Dietary soya saponins increase gut permeability and play a key role in the onset of soyabean-induced enteritis in Atlantic salmon (Salmo salar L.)

Dietary soya saponins are naturally occurring amphiphilic molecules and have been associated with many biological activities. The aim of the present study was to investigate whether soya saponins trigger the onset of soyabean-induced enteritis in Atlantic salmon (Salmo salar L.), and to examine if dietary soya saponins increase the epithelial permeability of the distal intestine in Atlantic salmon. Seven experimental diets containing different levels of soya saponins were fed to seawater-adapted Atlantic salmon for 53 d. The diets included a fishmeal-based control diet, two fishmeal-based diets with different levels of added soya saponins, one diet containing 25 % lupin kernel meal, two diets based on 25 % lupin kernel meal with different levels of added soya saponins, and one diet containing 25 % defatted soyabean meal. The effect on intestinal morphology, intestinal epithelial permeability and faecal DM content was examined. Fish fed 25 % defatted soyabean meal displayed severe enteritis, whereas fish fed 25 % lupin kernel meal had normal intestinal morphology. The combination of soya saponins and fishmeal did not induce morphological changes but fish fed soya saponins in combination with lupin kernel meal displayed significant enteritis. Increased epithelial permeability was observed in fish fed 25 % defatted soyabean meal and in fish fed soya saponin concentrate independent of the protein source in the feed. The study demonstrates that soya saponins, in combination with one or several unidentified components present in legumes, induce an inflammatory reaction in the distal intestine of Atlantic salmon. Soya saponins increase the intestinal epithelial permeability but do not, per se, induce enteritis.

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