

Comparative viscosity and syringeability of five florfenicol injectable solutions

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Easiness of injections is an important parameter for animal welfare and operators. This study was done to compare

viscosity and syringeability of 5 florfenicol injectable solutions marketed in Mexico or Brazil, under laboratory conditions.

Materials and methods

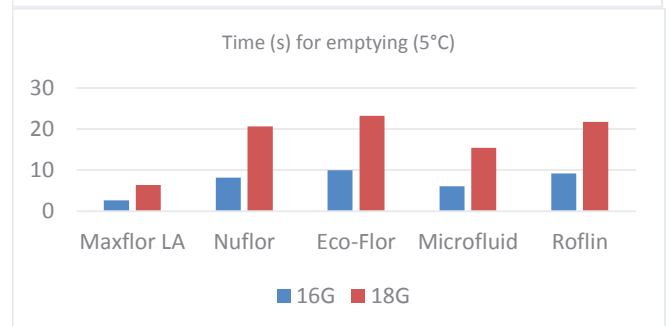
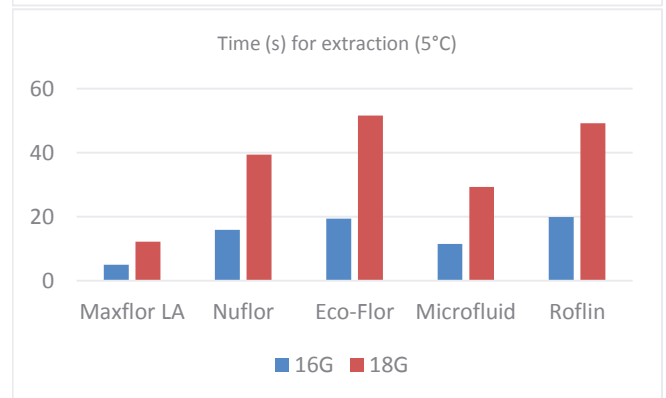
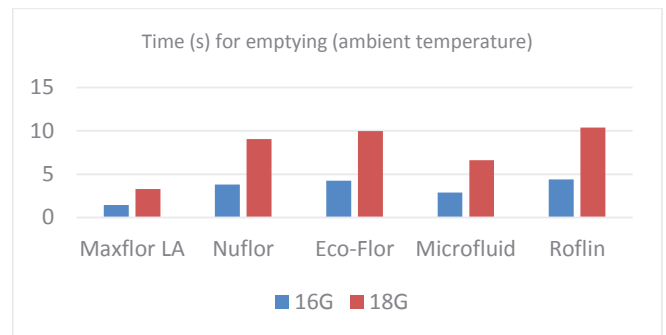
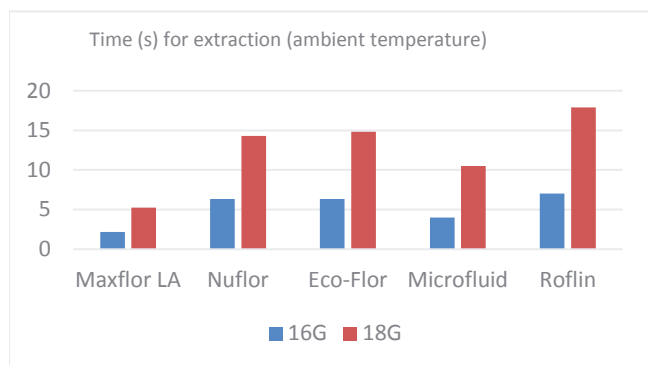
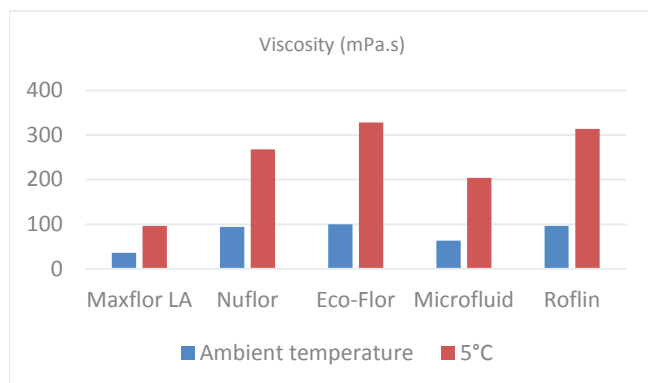
One 40% florfenicol injectable solution (Maxflor[®] LA, Virbac) was compared to four 30% florfenicol injectable solutions (Nuflor[®], MSD; Eco-Flor[®], Ecozoo; Microfluid[®], Vetanco; Roflin[®], Agener Uniao). Viscosity was measured at ambient temperature and 5°C by using a Brookfield viscosimeter. Syringeability was measured according to two tests: either as the time necessary to extract a 10 mL volume from a product vial by applying a constant strength of 19.6 N on a syringe or as the time necessary to empty a syringe containing a 10 mL volume of

product by applying the same constant strength of 19.6 N. Two temperatures (ambient one ranging from 19 to 22°C and 5°C) and 2 types of needle (16G, 18G) were tested. Each measure was repeated 6 times with a chronometer. Times were then converted to the times corresponding to a volume necessary to treat a pig weighing 80 kg for a florfenicol dose regimen of 15 mg/kg, assuming a proportionality of the time according to the volume. For syringeability tests, each 30% florfenicol solution was compared to the 40% florfenicol solution by the t test with Bonferroni correction for pairwise multiple comparisons.

Results

Viscosity ranged between 36 and 100 mPa.s at ambient temperature and between 96 and 328 mPa.s at 5°C, the 40% florfenicol solution having the lowest viscosity at both temperatures.

Extraction and emptying times were the shortest for the 40% florfenicol solution in all conditions, differences being statistically significant with all the 30% solutions.



Conclusion

Precision of the syringeability test was satisfactory. Measured times increased as viscosity of the product increased. Times were longer for the narrower gauge needle and at low temperature. Shortest times were recorded for the solution having both the highest florfenicol concentration and the lowest viscosity, reflecting influence of excipients. For this 40% formulation, shorter times appeared advantageous for animal welfare and practical constraints (metaphylaxis, lower temperature in winter).