



BSI Standards Publication

**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 procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information.

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

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 antibacterial agents with different physical properties and with little 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 and 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]