

# FOOD SUPPLEMENT BASED ON MOLYBDENUM FOR BEES



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## The context: a very worrying decline in bees around the world

In Europe 30% of colonies are lost each year. In some regions of the world these losses go up to 90%.

With their disappearance, 20,000 species of plants are also affected and 40% of our food...



**It is necessary to find non-toxic and effective solutions to safeguard the bees**

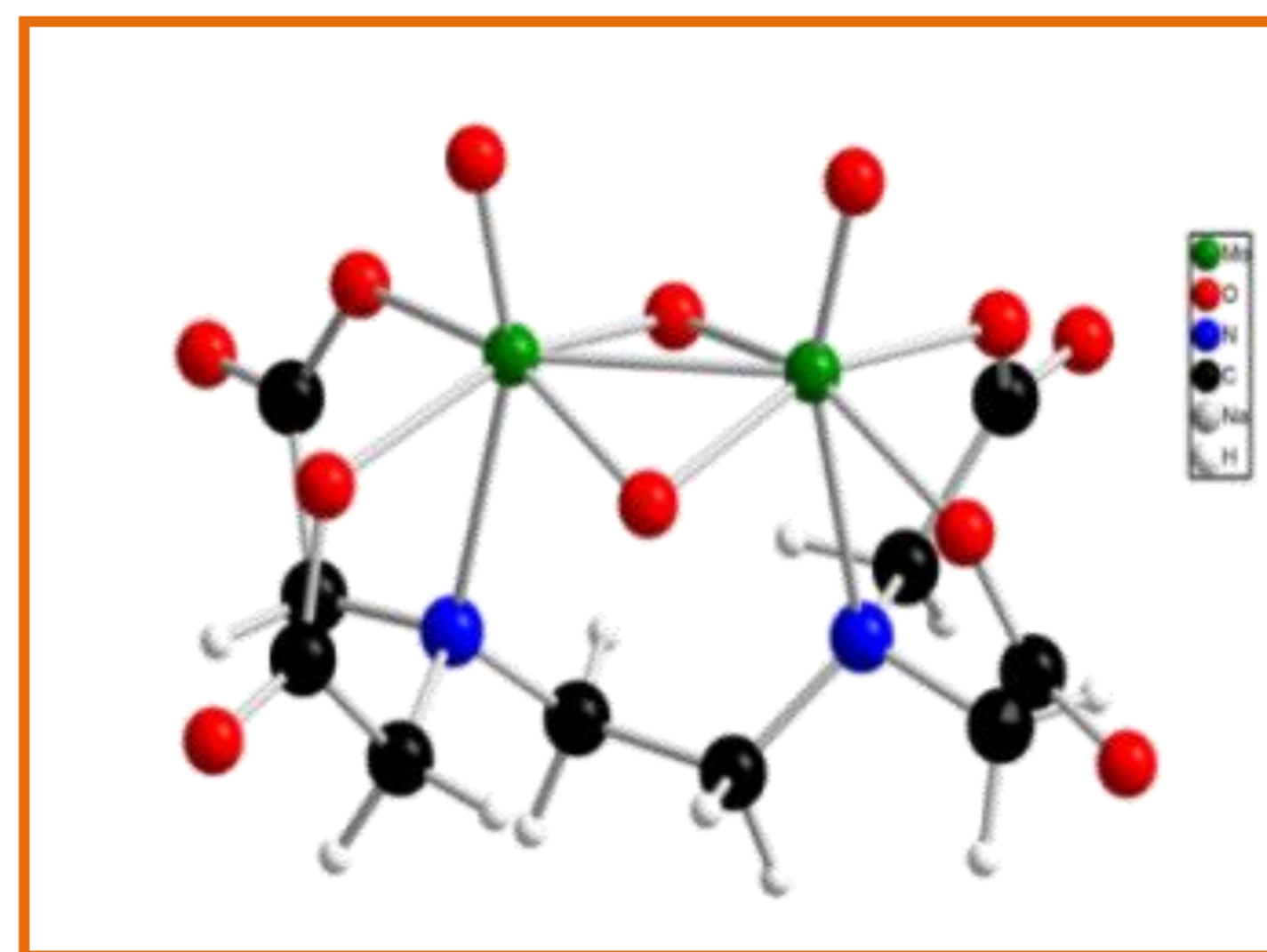
## The innovation: a molecule based on the trace element Mo, bio-inspired by natural Molybdenum enzymes

