Association between age at first calving and ovum pick-up *in vitro* production traits of Gyr cattle.

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The knowledge of the associations between traits allow identify the most efficient methods of selection and selection criteria breeding programs. Thus, the aim of this study was to estimate genetic (r_g) and residual correlation (r_r) between ovum pick-up in vitro production (OPU) traits and age at first calving (AFC). The data set used in the present study consisted of 3,094 Gyr cows with 13,160 phenotype records including the number of viable (VIA) and unviable oocytes recovered (INV) and AFC. The genetic parameters were obtained by REML procedures via BLUPF90 programs, in a three traits analyzes. The animal linear mixed model considered contemporary group (i.e., cohort of cows born in the same year and raised together) as a fixed effect, cow's age and OPU interval as a linear covariables (except for AFC) and additive and residual as a random effects. The r_g estimates among VIA and INV were 0.99±0.003, however, the r_g estimates among these traits and AFC were -0.05±0.07 and -0.06±0.07, respectively. Therefore, the VIA and INV are independent of AFC. The r_g estimates indicates the magnitude and direction of correlated responses to selection, thus in this population direct selection for AFC would be most effective than indirect selection. However, indirect selection between VIA and INV could be an alternative for reduce measurements cost and improve genetic progress in breeding programs. The residual correlation estimates were 0.95±0.07 for VIA and INV, 0.03±0.073 for VIA and AFC and 0.03±0.03 for INV and AFC. Thus, the environment and non-additive effects, not considered in this statistical model, similarly contribute to phenotypic variation of VIA and INV. The VIA and INV traits seems to share the genetic background with pleotropic effects and gene linkage thus, only one of these traits can be used as a selection criteria. Thus, VIA should be combined with AFC, through a selection index, to improve reproductive rates in dairy cattle systems.

Keywords: genetic and residual correlation, oocytes, reproduction, selection