



THE USE OF HONEY AS APITHERAPY REMEDY IN VETERINARY MEDICINE

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About pet population in Italy...

- 67% of Italians has almost a pet
- In 2018 pet population was estimated at over 60 millions, approximately the same as the number of people living in Italy
- Dogs and cats are 14.500.000: they are the most representative pets in the italian families

Source: ASSALCO (Italian Association of Pet Food and Pet Care Industries) -
Zoomark 2019, Report on feeding and care of pets.

Owners and veterinarians

In Italy the growing sensitivity towards pets carries pet owners to care about their animals' health: 9 out of 10 have a veterinarian of reference and always follow his/her advice concerning their pet's health and wellbeing.



**the veterinarian is the reference point
for pet health in Italy**

Source: ASSALCO (Italian Association of Pet Food and Pet Care Industries) -
Zoomark 2019, Report on feeding and care of pets.

So why Apitherapy in Veterinary?

- Applicable to all animal species
- Natural remedy:
 - ✓ No residues
 - ✓ No antimicrobial resistance



Antimicrobial resistance (AMR)



AMR refers to the ability of microorganisms to withstand antimicrobial treatments. The overuse or misuse of antibiotics has been linked to the emergence and spread of microorganisms which are resistant to them, making treatments ineffective and posing a serious risk to public health.

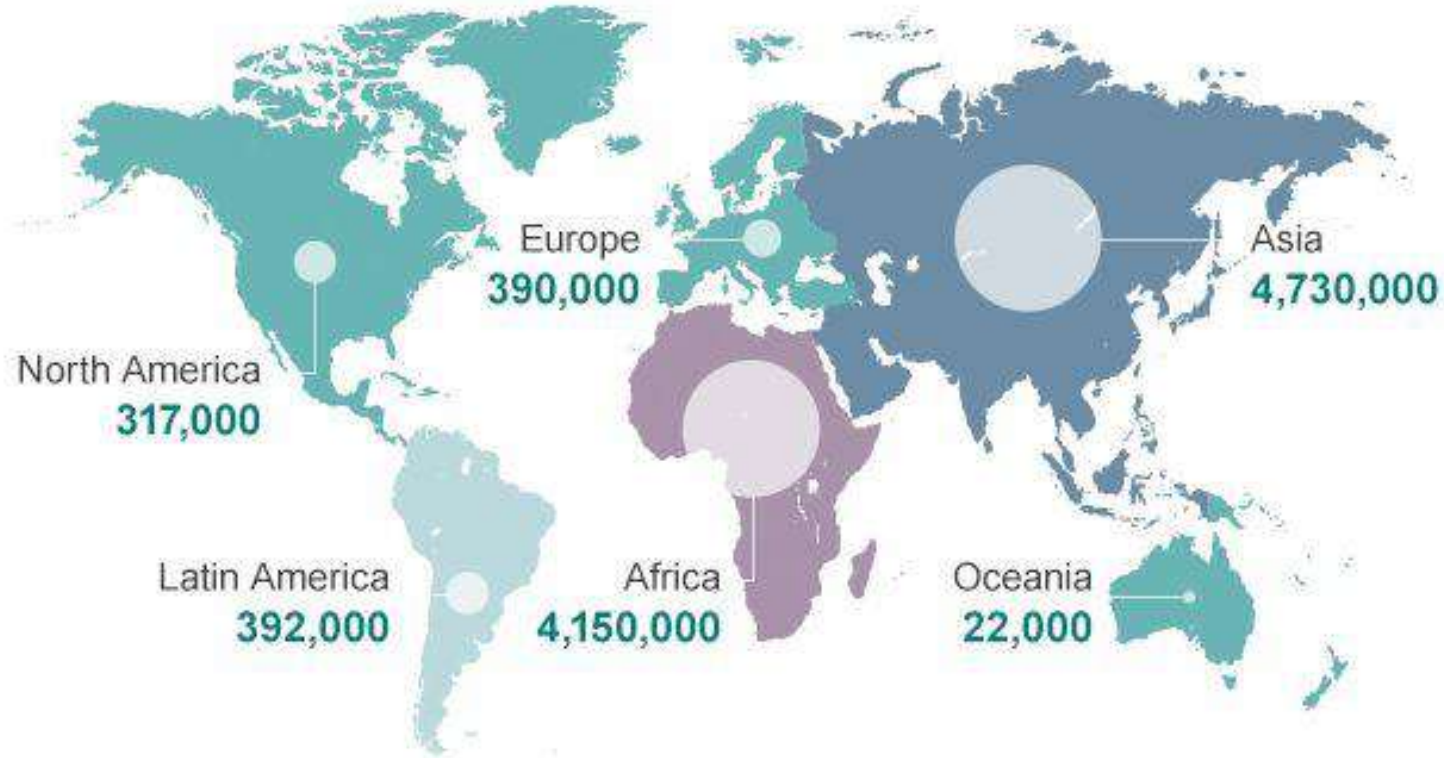
EU Commission with its Agencies is working to reduce AMR risks.