### Molybdenum, an omnipresent trace element in nature!

$MoO_4^{2-}$   $Fe_2(MoO_4)_3$   
 Natural source of Molybdenum in soils  
**A Soil without Molybdate is sterile**  
 Molybdenum is found in more than 50 enzymes  
 active site structure  
 Sulfite oxidase  
 L. B. Maia, I. Moura, J. J. G. Moura, in 'Molybdenum and Tungsten Enzymes', Royal Soc.Chem 2016

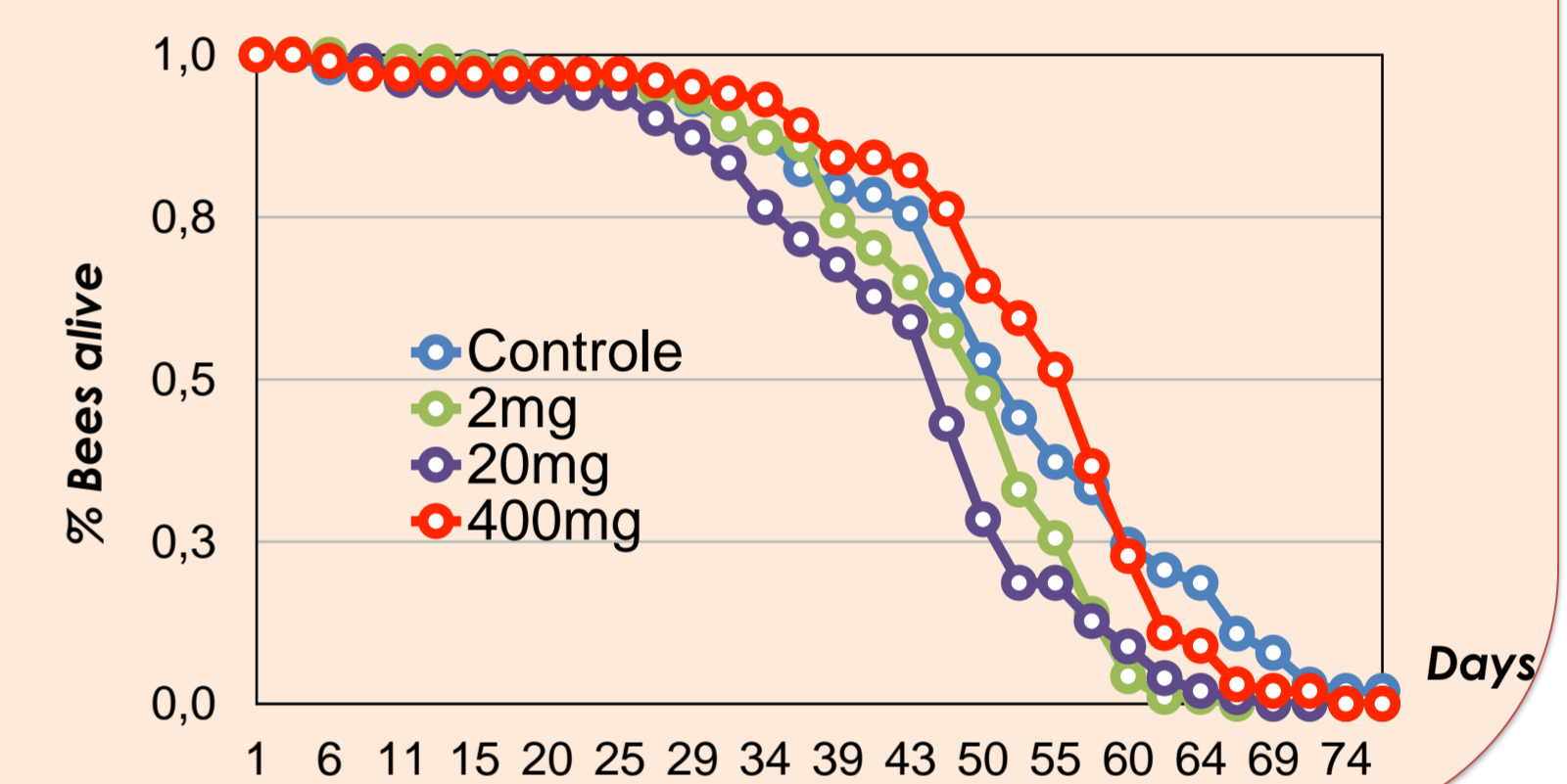
- ✓ Molybdenum is essential to human body
  - structure of the teeth
  - bone growth
  - metabolism of iron
  - detoxification of the body
- ✓ Molybdenum plays also a key role in plant growth
  - synthesis of two enzymes necessary for the N<sub>2</sub> metabolism : nitrate reductase and nitrogenase.
- ✓ Molybdenum is naturally present in bees (around 0.4 ppm in average)
  - ✓ Role unknown

