

# Custom-made gels suitable for drug delivery

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That gels based on proteins from yeasts can be used as drug delivery systems and carriers of antibodies is the most important conclusion from the Helena Teles' doctoral research at Wageningen University, The Netherlands. The custom-made proteins from the yeast *Pichia pastoris* are an alternative for animal gelatines and collagens used in the medical and pharmaceutical industries.

Teles' research shows that when other proteins are enclosed in the gel, they slowly leak out. Moreover, it turns out that erosion causes the gel to slowly dissolve from the exterior to the interior. In this way, all proteins enclosed in the gel are slowly passed on to the environment. These characteristics make the gels, which are derived from yeasts, suitable for [drug delivery](#).

## Custom-made protein gels

Researchers Frits de Wolf and Marc Werten from Food & Biobased Research designed these protein [molecules](#), which collectively form a network and swell in water. Each molecule consists of two small end pieces and a large middle piece, all of which can be custom designed. The molecule's short ends bond with the other molecules to form a network. The resulting gel can enclose other molecules, such as medicines or [antibodies](#), proteins that are used by the human body to eliminate viruses and bacteria. Pieces of [protein](#) can also be built into the gel molecules themselves.

By letting the yeasts produce shorter or longer molecules, the melting

temperature or the rigidity of the gel, for example, changes, and this can cause slower or faster delivery. Senior researcher De Wolf explains, "Because we can adjust their properties, these gels from biomaterial are also very suitable for other applications, for example, to cover a wound, to reinforce connective tissue or to seal off blood vessels during an operation."

## **Alternative for animal products**

These gels can offer an alternative to the animal-based gels, and possibly to the synthetic polymers, which are currently being used in the pharmaceutical and medical industries. These industries are looking for animal-free alternatives for gelatine and collagen because of the virus and prion contamination risks that animal-based gelatines and collagens bring with them.

Helena M. De Albuquerque Ferreira Teles is defending her dissertation on Tuesday, 7 September, with Prof. dr. Gerrit Eggink, Professor of Industrial Biotechnology at Wageningen University.

Provided by Wageningen University

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