Distribution of elements in silver nanoparticles containing sulfated polysaccharide

Negreiros, M.M.F. [1]; Machado, R.I.A[1]; Queiroz, M.F.[1]; Chiquetti, S.C.[1]; Morgano, M.A.[2]; Rocha, H.A.O.[1]

[1] Departamento de Bioquímica, Centro de Biociências, Universidade Federal do Rio Grande do Norte, Natal, Brazil.
[2] Centro de Ciência e Qualidade de Alimentos, Instituto de Tecnologia de Alimentos, Campinas, SP, Brazil.

Introduction: Nanoparticles are approach to the incorporation of potential drugs by cells. Algal sulfated polysaccharides (ASP) are known to exhibit diverse pharmacological activities, therefore, are the focus of many studies related to biotechnology. Nevertheless, there are few studies that identify how elements are arranged up to form the nanoparticles. **Objectives:** Characterize the arrangement of chemical elements present in the silver nanoparticle containing sulfated polysaccharides from three seaweeds. **Material and Methods:** The seaweeds *Spatoglossum schröederi*, *Dictyopteris justii* and *Sargassum filipendula* were collected in Pirangi beach, Natal, RN, washed and submitted to proteolysis for 18h. The ASP were precipitated with methanol. Sulfated polysaccharide silver nanoparticles (SPN) were synthesized adding ASP solution on 1mM silver solution. ASP and SPN had sugar, protein and phenolic identified and were analyzed by Zeta potential and Energy-dispersive X-ray spectroscopy (measure elements of surface). SPN were also analyzed on inductively coupled plasma emission spectroscopy. **Results and Discussion:** The chemical analysis showed that SPN contained high amount of sulfated polysaccharides and low protein contamination. Analysis of Zeta potential of ASP from *S. schröederi*, *D. justii* and *S. filipendula* was -23, -12 and -19mV, and SPN was -5, -18, and -19mV, respectively. The elemental composition of surface nanoparticles showed high content of carbon, oxygen, sulfur and silver. It is worth noting that content of sulfur was higher on SPN and lower on ASP from *D. justii* and *S. filipendula*. The total content of silver was identified as 0,949 ± 0,007%, 7,068 ± 0,488%, 0,325 ± 0,033%, to SPN from *S. schröederi*, *D. justii* and *S. filipendula*, respectively. **Conclusions:** We found that nanoparticles from *D. justii* and *S. filipendula* had sulfate groups on the surface whereas nanoparticle from *S. schröederi* had sulfate groups inside of the nanoparticles. Therefore the distribution of elements on SPN indicated that the nanoparticles had different structures.

Key words: biotechnology, element distribution, seaweed
Acknowledgment: CNPq, CAPES and MCTI