### A molecule bio-inspired of molybdenum enzymes



$[Mo^V_2O_4(EDTA)]^{2-}$   
Li<sup>+</sup> (MoLi) or Na<sup>+</sup> (MoNa) salts

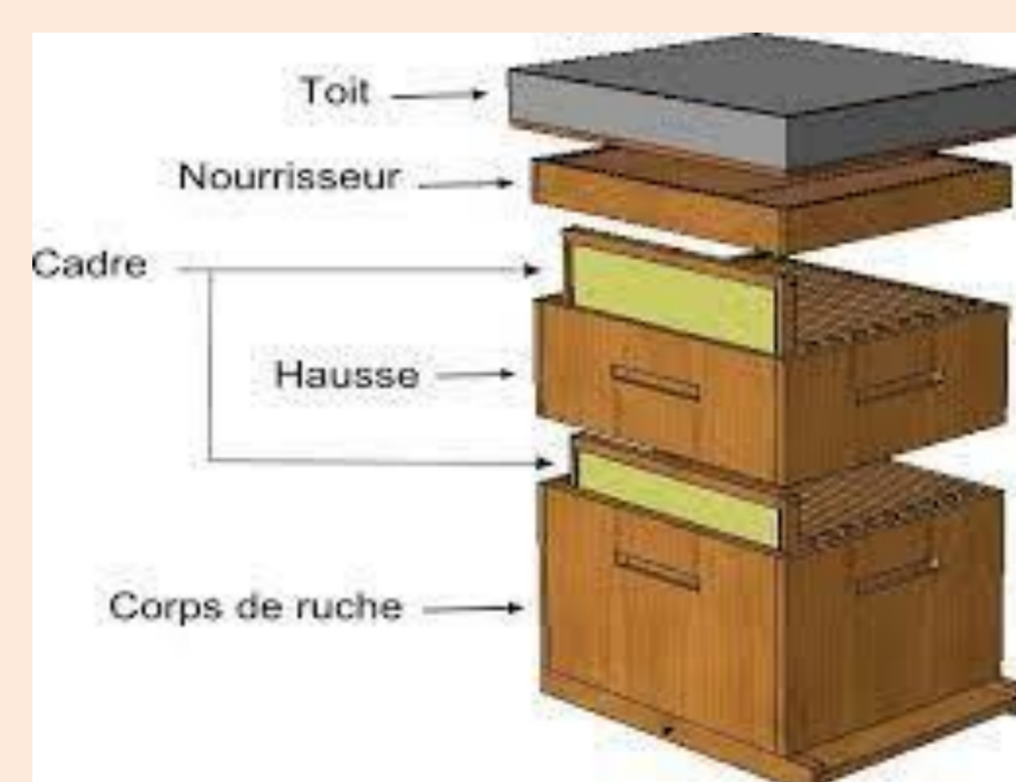
- ✓ Synthesized under green chemistry conditions
- ✓ Stable in solid form and in solution
- ✓ Non toxic (protozoaires, cellules, souris)
- ✓ No chronic and acute toxicity on bees evne at high concentration



## Exceptional results for only a few milligrams of our molecule per hive

### Feeding of beehives in spring March-April, few mg / hive in syrup (tests in Moldova and in France)

- ✓ Prolificity of the queen increased up to +15%
- ✓ Faster growing of the colonies
- ✓ Better disease resistance
- ✓ Increase of the production of wax (+40%)
- ✓ **Decrease in Varroa infestation**
  - ✓ **Adults bees up to -62 %**
  - ✓ **Larvae up to -82%**
- ✓ Increase of the production of honey (up to +60%)
- ✓ No modification of honey, no trace of product



Preparation of syrup at the ton scale

### Feeding of beehives in Autumn September-october, in syrup (Tests in California, USA)



- ✓ A strong impact on mortality of the colonies between september and january : up to -80 % of mortality

**A molecule assimilated by bees, non-toxic, easy to use by beekeepers, with scientifically proven efficacy, particularly on Varroa Destructor and winter mortality**

## Developments: a newly created startup looking for investors and distributors



[www.oligofeed.com](http://www.oligofeed.com)

<https://www.linkedin.com/company/oligofeed/>



Aneta Ozieranska  
CEO

## Grand prix du salon international des inventions de Genève 2023



INPI France special prize at Geneva 2023



Gold Medal at Geneva 2023