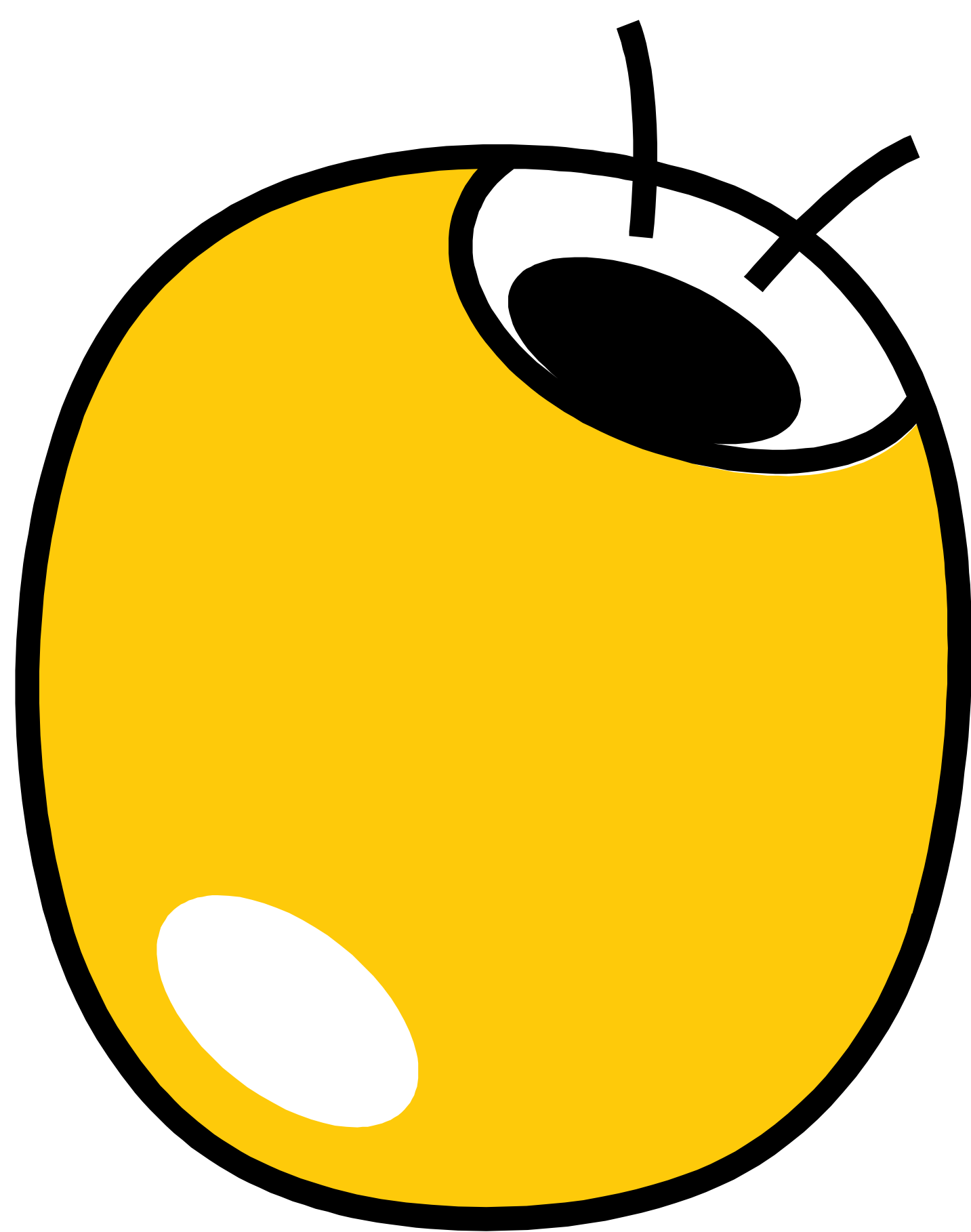


# Who are we?

**entokapsel** is a young European deeptech startup in Styria (Austria). We are a biotechnology company specializing in the field of insect artificial diet. **entokapsel** provides breakthrough innovative solutions to develop **alternative artificial feed (AAF)** and **alternative artificial hosts (AAH)** necessary for different species of arthropods including predators and parasitoids. Our unprecedented technology in the microencapsulation of liquids with hydrophobic outer shell and our proficiency in biological pest control and entomology along with our skills in the development of different formulas of insect diet allow us to create a professional company that will in future take over a significant market share in the beneficial insects' trade.



