

**Title** Frequency response of biospeckle laser images of bean seeds contaminated by fungi  
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#### **Abstract**

Biospeckle laser (BSL) images of bean seeds artificially contaminated by *Fusarium oxysporum* or *Aspergillus flavus* have been analysed using inertia moment (IM) and frequency values of the spatial time speckle (STS) signals. BSL imaging was performed with a He-Ne red beam laser (632.8 nm; 10 mW) and a CCD camera (image size 780 x 480 pixels), and frequencies of the STS signals were derived using convolution and fast Fourier transform. Intensities of the IM values of contaminated seeds were significantly greater than those of disease-free control seeds. Furthermore, *A. flavus*-contaminated seeds presented IM values that were significantly higher than those of seeds contaminated by *F. oxysporum*. The mean amplitude values of the frequencies components of FFT analysis detected in *F. oxysporum*-contaminated seeds were higher than those of *A. flavus*-contaminated and control seeds. In contrast, when the third harmonic was analysed independently, the amplitude values of the frequencies detected in *A. flavus*-contaminated seeds were significantly lower than those of control seeds which, in turn, were similar to those of seeds contaminated with *F. oxysporum*. It is concluded that frequency analysis may be used to complement the information provided by IM values, thus strengthening the application of BSL in the study of biological materials.