Evaluation of antidiarrheal properties of sulfated polysaccharide fraction extracted from Gracilaria caudata seaweed in rodents

Introdução: Diarrheal diseases nowadays comprise a public health problem that affects developing countries, with distinct etiologic agents. Gastrointestinal disorders are common in northeastern Brazil and local population is making use seaweed species regionals, as Gracilaria caudata to treat these diseases, such as diarrhea, it lacks scientific proof. We aim to investigate the antidiarrheal activity of a sulfated polysaccharide extracted from seaweed G. caudata in rodents. Materiais e Métodos: Ethics Committee Research (UFC no. 11/2013) approved this study. Antidiarrheal activity of PLS was evaluated by castor oil-induced diarrhea and enteropooling. Wistar rats (150-200g) were pretreated with PLS (10, 30, and 90 mg/kg, p.o.) or loperamide (5 mg/kg, p.o.), and after 1 h, was administered castor oil (10 ml/kg, p.o.) Animals were placed in cages lined with filter paper and observed for 3 h for the presence of diarrhea defined as watery (wet), unformed stool. Besides, were sacrificed and small intestine was isolated and volume of intestinal contents was measured by graduated tube. Intestinal motility was evaluated using activated charcoal. Mice (Swiss strain, 25-30g) received castor oil and 30 minutes later they were treated with PLS (90 mg/kg, p.o). After 1 h, all animals were received 0,2 mL of charcoal activated (10% charcoal suspension in 5% gum acacia p.o). 20 minutes later, animals were sacrificed, and the distance covered by the activated charcoal in the small intestine was measured. To evaluate the secretory diarrhea, it was used method of isolation of intestinal loops, evaluating the parameters: fluid levels, chloride ions and absorption, as described and to evaluate the interaction between PLS, cholera toxin and GM1 receptor was performed ELISA test as described. Resultados e Discussão: PLS (10, 30, and 90 mg/kg) was reduced significantly (P<0.05) the diarrheal severity (28.38, 26.13 and 49.41%, respectively), also decreased the frequency of defecation (20.65, 23.75 and 48.79% respectively) and total number of wet feces produced upon administration of castor oil as in enteropooling, where in all PLS doses significantly reduced intestinal content (33.57, 35.71, 45.71% respectively). PLS reduced significantly the gastrointestinal transit compared to control, showed anticholinergic mechanisms. In choleric diarrhea, PLS decreased by presence of fluid (0.05 ± 0.007g/cm) significantly when compared with group that received only cholera toxin (0.13 ± 0.017g/cm) and reduced in about 35% loss of chloride ions and didn’t alter the pattern of intestinal absorption. ELISA test showed that PLS can
bind to cholera toxin and receptor GM1, reducing cholera diarrhea. Conclusão: PLS from G. caudata exert anticholinergic action and reduces all parameters observed in choleric diarrhea by interaction PLS-GM1 receptor and PLS-cholera toxin. However, more studies are needed to unravel all the mechanisms involved in its anti-diarrheal action.