Source: EFSA JOURNAL, 2019.

www.efsa.europa.eu/efsajournal

AMR is a global challenge and the use of antimicrobials in animals is part of the problem. If AMR continues to grow, it will be increasingly difficult to treat some diseases both in humans and animals.

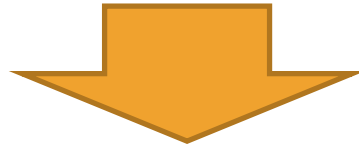
Deaths attributable to antimicrobial resistance every year by 2050



Source: Review on Antimicrobial Resistance, 2014.

What can be done to reduce the AMR in animals?

- REDUCE the use of antimicrobials
- REPLACE antimicrobials with alternative treatments



Will apitherapy products be of greater interest in the next few years because of their curative potential, specially in the veterinary sector?

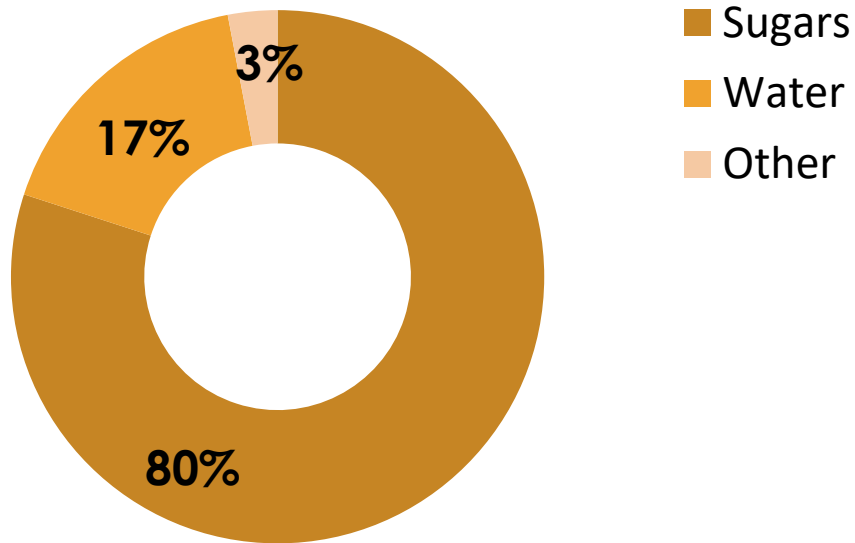


HONEY

Honey, among the hive products, is the most known and used.

Its composition is closely related to its botanical, environmental and climatic origin and linked to the species of bees from which it is obtained.

Medium honey composition



PECULIAR CHEMICAL AND PHYSICAL CHARACTERISTICS

- Honey consists mainly of sugars (80%), including monosaccharides (in particular glucose and fructose), disaccharides, oligosaccharides and polysaccharides.
- Water (17%).
- Traces of proteins (free amino acids and enzymes), minerals, vitamins, organic acids and pollens (3%).

Relevant therapeutic properties of honey in veterinary

- Antibacterial
- Antiviral, antiprotozoal, antiparasitic and antifungal
- Antioxidant
- Anti-inflammatory and painkiller
- Immunostimulant, immunomodulatory
- Energizing

Therapeutic uses of honey

Honey has been administered orally, by inhalation, intravenously and for topical applications on skin and mucous membranes in various clinical studies conducted on animals. Intravenous infusion of honey at different concentrations proved to be safe and in healthy sheep decreasing glycemia and improving lipid profile, renal, liver and bone marrow functions.

