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PP-324 [Apitherapy]

The effect of dehydrated honey as an energy source on boar sperm quality parameters

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Introduction

The semen used in artificial insemination (AI) procedure is diluted with various types of extenders that act as an energy source, provide temperature protection, facilitate membrane stabilization, pH buffering, antibiotic action, and generally extend sperm storage time. Dehydrated honey (DH) is a more convenient liquid honey alternative consisting of various types of carbohydrates that can act as an additional energy source for spermatozoa. The objective of this study was to evaluate the effect of storage at 17 °C for 96 hours on the motility and viability of boar spermatozoa when different concentrations of DH were added to semen samples.

Methods

Twelve semen samples were collected from 12 breeding boars, diluted with long term extenders, divided into separate parts and supplemented with 0 % (DH0), 0.1 % (DH0.1), 0.5 % (DH0.5), 1 % (DH1) and 2 % (DH2) dehydrated honey (Fig. 1).

Fig. 1. Dehydrated honey.

All samples were stored in a refrigerator at 17 °C for a period of 96 hours. Total sperm motility and sperm viability (HOST test and eosin/nigrosin staining (Fig. 2)) were determined before (0 H) and after 96 hours (96 H) of storage.

Fig. 2. Sperm cells stained with eosin/nigrosin: 2 viable (white), 1 non-viable (pink).

Results

Following the designated storage period, the eosin/nigrosin staining method showed the greatest reduction in sperm viability in the DH0 control group, with a percentage of non-viable spermatozoa of 45.92% (SD (standard deviation) = 16.262). In DH1, the percentage of non-viable spermatozoa was 40.33% (SD = 13.330), which was 5.59% lower (Fig. 3). No significant effect was observed in other DH concentrations compared to the control.

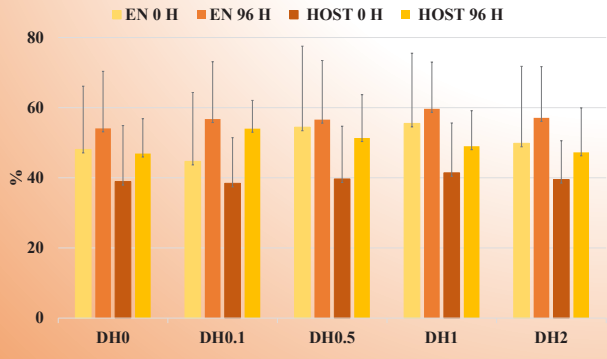

Fig. 3. Effect of dehydrated honey on sperm viability (eosin/nigrosin staining (EN) and HOST).

Furthermore, the hypo-osmotic swelling test (HOST) revealed the lowest viability in the DH0 control group (46.92% (SD = 9.931)), while in the DH1 group it was 49.00% (SD = 10.126). The DH1 group exhibited the highest total sperm motility and the lowest percentage of non-motile spermatozoa (11.66% (SD = 9.324)). In contrast, the DH2 group had the highest percentage of non-motile spermatozoa (27.44% (SD = 16.138)) ($P < 0.05$) (Fig. 4).

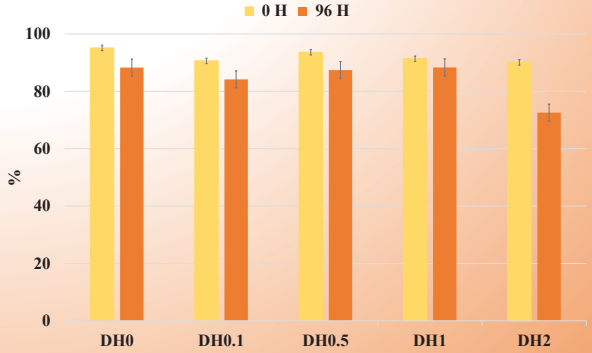

Fig. 4. Effect of dehydrated honey on sperm motility.

Discussion and conclusion

In conclusion, after 96 hours of storage at 17 °C, semen samples with a 1% dehydrated honey concentration had the highest levels of motility and viability across multiple assessments. In comparison, the control group had the greatest reduction in viability, highlighting the potential benefits of using appropriate concentrations of dehydrated honey to maintain semen quality during storage.

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The semen used in artificial insemination (AI) procedure is diluted with various types of extenders that act as an energy source, provide temperature protection, facilitate membrane stabilization, pH buffering, antibiotic action, and generally extend sperm storage time. Dehydrated honey (DH) is a more convenient liquid honey alternative consisting of various types of carbohydrates that can act as an additional energy source for spermatozoa. The objective of this study was to evaluate the effect of storage at 17°C for 96 hours on the motility and viability of boar spermatozoa when different concentrations of DH were added to semen samples. Twelve semen samples were collected from 12 breeding boars, diluted with long term extenders, divided into separate parts and supplemented with 0% (DH0), 0.1% (DH0.1), 0.5% (DH0.5), 1% (DH1) and 2% (DH2) dehydrated honey. All samples were stored in a refrigerator at 17°C for a period of 96 hours. Total sperm motility (SCA) and sperm viability (HOST test and eosin/nigrosin staining) were determined before and after 96 hours of storage.

Following the designated storage period, the eosin/nigrosin staining method showed the greatest reduction in sperm viability in the DH0 control group, with a percentage of non-viable spermatozoa of 45.92% (SD (standard deviation) = 16.262). In DH1, the percentage of non-viable spermatozoa was 40.33% (SD = 13.330), which was 5.59% lower. Furthermore, the hypo-osmotic swelling test (HOST) revealed the lowest viability in the DH0 control group (46.92% (SD = 9.931)), while in the DH1 group it was 49.00% (SD = 10.126). The DH1 group exhibited the highest total sperm motility and the lowest percentage of non-motile spermatozoa (11.66% (SD = 9.324)). In contrast, the DH2 group had the highest percentage of non-motile spermatozoa (27.44% (SD = 16.138)) ($P < 0.05$).

In conclusion, after 96 hours of storage at 17°C, semen samples with a 1% DH concentration had the highest levels of motility and viability across multiple assessments. In comparison, the control group had the greatest reduction in viability, highlighting the potential benefits of using appropriate concentrations of DH to maintain semen quality during storage.