# We craft Insects ;)

## Our advantages

- lower costs compared to using the alternative natural feed/host (ANF/ANH)
  - less labour
  - lower heating requirement
  - smaller space of insectaries
  - the possibility of long-term storage of AAF/AAH at room temperature
  - fast and easy transport, no need for cold lines and no need for quarantine certificates for plants and animals in case of international transportation
  - the possibility of production to order in large quantities at any season
  - no need for planning several months in advance
  - higher feeding and egg laying rate when using AAF/AAH compared to ANF/ANH
  - standardization of products and ability to control their quality before delivery to agents
  - completely sterile and free from pathogens, mites or other factors harmful for insects
  - completely optimal and selectable size depending on the requirements of the respective insect
  - the use of waste from agricultural activities and animal husbandry, without the use of cereals and changing the balance "human food:insect feed" in favor of human food
- Our technology also has the following benefits compared to non-commercialized patents and unoffered AAF/AAH formulas:
- no use of heat, cryotechnology and radiation during production of the AAF/AAHs
  - no use of heat, ozone, plasma, ultrafiltration, UV, gamma or X-ray radiation when sterilizing the AAF/AAH
  - no use of chemical preservatives, emulsifiers, gelling agents, polysaccharides and other supplements in the AAF/AAH
  - industrial production; cheap compared to all other existing technologies, with very high production rates
  - the ability to choose different sizes, outer shell thicknesses and outer shell materials depending on the environment of use and the target insect

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We're glad to meet you at booth 115

> Are you biological control agents producer?

We could probably have some easier and cheaper solutions for feeding or rearing your insects

# What are our products?

**Trichokapsel™** is an AAH for several species of parasitoids of the genus *Trichogramma* commonly grown on ANH such as *Ephesttia kuehniella*, *Corcyra cephalonica*, *Sitotroga cerealella* or *Antheraea pernyi*. **Trichokapsel™** functions similarly to a natural host or ANH, stimulating females to lay eggs. *Trichogramma* eggs develop in the capsules over the same, or sometimes shorter, period compared to ANH. Finally, the parasitic wasps hatch out of the capsules.

**ChrysoKapsel™** Usually, the entire feed of *Chrysoperla carnea* or its major part in insectaries is being supplied with the help of ANF *Ephesttia kuehniella*. **ChrysoKapsel™** is a suitable substitute for this type of feed, which can be used partially or fully, depending on the desired efficiency. The capsule size and outer shell properties are suitable for the digestive system of insects, so the insects can easily use the capsules as feed with their mouthparts.

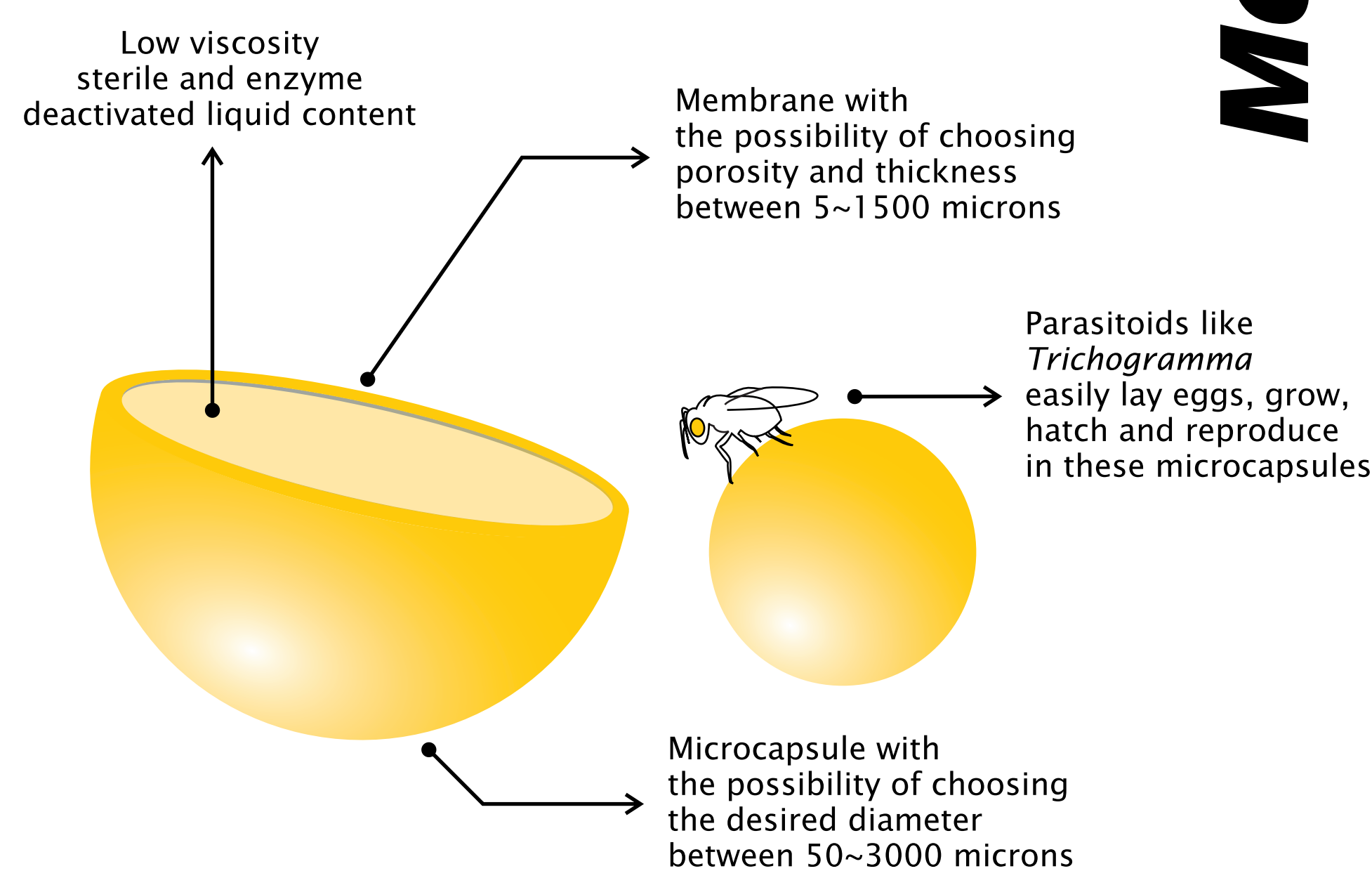
**Aquakapsel™** When raising many beneficial insects, especially insects with the mouthparts for piercing and sucking, a water supply as succulents is necessary. In nature, these insects usually use the sap of plants to quench their thirst. **Aquakapsel™** contains pure water and serves as a reliable water source for insects. Capsule size and outer shell thickness can be changed to order.