Source: *Intravenous and intrapulmonary administration of honey solution to healthy sheep: effects on blood sugar, renal and liver function tests, bone marrow function, lipid profile, and carbon tetrachloride-induced liver injury.* Al-Waili N. S. Journal of Medicinal Food, 2003.

SKIN

- DERMATITIS AND EXTERNAL OTITIS
- HEALING OF SKIN LESIONS (WOUNDS, ULCERS AND BURNS)

OPHTHALMOLOGY

- DRY EYE
- KERATITIS AND KERATOCONJUNCTIVITIS
- BLEPHARITIS

GASTROENTEROLOGY

- PREBIOTIC
- GASTROPROTECTIVE
- LAXATIVE
- ANTIDIARRHEAL

HEPATOPROTECTOR and DETOX

Mechanisms of action on wounds healing of SUGAR vs HONEY

SUGAR	SUGAR	HONEY
Reduced water activity (Aw) in the lesion with inhibition of bacterial growth.	X	X
High osmolarity that recalls nourishing lymph.	X	X
Acid pH that strengthens the antibacterial effect.		X
Production of hydrogen peroxide thanks to glucose-oxidase.		X
Presence of methylglyoxal (MGO) in some types of honey (Manuka) with non-peroxidase antibacterial action.		X
Bee-Defensin-1, antibacterial glycoprotein.		X
Major Royal Jelly Protein 1 (MRJP1), protein able to activate keratinocytes and accelerate the healing process.		X
Antioxidants that protect tissues from free radicals.		X
Pain killer.		X

Sources: *Wound management using sugar.* Mathews K.A., Binnington A.G. Compendium on Continuing Education for the Practising Veterinarian, 2002.

Wound management using honey. Mathews K.A., Binnington A.G. Compendium on Continuing Education for the Practising Veterinarian, 2001.

Infected skin wound after a bite in a dog with necrotic aftermath.
Natural honey was successfully used alongside systemic antibiotic therapy to hasten healing.

