

# Novel *Ascophyllum nodosum* feed ingredient for pig nutrition

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## INTRODUCTION

The brown algae *Ascophyllum nodosum* is rich in secondary plant constituents, which are known to have prebiotic and various other beneficial feeding properties. However, research on the use of the dried and ground brown algae *Ascophyllum nodosum* could not always show positive effects (Michiels 2012). Hence, a digestion processing technology was developed in order to potentiate the positive effects, such as toxin binding and germ-inhibition (Ford et al. 2020), prebiotic activity and formation of a protective film on the intestinal mucosa. The result of this special processing is the feed ingredient MAXASCO. Its gelling properties (right glass) are highly improved compared to unprocessed brown algae (left) as shown in the image on the left.



## MATERIAL & METHODS

The mycotoxin binding capacity of MAXASCO was investigated in a study in comparison with a conventional toxin binder (bentonite) (CON). The products were tested in different concentrations (500 and 2000 ppm) at different pH levels, simulating the stomach (pH 2.5) as well as the intestine (pH 6.5). Radioactively labelled deoxinivalenol (DON) mycotoxin was transferred in defined concentrations into a buffer/test material suspension. After incubation at 38 °C for two hours and subsequent centrifugation, the amount of unbound mycotoxin was determined by measuring the radioactivity using liquid scintillation counting. Furthermore, the effect of MAXASCO on the adhesion of *E. coli* to the mucus of the small intestine was assessed with an ex-vivo intestinal mucus model (pig) using radioactively labelled bacterial cultures (*E. coli*). Mannan-oligo-saccharide (MOS) was used in comparison.

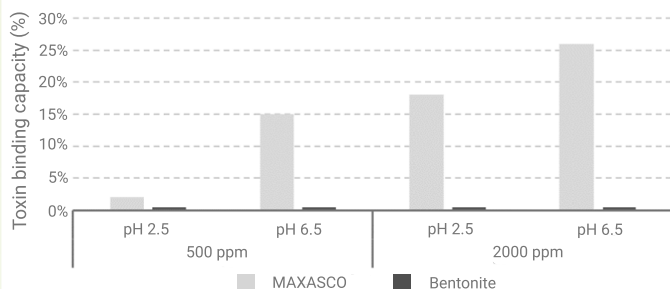


Fig. 1: DON binding capacities of MAXASCO and bentonite at pH 2.5 and 6.5 and two dosages.

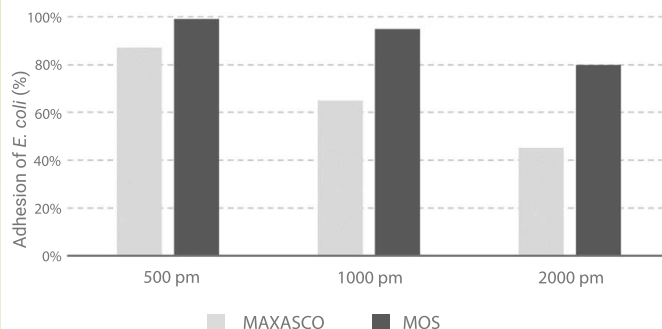


Fig. 2: Effect of MAXASCO and MOS on adhesion of *E. coli* to small intestinal mucus of piglets.

## RESULTS

The test evaluation showed that bentonite could only bind DON with moderate success (Figure 1). In contrast, MAXASCO was able to achieve a significantly higher binding of DON overall and reached over 25% at a dosage of 2000 ppm. Binding was also more efficient at neutral pH (gut).

The results (Figure 2) clearly indicate that MAXASCO is effectively inhibiting the adhesion of *E. coli* to the small intestines of piglets. Depending on the dosage efficacy ranges from 13% (500 ppm) to 55% (2000 ppm) and there is a clear advantage when compared with the inhibition efficacy of MOS.

## CONCLUSION

The advantages of the process for digesting seaweed meal lie in the improvement of the swelling behavior, the increase in the binding capacity and the protection of the gastro-intestinal tract of the animals resulting in higher zootechnical performances (data not shown). Due to these improvements, MAXASCO can make a decisive contribution to meeting the constantly growing demands of modern animal production and feeding. MAXASCO not only reduces the adhesion of pathogens (*E. coli*) in the digestive tract, but also effectively binds various mycotoxins such as DON.