia coli*, *Flavobacterium*, *Klebsiella*, *Proteus* and *Pseudomonas*

Honey spore forming bacteria

- *Bacillus cereus*
- *Clostridium perfringens*
- *Clostridium botulinum*

The spores can cause infections in consumers, especially children.

Toxic honey

Honey produced from flowers of certain toxic plants or nectar can cause honey intoxication. This is known as “*Mad Honey*”. Symptoms of intoxication include dizziness, weakness, sweating, nausea, vomiting, hypotension, shock, arrhythmia and sometimes death.

Implicated plants:

- *Rhododendron ponticum* - alkaloids that are poisonous to humans
- *Andromeda* flowers - grayanotoxins
- *Kalmia latifolia* (mountain laurel)
- Wharangi bush
- *Datura* plants
- *Belladonna* flowers
- *Serjanialethalis* in Brazil
- *Gelsemium sempervirens* in the American Southwest.

- Tutu (*Coriariaarborea*) flowers
- Oleander



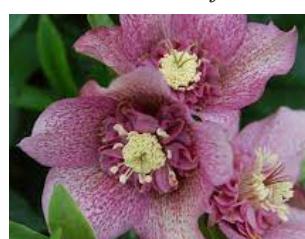
Kalmia flower



Datura flower



Rhododendron flower



Tutu flower

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HONEY FOOD SAFETY: WHAT YOU NEED TO KNOW

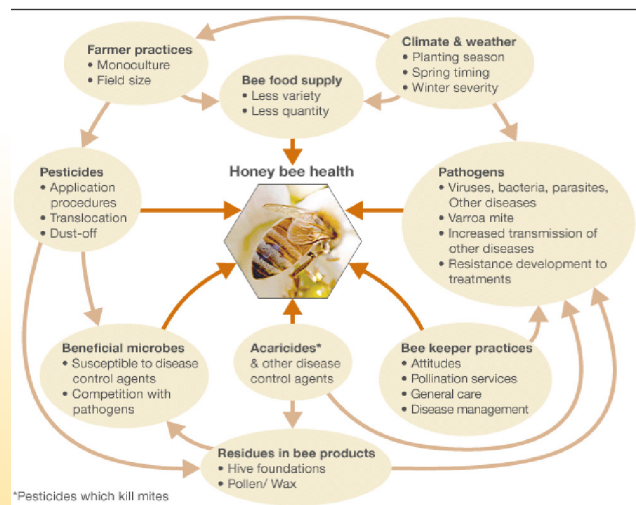


Introduction

Honey and other bee products have been historically used by humans for thousands of years in all societies worldwide, including during biblical times. Honey has been used to treat coughs and sore throats, infected leg ulcers, earaches, measles, eye diseases, and gastric ulcers among other human and animal diseases. Bee products are natural food products that are rich in minerals, antioxidants and sugars. Honey is known to be rich in antioxidants.

Contamination of honey

Honey can be contaminated by different sources



Stress factors and sources of contamination in honey bee populations

Source: Johnson and Corn (2012)

The environmental contaminants

- Heavy metals such as lead, cadmium and mercury.
- Radioactive isotopes.
- Organic pollutants, polychlorinated biphenyls (PCBs).
- Pesticides (insecticides, fungicides, herbicides, and bactericides).
- Pathogenic bacteria.
- Genetically modified organisms.

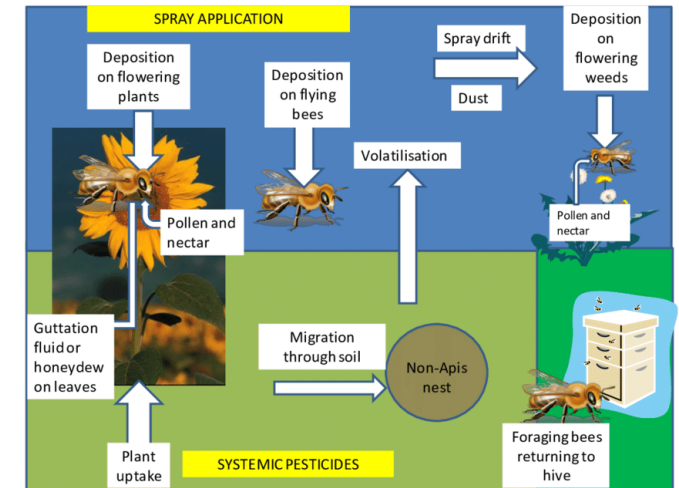
The bee contaminants

- Acaricides: Pyrethrins and other classes of chemicals and non-toxic substances such as organic acids and components of essential oils.
- Antibiotics used for the control of bee brood diseases, mainly tetracyclines, streptomycin, sulfonamides, and chloramphenicol.
- Paradichlorobenzene, used for the control of wax moth and chemical repellents.

Honey contamination by pesticides

One of the most common pesticides is varroacides. These are acaricides used to control the parasite *Varroa jacobsoni*. The most common ones are acaricides amitraz, celazole, bromopropylate, coumaphos, flumethrin, and taufluvallinate. They are used inside hives risking honey contamination.

Honey can also be contaminated by fungicides used against pests in fruit trees. The most common fungicides include; Inclozolin, Iprodione, Methyl thiophanate, Captan and Difenoconazole. Organic contaminants and polychlorinated biphenyl (PCBs), which originate from motor oil, coolants and lubricants are also common in honey and wax.



Major routes of exposure of foraging bees to pesticides

Source: Jean Lou C M Dorne

Health implications of pesticides

Farm workers and their families have the greatest exposure to agricultural pesticides. The health effects include; skin irritation, birth defects, tumors, genetic changes, blood and nerve disorders, endocrine disruption, coma or death.

Antibiotics and honey contamination

Antibiotics are found in honey because they are used in bee production for the treatment of bacterial diseases. Other sources are mostly from the environment and improper beekeeping practices. The most common ones are; Oxytetracycline, Chloramphenicol, Erythromycin, Lincomycin, Monensin, Streptomycin and Enrofloxacin.