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High-yielding dairy cows fertility remains relatively low, with first service mean success rate between 35 and 40%. In a previous study (Elis s. Animal Reproduction Science 164: 121-132, 2016), long chain n-3 polyunsaturated fatty acids (n-3 PUFA LC) supplementation of the diet of dairy cows tended to decrease the non-fertilization – early embryo mortality rate after first service (n3 PUFA LC: 13.5% (n = 22) vs control 38.8% (n = 23), P = 0.09), suggesting a potential effect on oocyte quality. In this study, we evaluated the effects of n-3 PUFA supplementation on in vitro embryo production in dairy cows, after hormonal ovarian stimulation. 37 primiparous Holstein cows were supplemented with n-3 PUFA (n = 18, micro encapsulated fish oil, 1% DM, OMG750®, Kemin) or n-6 PUFA (n = 19, micro encapsulated soy oil, 1% DM, OMG Soy®, Kemin). Three ovum-pick up sessions were performed on cows every two weeks (5 groups of 6 to 9 cows), after 2, 5 or 7 weeks of supplemented diet (between 92.0 0 ± 2.4 and 127.0 ± 2.4 day postpartum). Fatty acid composition in plasma was measured to assess the efficiency of the diet. Plasma anti mullerian hormone (AMH) assay was performed on the first day of diet supplementation to evaluate potential response of cows to hormonal ovarian stimulation. After follicular puncture, oocyte-cumulus complex (OCC) underwent in vitro maturation, fertilization (IVF) and development. Fertilization rate was determined 48 hours after IVF by counting cleaved embryos. Embryo development rate and embryo quality were determined 7 days after IVF by counting blastocysts. To compare n-3 and n-6 cows, multifactorial linear repression (quantitative parameters) or logistic regression (rates) models were used (fixed effects: diet, supplementation duration and interaction, cow as a random effect). Fatty acid composition showed a significant 1.62-fold increase in plasma EPA after 2 weeks of n-3 supplementation ($P < 0.0001$) while the increase in plasma DHA became significant (1.46-fold, $P < 0.0001$) only after 7 weeks diet. A total of 1462 follicles were punctured on n-3 cows (54 puncture sessions) and 1538 follicles on n-6 cows (57 puncture sessions). OCC recover rate was significantly increased in n-3 cows (41.6% vs 36.2% in n-6 cows, P = 0.0035). No significant difference was reported on cleavage rate (P = 0.1033) between n-3 cows (77%) and n-6 cows (85%). Nevertheless, blastocyst rate (relative to cleaved embryo) tended to increase (P = 0.0865) in n-3 cows (48.2%) compared to n-6 cows (38.7%). A significant increase in good quality blastocysts (grades 1 and 2, relative to cleaved embryo) was observed (P = 0.0217) in n-3 cows (42.7%) compared to n-6 cows (33.3%). The number of total blastocysts and of grade 1 and 2 blastocysts produced per OPU session was 2.87 ± 0.34 and 2.48 ± 0.31 in n-3 cows versus 2.28 ± 0.31 and 1.88 ± 0.28, respectively, in n-6 cows. These results suggest that n-3 supplementation in the diet could improve embryo quality.