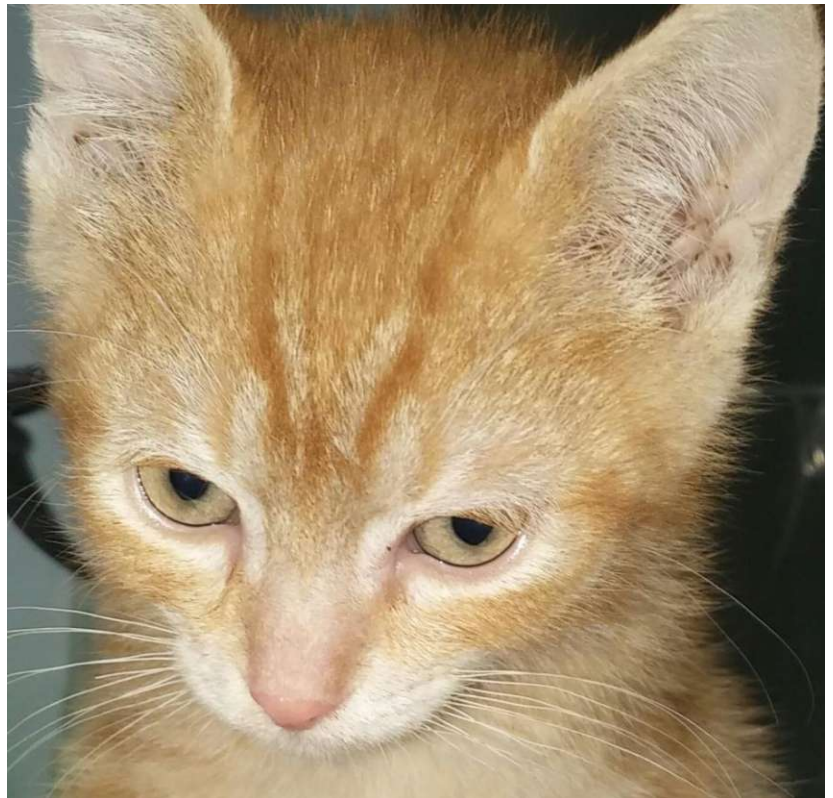


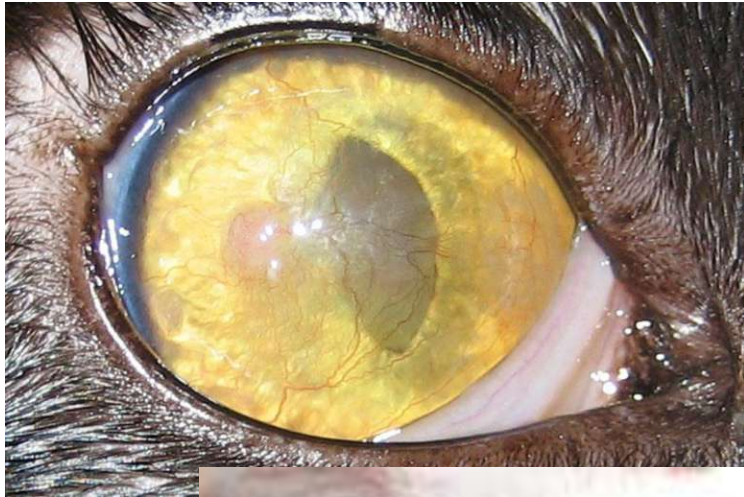
Source: *Management of a chronic necrotizing wound in a dog using natural honey therapy.* Adeyemi A.B. et al. *Explor Anim Med Res*, 2017.

Mycosis in a kitten's nose

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Treated by daily topical application of acacia honey





Keratitis and
conjunctivitis in cat

OPHTHALMOLOGY

Application of honey
eyewash drops: solution 1:3
(1 ml of honey and 2 ml of
saline solution NaCl 0,9%)

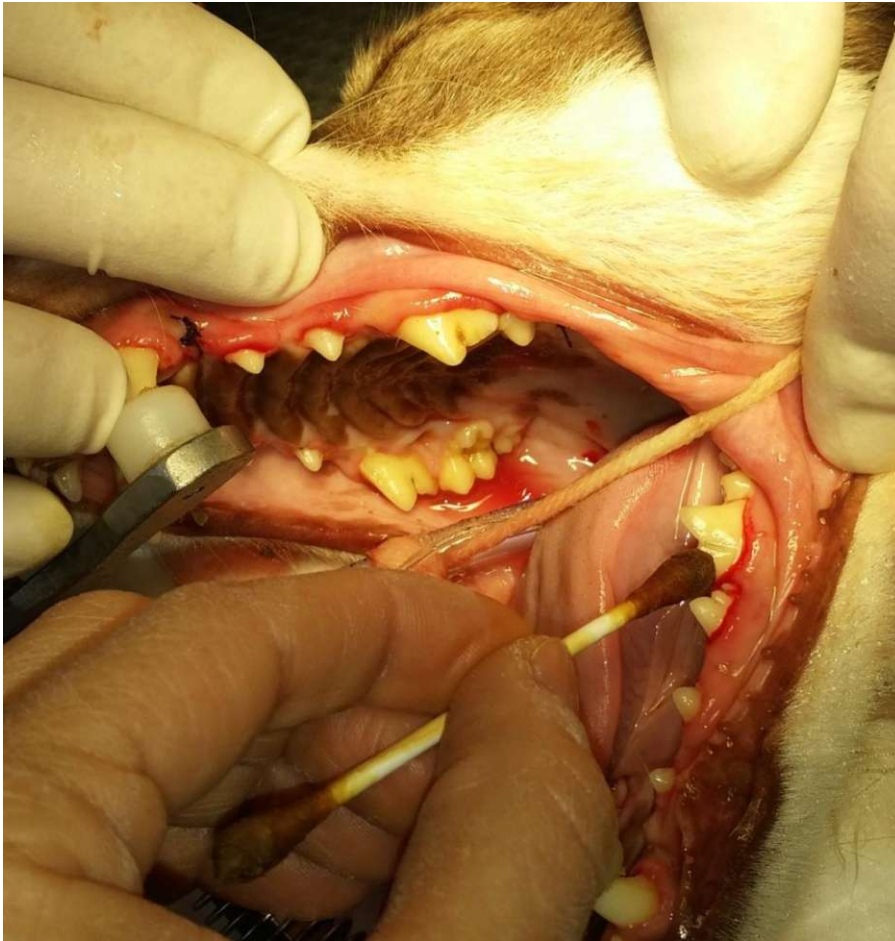


RESPIRATORY TRACT

- COUGH
- ASTHMA



Honey can be useful in case of cough of infectious, allergic or irritative origin, both in dogs and cats, as the canine kennel cough, the feline rhinotracheitis (per os) and asthma (by inhalation), alone or in co-therapy to reduce or relieve the symptoms.



