Photoacoustic Imaging of a Subcutaneous Anomaly Tissue Phantom: Preliminary Results

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The use of optical spectroscopy as a diagnostic tool in biomedical applications and research has grown considerably in the last two decades. One of them is the pulsed photoacoustic or optoacoustic spectroscopy which promises to become one of the most important tools for disease diagnostics, while most spectroscopies exploit the optical nature of the light-tissue interaction photoacoustic spectroscopy uses optical energy to generate an acoustic wave which propagates through tissue. In this work, by using a homemade ultrasonic detector with 20 mm of diameter and 65 mm of large, 2D and 3D images of a cancerous breast tissue phantom were reconstructed using 121 recorded photoacoustic signals in the reflection and transmission modes. The tissue phantom used was an agar gelatin in which an optical absorber 5 mm wide, 5 mm long and 3 mm thick was buried at different depths, namely 1.5, 3 and 6 cm. The resolution and sensitivity of the detector is discussed.