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Nanotechnologies — Determination of silver nanoparticles potency by release of muramic acid from *Staphylococcus aureus*

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National foreword

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Nanotechnologies — Determination of silver nanoparticles potency by release of muramic acid from *Staphylococcus aureus*

Nanotechnologies — Détermination de l'efficacité des nanoparticules d'argent par la libération de l'acide muramique du Staphylococcus aureus

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Foreword

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The committee responsible for this document is ISO/TC 229, *Nanotechnologies*.

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Introduction

The antimicrobial properties of silver nanoparticles (AgNPs) are being increasingly utilized in consumer products. It has been widely used for development of many biological and pharmaceutical processes, products, and applications such as coating material for medical devices, orthopaedic or dental graft materials, topical aids for wound repair, clothing, underwear and socks, textile products, and even washing machines.[1] Industries are producing wide varieties of AgNPs as an antibacterial agents with different physical properties and with little low concern to their side effects. Moreover, there is a risk of enhanced bioavailability of the nanoparticles in the different media[2][3] which might have impact on the beneficial soil flora, plants, animals, and humans. From this point of view, the potency of AgNPs should be evaluated and classified according to its final biological activities.

This Technical Specification does not describe use of this Technical Specification to evaluate what properties of silver nanomaterial are to be assessed.

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Nanotechnologies — Determination of silver nanoparticles potency by release of muramic acid from *Staphylococcus aureus*

1 Scope

This Technical Specification provides a test method for evaluating potency of silver nanoparticles to cell wall degradation of *Staphylococcus aureus* and muramic acid release as quantified by a gas chromatography-mass spectrometry (GC-MS).

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1
antibacterial activity
property of compound or substance that kills (bactericidal) or slows down (bacteriostatic) the growth of bacteria

2.2
dynamic light scattering
photon correlation spectroscopy
DLS
technique in physics that can be used to determine the size distribution profile of small particles in suspension or polymers in solution

2.3
gas chromatography–mass spectrometry
GC-MS
method that combines the features of gas-liquid chromatography and mass spectrometry to qualitatively and quantitatively analyse volatile compounds within a test sample (Annex A)

2.4
Gram positive bacteria
bacteria that are stained/resistant to bleaching by organic solvent during Gram staining

2.5
internal standard
compound of known concentration added to a sample to facilitate the qualitative identification and/or quantitative determination of the sample components (Annex B)

[SOURCE: ISO 20752, 3.2]

2.6
limit of detection
LOD
minimum amount or concentration of the analyte in a test sample which can be detected reliably, but not necessarily quantified, as demonstrated by a collaborative trial or other appropriate validation

[SOURCE: ISO 8196-1, 3.4.3]

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