Gums disinfection with honey and propolis after scaling in a dog

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ORAL CAVITY

Honey has been successfully used in dentistry, alone or in association with propolis, for the treatment of various problems:

- ORAL INFECTIONS
- STOMATITIS AND BUCCAL ULCERS
- PERIODONTITIS
- HALITOSIS

Cat: a special case!



- Cats are strict carnivores:
they consume minimal amounts of carbohydrates
- Cats are adapted for higher metabolism of proteins and lower utilization of carbohydrates than dogs or other omnivores. Although cats can use carbohydrates as a source of metabolic energy, they have limited ability to spare protein utilization by using carbohydrates instead
- Cats are not attracted to foods with a sweet taste

Cats are efficient in the use of simple sugars but...

- Lack salivary amylase
- Low activities of intestinal and pancreatic amylase and reduced activities of intestinal disaccharidases that break down carbohydrates in the small intestines
- The liver in cats also does not contain fructokinase, an enzyme necessary for metabolism of simple sugars
- The activity of these enzymes cannot be induced by feeding cats increased amounts of sugars or starch
- High amounts of carbohydrates in diet decrease protein digestibility and increased microbial fermentation in the colon and production of organic acids

Source: Nutrient Requirements of Dogs and Cats.
National Research Council, 2006.



Dietary levels that have been proven to be safe in cats (referred to as safe upper limits) are specified for several sugars and carbohydrates: these limits equate to 50g/kg dry to matter (DM) to 150g/kg DM for glucose and sucrose.

Source: Nutrient Requirements of dogs and cats. National Research Council, 2006.

Suggested daily dosage of honey in CAT

Cats are strict carnivores so it is very important to not exceed the dose and do not administrate honey for long periods to avoid the risk of obesity and diabetes.

- $\frac{1}{2}$ teaspoon of honey (2,5 g) per day in kitten or small cats (<4 kg), in food.
- 1 teaspoon of honey (5 g) for adult cat (>4 kg) per day, in food



Suggested daily dosage of honey in DOG

Dog size

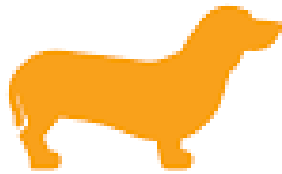


1-10 lbs

0,5-5 kg



½ teaspoon (2,5g)

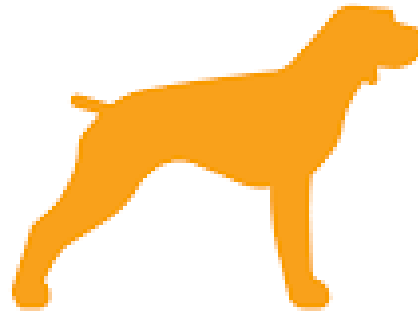


11-30 lbs

5-15 kg



1 teaspoon (5g)

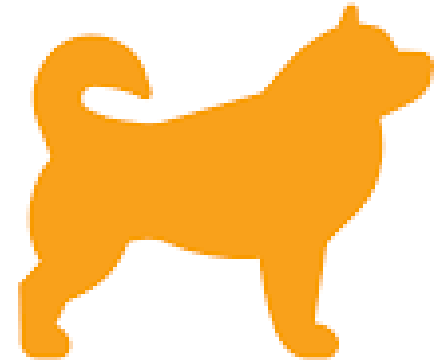


31-50 lbs

15-25 kg



2 teaspoon (10-15g)



50+ lbs

>25 kg



1 tablespoon (20 g)



Honey as
natural
therapeutic
option
for veterinarians

Conclusions

- Honey is rich in nutritional and therapeutic properties (nutraceutical)

- Natural remedy against the antimicrobial resistance
- In co-therapy to reduce the use of drugs or enhance their effects

- Lack of specific scientific researches
- Need for clinical studies



Thank you for your attention!



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