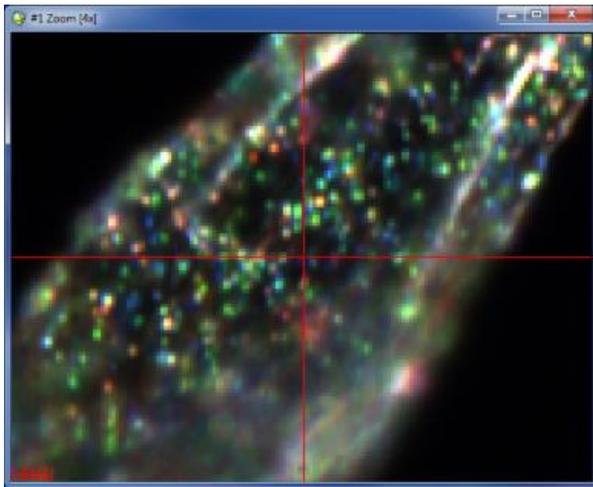


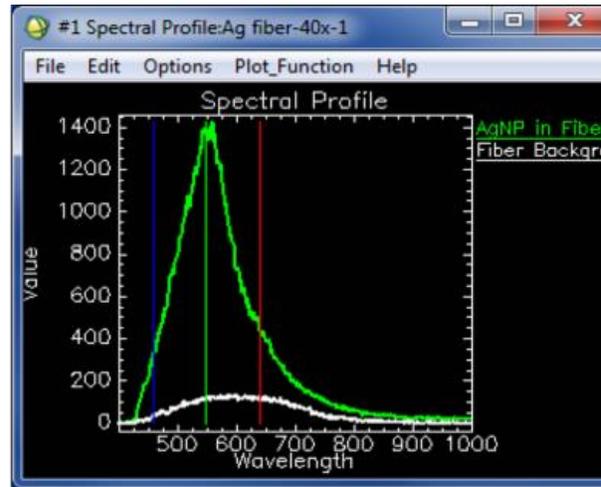
Confirming AgNPs in Food Containment Systems and Textiles

Silver nanoparticles (AgNPs) are being widely used as an anti-microbial agent in food containment systems, clothing and other consumer based items. However, effective integration of the AgNPs requires that one can rapidly observe and confirm the presence and location of the nanoparticles when integrated in these matrices. This is not only important during the development phase of this process, but also to maintain quality control.

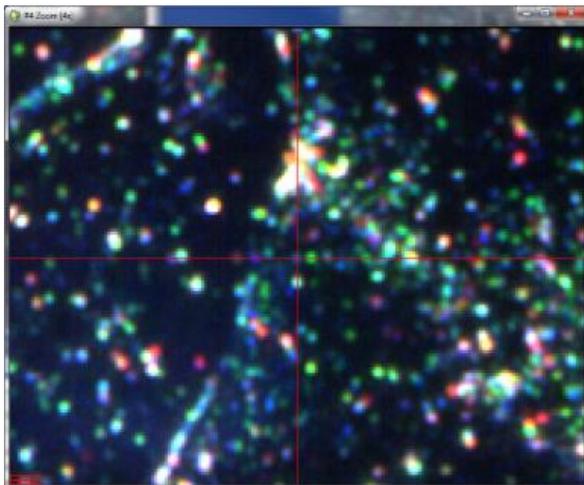
CytoViva's Enhanced Darkfield Hyperspectral Microscope is a proven technology for enabling rapid optical observation and hyperspectral confirmation of AgNPs in polymer food containment systems, textiles and other environments. With the CytoViva system, samples can be imaged in seconds and no sample prep is required.



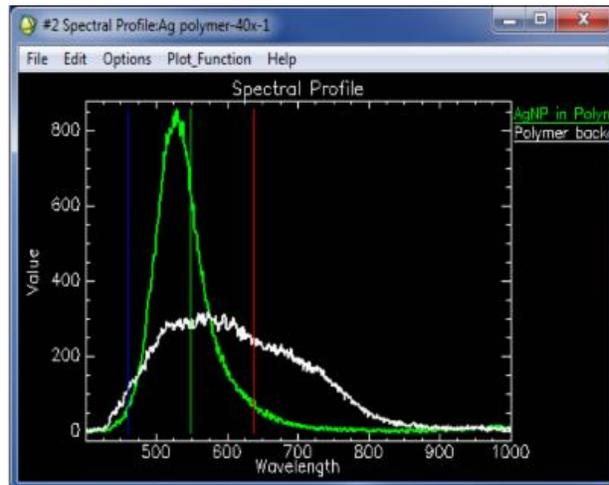
Enhanced darkfield hyperspectral image of AgNPs in textile fiber



Spectral response of AgNP (green) and textile fiber (white)



Enhanced darkfield hyperspectral image of AgNPs in polymer food wrapper



Spectral response of AgNP (green) and polymer food wrapper (white)

See above example images of AgNPs and hyperspectral confirmation of these nanoparticles in both a textile fiber environment and in a polymer based food containment system. The scatter from a single nanoparticle can be easily observed as well as aggregates within the context of the matrix. The plasmon resonance produced by these nanoparticles not only creates a high scatter efficiency for observation, but also produces a unique

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reflectance spectra from the background material. With hyperspectral imaging, AgNPs can be spectrally mapped in a wide range of environments, providing quantitative insight regarding surface area coverage of the nanoparticles.

The CytoViva system can help researchers understand the dispersion of the AgNPs and their stability in the polymer or textile environment. It can also be utilized to understand how they interact with bacteria or other pathogens mechanistically. The abstract link below demonstrates this ability to observe and characterize bacterial interaction with AgNPs.

[Single-Cell Investigations of Silver Nanoparticle–Bacteria Interactions](#)

Additionally, the CytoViva system is effective for understanding the long term implications of AgNPs in the environment as is illustrated in the paper from this abstract link below.

<http://pubs.acs.org/doi/abs/10.1021/es204140s>

If you are working with AgNPs, or related nanomaterials, and need to rapidly observe and characterize these nanoparticles in a wide range of environments, please contact CytoViva at info@cytoviva.com. We would be pleased to conduct test imaging of your samples to help you understand how the CytoViva technology can advance your work.