Sulfated polysaccharides are complex macromolecules found in seaweeds that present important biological activities. The aim of this study was to analyze the effects of a sulfated polysaccharide fraction from the red seaweed *Gracilaria birdiae* (SP-Gb) on the cell viability of Vero cells and the antiviral activity against HSV-1 and HSV-2. SP-Gb was obtained by enzymatic digestion, followed by ion exchange chromatography on DEAE-cellulose. The effect of SP-Gb in cell viability was determined by two methods. Initially, by the morphological change, where the cells were treated with serial dilutions of the SP-Gb from 500 to 7.8 µg/ml, using culture medium without fetal bovine serum as a diluent, incubated for at 37°C with 5% CO₂ atmosphere. After 2 days, the cells will be observed in inverted optical microscope and compared with the control (no substance, only cells). The highest concentration of substance that did not alter the cellular morphology was called maximum non-toxic concentration. After that, it was incorporated the neutral red dye by living cells with subsequent quantification by a spectrophotometer at a wavelength of 492 nm. The degree of antiviral activity is expressed as percentage of viral inhibition. The results showed that SP-Gb in the highest concentration (500 µg/ml) presented a cell viability of 82% on Vero cells, and an antiviral effect with inhibition of 95.8% against HSV-1 and 94.4% against HSV-2 when compared to control group (cells + virus). In conclusion, SP-Gb did not present citotoxicity on Vero cells and presented an antiviral activity in the tested concentration.

**Word Keys:** cell viability, antiviral effect, *Gracilaria birdiae*

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