Lipid profile in chicken sperm of Italian chicken breeds

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Lipids are a basic component of sperm, involved in its highly specialized membrane structure and functions. Sperm lipid composition is species-specific and differences have been also reported among poultry breeds or strains. The aim of the present study was to characterize sperm lipids and quality in 5 Italian chicken breeds: Bionda piemontese (BP), Bianca di Saluzzo (BS), Mericanel della Brianza (MB), Pepoi (Pe), Robusta maculata (RM). Birds were housed in individual cages in controlled environment and fed *ad libitum* a standard chicken breeder diet and fresh drinking water. Ejaculates were routinely collected twice per week and the following quality parameters were assessed: volume, concentration, sperm membrane integrity and motility parameters (CASA). Pooled semen samples were centrifuged to separate sperm pellets, then stored at -20°C until lipid analyses. After total lipid extraction, major lipid classes were fractionated by thin-layer chromatography on silica gel and fatty acid (FA) composition of phospholipid (PL) was determined by gas-chromatography; free cholesterol was assessed by colorimetric kit.
Sperm membrane integrity (range 75-92%) and sperm motility (range 78-98%) did not show significant variability between breeds. In contrast, significant breed differences were found in progressive motility and the majority of kinetic parameters. RM and BP sperm were characterized by the highest and lowest values, respectively, in progressive motility (40.3% vs 22.3%, $P<0.05$), linearity (49.0% vs 29.2%, $P<0.001$) and straightness (68.3% vs 52.9%, $P<0.001$). Variability in sperm lipid components was also found in the same breeds. RM sperm showed the lowest total lipid content (182 $\mu g/10^9$ sperm), significantly lower compared to all other breeds, and a significant higher proportion of phospholipid (46%) compared to BP sperm (33%); as a consequence, the free cholesterol/phospholipids ratio was significantly lower in RM sperm (0.52) compared to BP sperm (1.00). Furthermore, PL-FA composition of RM and BP sperm showed significant differences in total saturated fatty acids (RM 58% *vs* BP 69%, $P<0.05$), n-6 polyunsaturates (RM 34% *vs* BP 14%, $P<0.001$) and n-3 polyunsaturates (RM 0.84% *vs* BP 5.81%, $P<0.001$). In conclusion, a peculiar association between quality and lipid components in sperm of Italian chicken breeds was found. Sperm biological differences between breeds may contribute to improve reproductive and conservation strategies.

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