Mycoplasma hyopneumoniae detection in nylon-flocked and rayon-bud swabs
Karine L. Takeuti, David E. S. N. de Barcellos, Maria Pieters

Keypoints:
- Absorption and detection of M. hyopneumoniae in nylon-flocked swabs was significantly higher than rayon-bud swabs.
- Nylon flocked swabs could be suggested to use in chronic infections where the bacterial load could be low.

Introduction
Mycoplasma hyopneumoniae is the causative agent of enzootic pneumonia, a chronic respiratory condition in pigs. Sterile swabs are used to collect clinical samples from the pig’s respiratory tract. Research studies have shown that the sensitivity of respiratory pathogens detection can vary depending on the type of swab used for sample collection. The effect of swab type on M. hyopneumoniae detection has not been evaluated to date.

Objective
To compare two types of commercial swabs for M. hyopneumoniae detection by real-time PCR.

Material and methods
In order to compare swab absorption, 10 nylon-flocked and 10 rayon-bud swabs were individually weighted and dipped into one matrix, either 200μL of PBS or 0.600±0.002g of lubricant (as a surrogate for respiratory secretions). Swabs were dipped in the matrix and forty comparisons were made, including 10 repeats for each combination (type of swab and matrix).

The detection of M. hyopneumoniae by real-time PCR was compared using tracheal and bronchial mucous from M. hyopneumoniae negative pigs mixed with M. hyopneumoniae strain AP414 at a final concentration of 650 ng/μL, equally distributed into 40 aliquots. In each tube, one nylon-flocked and one rayon-bud swab were dipped alternating the dipping order. Twenty repeats per swab type and dipping order were performed (n=80). DNA was extracted and samples run by PCR individually in duplicate.

Paired t-test was used to compare absorption of PBS or lubricant based on swab type, and a linear mixed model was performed to assess differences in Ct values between swab types.

Results
The absorption of PBS and lubricant was significantly higher (p<0.05) in nylon-flocked than in rayon-bud swabs (Figure 1). Detection of M. hyopneumoniae by real-time PCR of each swab type is shown in Figure 2. Overall, the mean Ct value of M. hyopneumoniae detection in nylon-flocked and rayon-bud swabs was significantly different, and was significantly influenced by dipping order (25.9±0.48 and 26.4±0.78 for nylon-flocked swabs, and 27.6±0.84 and 26.9±0.57 for rayon-bud swabs dipped first and second, respectively). No differences in the percent of positive samples detected by each swab type were observed.

Conclusion
Nylon-flocked swabs are made of short fibers arranged perpendicularly, working as a brush, while rayon-bud swabs consist of a small wad wrapped around one end of a rod. It is speculated that the swab design may have been responsible for the differences observed in this study. Although the influence of the material cannot be ruled out.

Absorption and detection of M. hyopneumoniae in nylon-flocked swabs was significantly higher, although mean Ct differences were only 0.5 to 1.7, which may not be of significant importance from the biological and diagnostic perspective. Nevertheless, it can be suggested that nylon-flocked swabs are used in cases of M. hyopneumoniae chronic infections, when bacterial loads may be low and therefore more difficult to detect.

Overall, our results highlight the potential influence of the material and shape of the sampling device used for M. hyopneumoniae detection by PCR.