**Nutrikapsel™** When rearing beneficial insects on ANF, there is often a need for specific supplements to compensate for deficiencies in certain vitamins, minerals, or other important nutrients. With **Nutrikapsel™**, we have developed a universal insect breeding supplement that compensates for all these shortcomings and can be used by different species of insects with different mouthparts.

## More about our technology...

The production of artificial diet for beneficial insects is a longstanding and yet unsolved challenge. Despite many advances that have already been made in this area, no achievable business solutions have been offered to the producers of beneficial insects. As the world's first AAF/AAH supplier, we have pioneered the manufacture of microcapsules with a thin hydrophobic outer shell and liquid content using our unique secret technology. Conventional methods for microencapsulation of polysaccharides based on hydrophilic biopolymers, such as spherification with chitosan, alginate, carrageenan, pectin, polyacrylic acid and other substances, have shown, based on many experiences in entomotechnology, that they are not suitable due to rapid drying and high water permeability for beneficial insects rearing. In addition, these substances and their crosslinking agents or manufacturing processes are harmful to the digestive system of insects and cause serious problems. We have developed an innovative microencapsulation method specifically for insect feed to allow a low viscosity liquid content to be encapsulated in a hydrophobic outer shell without any gelling agents. The outer shell is very thin and is suitable for insects with different mouthparts. Furthermore, parasitoids can easily lay their eggs in these microcapsules and even the smallest parasitoids can puncture the outer shell without its disintegration. This outer shell is breathable and can be manufactured to the desired porosity, allowing insect embryos and larvae to breathe naturally inside. The outer shell also stimulates egg laying and is non-toxic to insects.

Since the microcapsules contain peptides, growth factors and very sensitive vitamins such as vitamin C, which change their properties at temperatures above 35 degrees Celsius, we do not use effective heating in this method, which can lead to their demolition. We also do not use radiation such as UV and do not use harmful crosslinking agents. Our method is based on changing the phase of hydrophobic substances, which includes a wide range of waxes, polymers, esters, fatty alcohols, fatty acids and other organic substances. Although these substances have a high melting point, we can still use them as suitable outer shell materials. The traditional methods such as spray drying, coacervation, extrusion, spherification, pan coating, Wurster fluid bed coating of polysaccharide microcapsules and similar processes have proven to be unsuitable for the production of beneficial insects and we have not used these methods in encapsulating our AAF/AAH because the heat and long process lead to the destruction of the content. Moreover, we have developed special formulas and preservation methods for common and new beneficial insects such as *Chrysoperla carnea*, *Orius*, *Trichogramma* and *Trissolcus* and are continuously expanding the range of formulas. As a result, in the near future we will develop a unique formula for almost every predator or parasitoid that simplifies the work of beneficial insect manufacturers and reduces their costs. Our meric formulas are significantly less expensive than using alternative natural feed (ANF) or alternative natural hosts (ANH) and do not compete with human food because they are made from waste from food production and agricultural activities, leading to better environmental practices.



Sterile process	Low effective temperature during processing	Lower price than natural hosts or feeds	Without gelling agents
Enzyme deactivated content	Without UV or any radiation	Fully customizable size and properties	Lower consume of cereals in production process

Scan it!



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