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The rearing of laying hens is in the process of transitioning to alternative systems to cage. The objective of the ELEV'OP project is to assess the impact of different rearing systems (cage, barn system and free-range) on microbiological contamination and on the macrostrusture of eggs. Two strains of hens were studied at an average age of 58 weeks: 13 Lohmann Brown Classic (LB) flocks and 13 Lowmann LSL Classic (LW) flocks evenly distributed in the 3 different rearing systems. Quality of eggs was compared with a DET6000 (Digital Egg Tester). The weight of eggs and yolks showed a strong inter-farms variability with a significant difference between the 2 strains. LW eggs and yolks are on average heavier ($p < 0.01$) in agreement with the reference data. We do not observe any effect of rearing system in LW whereas in LB egg and yolk weights are lower in free-range than in cage (-2.21g for egg and -0.9g for yolk). Shell resistance were stronger in LB than LW, and is also impacted by the rearing system for both strains (Cage > barn & free-range). The yolk index was impacted by age and strain hens but not by the rearing system. Haugh unit showed a strong difference between strains (LB < LW) in addition to being impacted by the rearing system (+2.18 for free-range and +2.31 for barn compared to cage farms). The microbial contamination of egg surface was evaluated by counting the total flora at 30° C, enterococci and presumed enterobacteria. There was a high variability between farms unrelated to the rearing system, but which can be attributed to the management of the farm.

Keywords : egg quality, rearing system, cage, free-range, microbiology