

Possibilities and risks of use of drugs in bee hives



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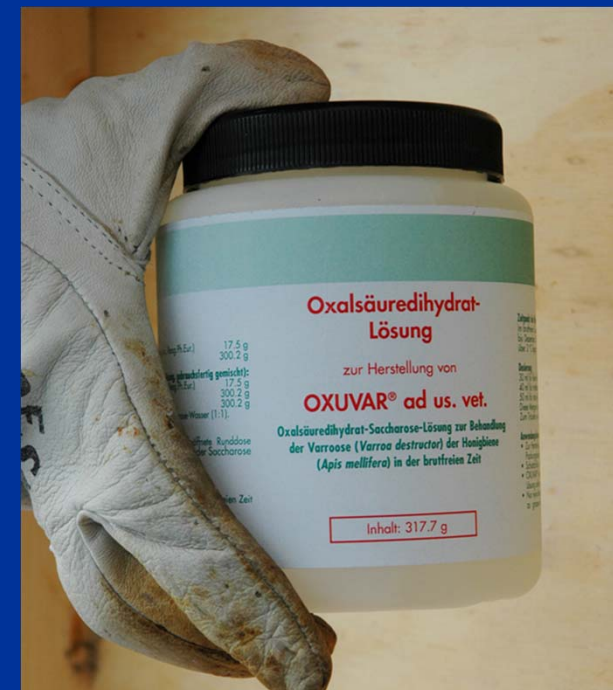
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Basic prinziples

- Beekeepers opinion:
„what helps is allowed“
- Safety profile of medicine
 - Safe use
 - Acceptable residues
 - Effectiveness
 - Low side effects



User`s Risk

- **Active substance**
- **Application**



Residue situation

- **Application of medicaments leads to contamination of bee nest**
- **Hydrophilic substances**
 - Contaminate honey
- **Lypophilic substances**
 - Accumulate in wax



Accumulation in Wax

- Wax recycling
- Comb foundation

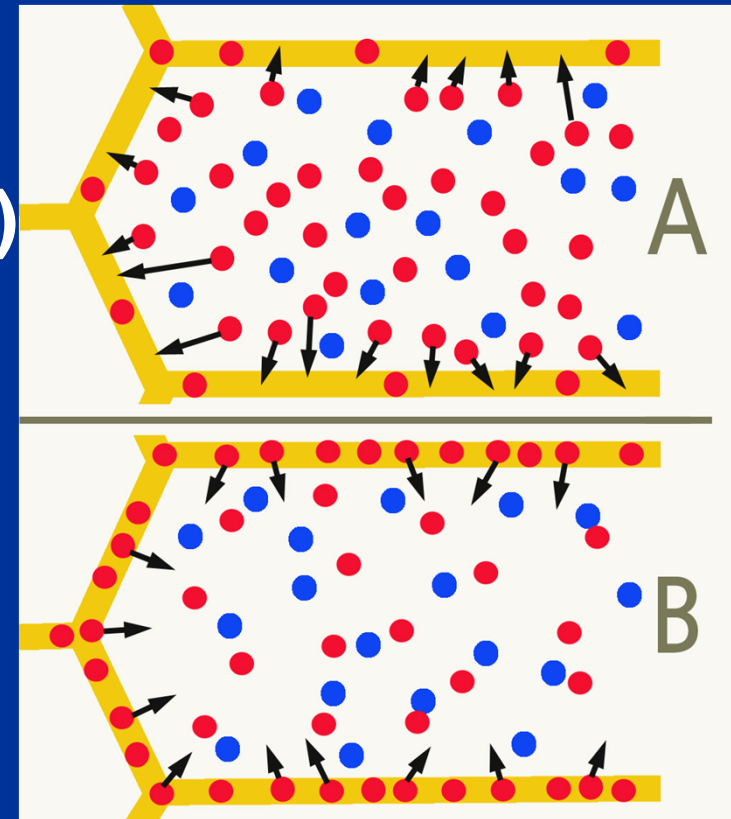


Accumulation in Wax

Recontamination of honey

A. Lipophilic substances (red) transferred to wax
Hydrophilic substances (blue) remain in honey

B. Lipophilic substance recontaminate honey



Applications

- **Feeding**
- **Trickling**
- **Permanent strips**
- **Vaporization and Evaporation**
- **Spraying**
- **Dusting**

Application

- **Feeding**

- Food exchange (Trophalaxis)
- Food stored

- Low risk for applicant
- High contamination of food in combs
- Effect against bacteria in brood and endoparasites in adults



Application



- **Trickling**

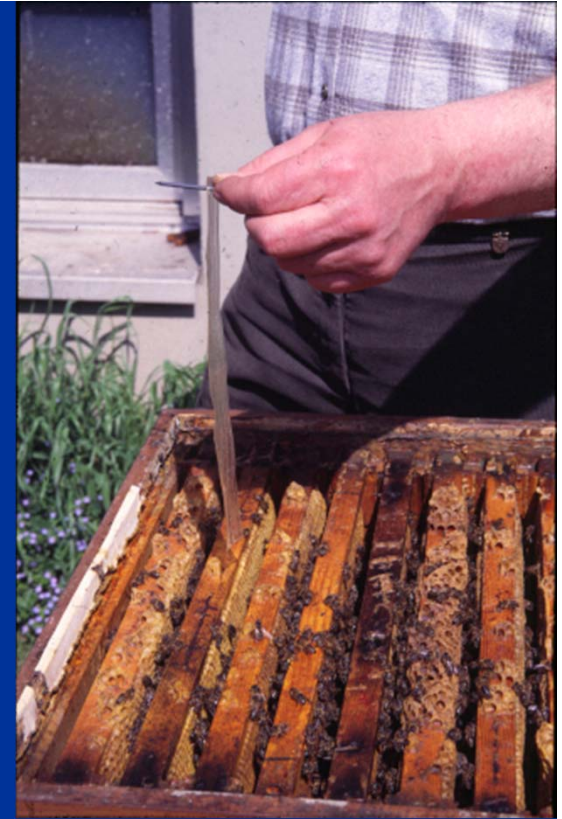
- Food exchange (Trophalaxis)

