

# Extremely precise medicine delivery possible thanks to new type of production machine

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Robin de Bruijn and the INFINITY prototype. Credit: Bart van Overbeeke.

Eindhoven University of Technology spin-off EmulTech last week launched INFINITY: a unit that allows pharmaceutical companies to encapsulate medicines with very high precision. The resulting microparticle all have exactly the same size and medicine content, allowing extremely precise control of delivery. This is very important in applications such as asthma respirators.

Encapsulating medicines is currently still done by mixing oil containing the [active ingredient](#) with [water](#). The oil is not soluble in water, which

results in droplets. However these are not all the same size, so they do not contain the same amount of medicine and do not give a consistent delivery. Manufacturers therefore filter out spheres that are too large or too small, which can account for a loss of around 40% of production.

This is reduced to less than 1% in the production of EmulTech. The conventional [technology](#) can easily allow differences in the properties of individual batches. But the EmulTech system, which produces continuously, the properties are consistently the same. This is particularly valuable for the pharmaceutical industry.

The EmulTech technology, which was invented at TU/e and was developed by Robin de Bruijn of EmulTech, uses a different principle. The [oil](#) mixed with medicine and water is mixed in microscopic channels in a precisely controlled process; the water extrudes tiny [droplets](#) which then harden into spheres. Producers can themselves set the desired size, which they can choose between 1 micrometer and 1 millimeter. The spheres can also be made so they deliver their payload after a specific time, or at a specific temperature or pH level, which ensures that the medicine is delivered at exactly the right place. An animation that clearly shows how the technology works can be found on the EmulTech website: [www.emultech.nl/150\\_emultech-animation.html](http://www.emultech.nl/150_emultech-animation.html)

An example of a possible application of the technology is in asthma respirators. If the [medicine](#) particles are too small, they will penetrate too far into the lungs. And if they are too large, they will remain trapped in the throat. This makes it very important that all the particles are of exactly the right size. Another example is foods that only release their nutrients in the intestine, and not in the stomach. There are also benefits for medicines that are injected. Because there are no longer any particles of above-average size, a smaller needle can be used.

Up to now EmulTech has produced for pharmaceutical manufacturers.

But the INFINITY, which has the same size as a small refrigerator, allows companies to carry out their own production using this technology. The company presented the prototype to suppliers and customers at a mini-symposium last Thursday. Describing the name of the product, EmulTech's Joint founder and CEO Fränk de Jong says: "The name INFINITY is a light-hearted reference to the unlimited possibilities of the system, and its ability to produce continuously."

Provided by Eindhoven University of Technology

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