

Abstract

Accurate DNA quantification is essential for studying aging and longevity, particularly in generating induced pluripotent stem cells (iPSCs) and direct conversion (DC) models. This paper evaluates the NanoDrop Lite, NanoDrop 2000 C, and Qubit Fluorometer for DNA quantification, highlighting their strengths and limitations. The NanoDrop Lite offers convenience but lacks precision at low concentrations. The NanoDrop 2000 C improves accuracy for DNA dilutions highly concentrated with DNA but remains limited in detecting contaminants. The Qubit Fluorometer provides superior sensitivity but requires longer processing times and has a hard time measuring high concentrations. Findings suggest that combining these tools optimizes DNA quantification for aging research, ensuring more reliable genetic data. Specifically, the NanoDrop 2000 C should be used for initial concentration assessments and high-concentration samples, while the Qubit Fluorometer is best for highly diluted DNA. Regular calibration and cleaning of all the instruments enhance reliability. This approach ensures reproducible genetic data, advancing research on aging, resilience, and longevity, with implications for medical diagnostics, regenerative medicine, and age-related disease prevention.