Dottorato di ricerca in Scienze Veterinarie XXXVIII CICLO - Anno di corso: I

Dott.ssa Anisa Bardhi **Curriculum:** Scienze cliniche

Supervisor: Prof. Andrea Barbarossa **Cosupervisor:** Prof.ssa Paola Roncada

Therapeutic drug monitoring of ampicillin in foals

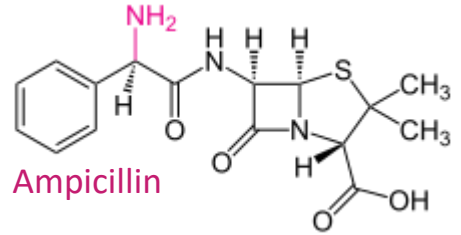
Objective Therapeutic drug monitoring (TDM) has become a crucial tool in determining appropriate antibiotic doses for individual patients with infections. This is particularly important for critically ill patients, which display altered and highly variable pharmacokinetics (PK). To date, no TDM studies have been conducted to determine appropriate ampicillin dosing in critically ill newborn foals. Therefore, we aimed to develop a LC-MS/MS method for quantifying ampicillin in foal plasma and apply it to samples collected during a TDM study.

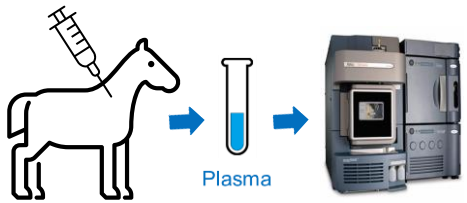
Materials and Methods Plasma samples (100 µL) were precipitated with acetonitrile and injected in the analytical system. Ampicillin separation was obtained with a Waters Acquity UPLC pump equipped with a BEH C18 column, pumping a mixture of 0.1% AF in H2O and ACN under programmed conditions. The quantification of the analyte was performed on a Waters XEVO TQ-S Micro, operating in ESI+ and monitoring two specific transitions (350.1 > 105.95 and 350.1 > 113.89 *m/z*).

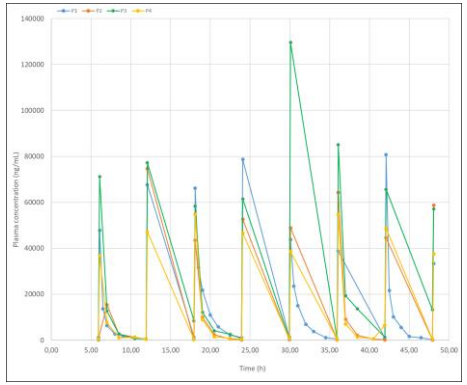
A preliminary application of the analytical approach was performed on samples collected (5 min before and 5 min after each administration) from four foals receiving 20 mg/kg of ampicillin intravenously every six hours.

Results The LC-MS/MS approach was validated following current European guidelines and was successfully applied for the determination of ampicillin maximum and minimum concentrations of the drug in foals.

In future proposal Applying this method to a larger number of patients will allow to design appropriate treatment protocols (dose and frequency) in critically ill foals, also in relation to MIC values associated with specific pathogens.







References *European Medicines Agency (EMA). ICH guideline M10 on bioanalytical method validation and study sample analysis, London, U.K. July 2022. EMA/CHMP/ICH/172948/2019.*

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