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Isualizing novel macrolide antibiotics bound to their ribosomal target

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Respiratory tract infections in cattle are commonly associated with the bacterial pathogens Mannheimia haemolytica and Pasteurella multocida, and are treated with several types of veterinary antibiotics including macrolides. Tildipirosin (20,23-dipiperidinyl-mycaminosyl-tylonolide) is a semi-synthetic macrolide derived from the naturally occurring compound tylosin. Compared to tylosin and tilmicosin (an earlier tylosin-derivative), tildipirosin is effective against macrolide-susceptible isolates, and retains activity against some of the recently emerging resistant strains (1-3). Here, the molecular interactions of the macrolides are mapped and visualized at their inhibitory target on the bacterial ribosome.

Tildipirosin, tilmicosin and tylosin all bind and inhibit the drug site within the large subunit of the bacterial ribosome. There are, however, subtle differences in how they occupy the site. Interactions of the two piperidine components, which are particular to tildipirosin (green), indicate how its mode of action is distinct from tylosin, tilmicosin (magenta) and the 15-membered macrolide tulathromycin (red) (4).

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Optimization of biosorption conditions of hexavalent chromium by *Aspergillus niger* and *Spicaria silvatica* mycelial mats using taguchi orthogonal array

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In order to maximize the biosorption efficiency, eighteen experiments were designed to investigate the potentialities of fungal biomass as a resistant and cost effective Cr+6 biosorbent. The influences of individual parameters as well as the interaction between them were studied using Taguchi statistical design. Groups of statistical analysis that can define the relationships between the responses of independent variables were carried out. In the current study, it was detected that the biosorbed Cr+6 by *A. niger* and *S. silvatica* varied greatly among the 18 media used indicating the importance of optimization experiments in bioprocesses. In case of *A. niger* the ANOVA analysis of variance revealed that temperature, mycelium status, $NaNO_3$ and agitation were the most significant factors influencing the Cr+6 biosorption. In *S. silvatica*, temperature, mycelium status, agitation and $MgSO_4$ $7H_2O$ were the highly significant variables influencing Cr+6 biosorption. The design detected that the experimental values of biosorbed Cr+6 were in reasonable agreement with the predicted values and the model was significant. The optimized predicted medium from the software design for Cr+6 biosorption by *A. niger* and *S. silvatica* was dead mycelium, sucrose (15 gl-1), $NaNO_3$ (1.5 gl-1), $MgSO_4$ $7H_2O$ (0.1 gl-1), temperature (18°C), pH (5), cultivation (static) and incubation period (5 days).

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