

RNase Impurities in Single-Use Systems

Technical Regulatory Topic

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Author: Gilbert E. Tumambac

Ribonucleases (RNases) are enzymes that specifically break down ribonucleic acids (RNA). As RNases are ubiquitous in nature, they are considered a potential impurity from single-use systems (SUS) that could adversely affect the quality and efficacy of RNA-based medicines.

As part of Cytiva's stringent contamination risk control, our SUS are manufactured under strict adherence to ISO Class 7 clean room specifications. Under these conditions, there is a minimal exposure of product-contact materials to external environment to mitigate the introduction of contaminants including RNase into fluid-contact pathways. Furthermore, irradiation of systems at or above the typical sterilization dose (> 30 kGy) is expected to irreversibly reduce and further diminish RNase activity^{[1][2]}. However, irradiation alone following clean room production does not guarantee complete elimination of RNase impurities from SUS.

Please note that Cytiva does not routinely test for RNases as part of SUS qualification and does not employ a specific protocol to control RNase impurities in SUS. We recommend our end-users to incorporate additional measures or perform additional testing to meet their process-specific requirements.

References

- [1] E. Vasileva-Tonkova and T. Chomoneva, "Effect of Gamma-Irradiation on Guanyl Specific Ribonuclease From *Trichoderma harzianum*," *Process Biochemistry*, vol. 39, no. 12, pp. 2257-2260, 2004.
- [2] E. Slobodian, M. Fleisher, W. Newman and S. Rubinfeld, "Effects of Gamma Radiation on Ribonuclease," *Archives of Biochemistry and Biophysics*, vol. 97, no. 1, pp. 59-69, 1962.

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