- Low risk for applicator
- Less contamination of food in combs
- Effect against ectoparasites on adults



Application

- **Permanent strips**
 - Low risk for applicant
 - Less contamination of food in combs
 - Effect against ectoparasites on adults and emerging from bee brood (long term)



Application



- **Vaporization and Evaporation**
 - High risk for applicant
 - High contamination of food in combs
 - Effect against ectoparasite on adults and emerging from or in bee brood
 - Effect against bacterial and fungal brood diseases

Application

- **Spraying**

- High risk for applicant
- High contamination of food in combs
- Effect against ectoparasite on adults (additional grooming)
- Effect against bacterial and fungal brood diseases (additional removing)



Application



- **Dusting**
 - Low risk for applicator
 - High contamination of food in combs
 - Effect against ectoparasite on adults (additional grooming)

Side Effects

- **Acute toxic effect**
- **Sublethal doses**
- **Registration:**
 - Short-term and longt-term examinations
 - Brood tolerance



Side Effects

- Disinfectant effect of treatment
- Antagonists
 - Bacteria
 - Fungi
 - Antagonistic Substances
- Chalkbrood (*Ascosphaera apis*)



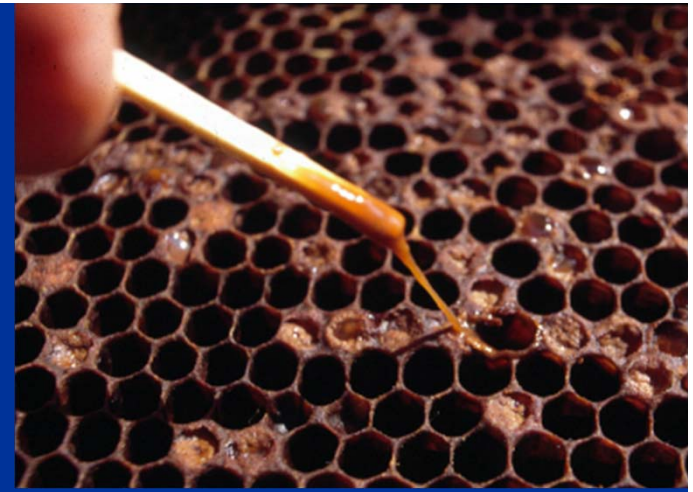
Nosemosis

- **Antibiotics Fumagillin**
- **Nosema apis replaced by Nosema ceranae**
- **Nosema ceranae**
 - Multiply quicker at high temperature
 - Die off faster at low temperatures
- **Alternative control methods**
 - Beekeeping management measures
 - Vegetable active ingredients
 - Anti-coccidian medicines (off label use)



American Foulbrood

- **Antibiotics**
Streptomycin and Tetracycline
 - Kill vegetative Form of *Paenibacillus* larvae
not spores
- **America/Asia:**
Permanent treatment
 - Re-infection from spores in honey
- **Europe:**
Disinfection, killing, shifting
 - Eradication of spores



European Foulbrood



- **Antibiotics**
Oxitetracyclin and other
 - Kill the vegetative and durable form of **Melissococcus pluton**
- **America: occasional treatment**
- **Europe: (no Antibiotics allowed)**
 - Beekeeping management measures (most countries)
 - Disinfection, Killing, Shifting (some countries like GB, Switzerland)

Tropilaelaps mite

(Tropilaelaps spp.)



- **Difference to Varroa:**
 - Infest brood only not adults
- **Varroazids distributed on combs are effective:**
 - Evaporation, Dusting, ..
- **Varroazids acting via body contact have no or low effect:**
 - Contact (Trickling...)

Varroosis

(*Varroa destructor*)



- **Treatment in colonies with brood**
 - Long lasting evaporation
 - Strips present for more than 3 weeks
- **Treatment in colonies without brood**
 - Spraying
 - Trickling (only bees in cluster)
 - Dusting

Varroosis

(*Varroa destructor*)



- **Resistance with synthetic a.i.**
 - Coumaphos (Italy)
 - Pyrethroids (Flumetrin, Fluvalinat) (worldwide)
 - Amtiraz (Italy, Portugal)
- **Uncertain effects with natural a.i.**
 - Climate
 - Error in treatment

Small Hive beetle

(*Aetina tumida*)

- Coumaphos (Checkmite)
- Temperate climate: occasional treatment
- Warm climate: permanent treatment
- EU regulations: eradication or treatment (epidemiological situation)



Conclusions

- **Use of medicaments implicate risks**
 - Residues
 - Health of user
- **Use registered medicaments only**
- **Prefer natural in place of synthetic products**
- **Prefer management techniques**



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