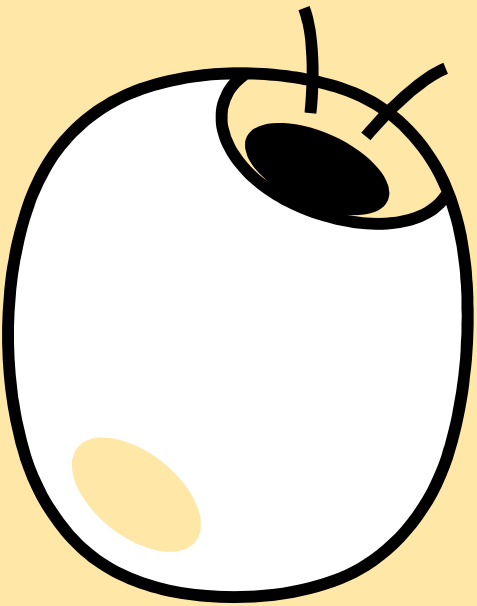

We craft insects ;)

Who is entokapsel ?

entokapsel is small biotechnology laboratory and startup. We are professionals in alternative artificial feed and host (AAF and AAH) research and production. In 2023 we started our startup in Feldbach, Steiermark (Austria). Our goal is providing engineering solutions to current manufacturers of biological agents to produce more affordable macro biological agents.

What is new in our technology?

Our products can be used instead of natural feed for predators and hosts for parasitoids. They are mimicking properties of insect egg, nymph or body.

We have a unique and innovative microencapsulation technology which helps to produce small microcapsules with 50~3000 microns diameter and 5~1500 microns membrane thickness. Our microcapsule membrane is made of wax/polymer or other wax like/polymer compounds like esters, fatty alcohols, alkanes or fatty acids. Their compound depends on the properties we want from our microcapsules, for example lower water permeability, oxygen and carbon dioxide passing or antimicrobial properties. Also, our microcapsules are isodiametric and egg laying stimulant. Our microcapsules have hydrophobic and easy-puncturable membrane. These properties are very important to avoid drying microcapsules or for using them as hosts for parasitoids. However, technologies that use hydrophile shell are well developed at the moment, but there is no reliable technology for porous, breathable and hydrophobic microencapsulation now.

Our microencapsulation machine, Kapseler 200 can sterilize and deactivate enzymes like tyrosine-melanin metabolism without using UV, Gamma or heat. Therefore, we have a sterile content in our microcapsules that increases their shelf time.

One of the important reasons for failure of the previous artificial projects so far was using of antibacterial or antifungal preservatives in artificial feed or hosts. Because these substances cause destruction of natural flora of insects' digestive system or symbiotic bacteria such as Wolbachia, on which food digestion and health are highly dependent. Knowing this, we tried not to use these substances in inhibiting enzymes or deactivating spoilage organisms.

entokapsel

Kapseler 200 process is also without using effective heat on microcapsules contents, however high melting point polymer or waxes are used as membrane. Previous studies have shown that using heat in artificial eggs can decrease vitamins or denaturate proteins and growth factors, so we avoid using it in our technology.
Kapseler 200 is a very small computer-controlled benchtop machine with high volume production. Typical microcapsule production capacity is more than 2 kg/hour, therefore one machine can manufacture more microcapsules than every *Ephestia*/*Sitotroga* insectary.
Every supplier of parasitoids or other agents knows that supplying large quantity of agents in outbreak season needs planning months in advance. Artificial eggs or hosts can be produced in large quantities in short time without pre-order from farmers. This important property could have many benefits for farmers and suppliers, which was not possible before, and it was cited as the main reason, why farmers do not want to use biological control.
Our microcapsules are cheaper and don't need cold line to transport them. Also, we don't use large spaces, consuming cereals and high energy in our production process hence our technology is completely environmental friendly.
Due to our innovations, now we have a new platform that able us to work on new parasitoids that before nobody worked on them why so there was not an economic and feasible alternative natural host for them.

What products do we currently have?

Trichokapsel™

Trichokapsel™ is an AAH for several species of parasitoids of the genus *Trichogramma* commonly grown on ANH such as *Ephestia 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 *Ephestia 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.

What is our plan to enter the market?

This is a game changing innovation that we would like to use in order to help current biological control agents market holders to supply more low-cost agents. Some traditional technology of feed or host insects like lepidopteran eggs production will not be economic henceforward. entokapsel believes it is better to spend our resources on technological aspects and focus on presenting new products based on this platform. We're open to find new partners for developing and marketing this technology. Get in touch with us.

entokapsel

entokapsel e.U.
Sigmund-Freud-Platz 1
8330 Feldbach, Austria
+43 681 10 302038
info@entokapsel.at
www.entokapsel.at

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