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Synthesis and characterization of magnetic nanoparticles covered with molecular imprinted polymer templated with doxorubicin. *In vitro* drug release

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It has designed new ways of treating cancer, one of which is use of nanoparticles. When synthesized with a magnetic core and coated with molecular imprinted polymer (MIP), they may function as a system targeted drug delivery. Because of this synthesized magnetic nanoparticles coated with acrylates, using doxorubicin as template (NMSPD). Synthesis of magnetite nanoparticle was performed by the co-precipitation method, coated with silicates by tetraethyl orthosilicate hydrolysis to prevent decomposition, and MIP was built by thermal polymerization. In the characterization of nanoparticles was determined particle size, Z potential, spectroscopy ATR-FTIR, X-ray diffraction powder, absorption and desorption. Results for nanoparticle size were 10±0.02 nm by TEM, Z potential was 1.98±0.06. Infrared analysis showed bands at 3436, 2981, 1616, 1579 and 803 cm-1 by doxorubicin, at 2940, 1729, 1413, 1210, 1113 and 1008 cm-1 by acrilates of MIP, at 1040 and 1151 cm-1 by silicates and 551 cm-1 by magnetite. Diffractogram peaks at 2θ were 30.26°, 35.64°, 43.31°, 53.75°, 57.33° and 62.87°, which agrees with the characteristic peaks of magnetite. NMSPD adsorbed 124 mg doxorubicin/g nanoparticles in contrast with no imprinted polymer (NMSP) 109 mg doxorubicin/g nanoparticles and 3.35 times more specific. NMSPD desorbed 56 mg doxorubicin/g nanoparticle at 528 hours in a buffer of phosphates pH=7.4, delivery is kind Fick from a polymer matrix. Conclusions were synthesized and characterized magnetic nanoparticles and may function as a system targeted drug delivery, because are magnetic and delivery is prolonged.

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Water contaminated with *Didymosphenia geminata* generates changes in *Salmo salar* spermatozoa activation times

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Didimosphenia geminata ("didymo") has become a powerful and devastating river plague in Chile. A system was developed in *D. geminata* channels with the purpose of evaluating the effects of water polluted with didymo on the activation of Atlantic salmon (Salmo salar) spermatozoa. Results indicate that semen, when activated with uncontaminated river water had an average time of 60±21 s. When using Powermilt, (a commercial activator), times of 240±21 s are achieved, while rivers contaminated with *D. geminata* achieve a motility time of 30±12 s. Interestingly enough, the kinetic parameters of VSL, VCL and VAP showed no significant changes under all of the conditions. Furthermore, the presence of *D. geminata* reduces activation time of the samples as the cells age, indicating increased effects in spermatozoa that are conserved for more than 5 days. *D. geminata* has antioxidant content, represented by polyphenols. 200 ppm of polyphenol was obtained, in this study, per 10 grams of microalgae. Spermatozoa exposed to these extracts showed a reduction in mobility time in a dose dependent manner, showing an IC50 of 15 ppm. The results suggest an effect on spermatozoa activation, possibly due to the release of polyphenols present in contaminated rivers, facilitating the alteration of sperm motility times, without affecting the viability or kinetics of the cells. These findings have important implications for current policy regarding the control of the algae. Current control measures focus on the number of visible species, and not on the compounds that they release. As shown in this study, these released compounds also have a problematic effect on salmon production.

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