Bacteria isolated from gastrointestinal tracts of wild fish as potential probiotics with antagonistic effects against fish and human pathogens.

Itziar Chapartegui-González^a*, María Lázaro-Díez^a, Ana Franco González de Canales^a, María del Carmen Castro^b, Inés García de la Banda^c, Alma Hernández de Rojas^b, Margarita Berdasco^b, Xabier Moreno-Ventas^d, Santiago Redondo-Salvo^e, Jose Ramos-Vivas^a

^aInstituto de Investigación Sanitaria Valdecilla IDIVAL, Santander. Spain. ichapg00@gmail.com*

^bInstituto Español de Oceanografía IEO, Gijón. Spain.

^cInstituto Español de Oceanografía IEO, Santander. Spain.

^dCYTAMA, Universidad de Cantabria, Santander. Spain.

^eInstituto de Investigación en Ingeniería de Aragón (I3A), Universidad de Zaragoza. Spain.

Solutions are urgently required for the growing number of infections caused by antibiotic-resistant bacteria and several alternative strategies such as probiotic bacteria have been suggested. The selection of probiotics requires various *in vitro* screening experiments for the production of antagonist compounds towards pathogens. In this study, a total of one hundred and twenty nine strains were isolated from different marine fish species (from the Cantabrian Sea coast) in MRS or TSB medium supplemented with 1.5% NaCl. A bacterial growth inhibition study to test for the production of antimicrobial metabolites by the isolates was performed using twenty strains of Gram positive or Gram negative pathogens: *Aeromonas hydrophila, Streptococcus iniae, Yersinia ruckeri, Staphylococcus aureus, Acinetobacter* spp., *Enterobacter* spp., *Listeria monocytogenes, Serratia liquefaciens* and *Corynebacterium* spp.

Seven Gram-positive, non-motile candidate probiotics showed antagonistic activity against at least two pathogens. The pathogens *A. hydrophila*, *Y. ruckeri* and *S. aureus* had the highest number of antagonists (5, 3 and 5 respectively). Candidate probiotic 17.3 showed the greatest antagonistic activity, inhibiting five of the pathogens. Interestingly, three candidate probiotics showed high antagonistic activity against a methicillin resistant *Staphylococcus aureus* (MRSA) strain. These results showed that some of the selected probiotic candidates could be considered as potential probiotic strains against fish or human pathogens.