Isolation and culture guidelines for *Streptobacillus moniliformis* in a clinical setting: re-evaluating the role sodium polyanethole sulfonate plays in organism viability

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**Background:** Rat-bite fever (RBF), a zoonotic disease, is rarely seen or diagnosed in a clinical setting. Caused by the bacteria *Streptobacillus moniliformis*, the clinical presentation often includes fever, chills, myalgia, headache, vomiting and polyarthritis in roughly 50% of all patients with a 7-13% mortality rate if left untreated. *Streptobacillus moniliformis* is often difficult to recover or culture in a clinical setting due to the fastidious nature of the organism, requiring 20% serum or ascetic fluid or 10-20% whole blood supplementation to support growth. Published reports and clinical guidelines also state that sodium polyanethole sulfonate (SPS), or “Liquoid”, the main anticoagulant used in commercially available blood culture bottles, inhibits the organism in ranges from 0.05%-0.0125%, which is currently used industry wide.

In the present study, we show how SPS and organism viability are not directly related and propose new and updated guidelines to be utilized in a clinical setting in order to efficiently isolate *S. moniliformis* from submitted clinical samples.

**Material/methods:** McFarland concentrations ranging from 0.98-1.10 were made in 3mL of BHI, and then diluted out in a 1:9 ratio in order to obtain concentrations ranging from 3.00e8 CFU/mL-3.00e2 CFU/mL. These concentrations (1mL) were inoculated alongside 10mL of whole human blood, containing no anticoagulants (ZenBio, NC. USA), which was then inoculated in BD Plus Aerobic/F blood culture bottles (Becton, Dickinson and Co, NJ USA) and incubated for 21 days.

**Results:** Using four isolates, with four set concentrations ranging from 3.00e8 to 3.00e2, all isolates were successfully detected with average time-to-detections for each data set being 24.0, 40.3, 37.3 and 51.5 hours respectfully.

**Conclusion:** *Streptobacillus moniliformis* can be reliably isolated and recovered from automated blood culturing bottles used in most clinical hospital laboratories. More importantly, data shows that the bottles with a SPS concentration of 0.05%, twice the recommended amount, has little to no effect on organism viability when the appropriate amount of blood is used, further suggesting that blood volume and organism viability could be directly related when using current blood bottle formulations available today.