

## State-of-the-art coextrusion technology for edible alginate sausage casings (#622)

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### Introduction

Sodium alginate solutions have the ability to rapidly form stable hydrogels in the presence of calcium ions. This so-called ionotropic gelation of alginates is used in the food industry to produce products such as sausages with edible calcium alginate hydrogel casings. However, during industrial production of such films, the alginate gelation kinetics is a limiting factor. To work at high production speed an optimum adaption of the alginate technology to a highly accurate processing equipment is required to instantly obtain a mechanically stable alginate film.

### Methods

The present work is aimed at presenting a coextrusion system that allows to fully exploit the ionotropic gelation of alginate for film formation. The system consists of two feeding pumps that are connected to a coextrusion nozzle, in which a sodium alginate solution is extruded through an annular gap on the surface of a coextruded food product and immediately crosslinked with calcium ions. By this means a calcium alginate film is generated continuously at a high speed of up to 2 m/s. By adjusting the speed of the feeding pumps and the concentration and composition of the crosslinking solution, the thickness of the alginate films on the food product can be controlled, typically in a range of 0.1-0.3 mm.

### Results

With a special variation of the coextrusion nozzle individual food portions can be generated by linking. These linked portions are completely coated by a calcium alginate film. In these completely sealed calcium alginate coatings also liquids can be packaged. The system has been successfully applied in meat, dairy and vegetarian applications for the production of sausages with edible alginate casings.

### Conclusion

The alginate used is totally compatible with vegan and vegetarian diets. The raw material is harvested from a sustainable source. Alginates are available with halal and kosher certification and are approved for use in organic foods. In the light of major, global food trends towards appropriate diets and lifestyles, the system offers a large industrial potential for food applications in general to create alginate-based coatings for low-viscous to highly viscous food products.

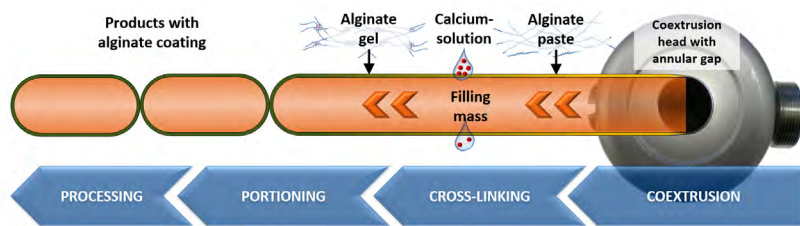


**Dry sausage with white moulds in alginate casing**  
Alginate-encased products can be frozen, dried, heated in water, oil or hot air, fried, barbecued and smoked. They can also be matured and enriched with mould.

### Notes



**The Handtmann ConProLink coextrusion system for the production of sausages in alginate casings** The ConPro system essentially comprises two vacuum filling machines which are connected via a coextrusion head. One of the two vacuum fillers, the “master machine”, pumps the filling product that a product strand is produced from. The “slave machine” transports the alginate paste which subsequently forms the product casing. The pasty sodium alginate solution is applied to the product strand as a thin film through an annular gap at the coextrusion head and crosslinked in a fixing bath containing calcium ions. The alginate coated strand can then either be cut into individual portions or linked.



**Schematic illustration of the coextrusion process to produce alginate coated food portions** After coextrusion and crosslinking the alginate coated product strand is portioned. This can be done by cutting the coextruded product strand into individual portions, leading to products with open ends which are not completely enclosed by the alginate casing. Alternatively, the coextruded product strand can be linked into individual portions during alginate crosslinking to produce individual portions which are completely encased in alginate.

## Notes