

## Mummification of cells: how dry is dry?

Human cells, the fundamental building blocks of tissues and organs, are often used to replace damaged body parts as well as for the production of certain medicines. However, the long term storage and transport of these cells is considered problematic- the most common method currently used is to simply freeze them. Unfortunately, due to practicality, the use of dangerous antifreeze reagents and pure capital costs, an alternative needs to be urgently found. Desiccation, the absence of water, has been proposed to be a possible method- akin to the use of baker's and/or brewer's yeast following the addition of water. Although some researchers have claimed to have achieved this, there is disagreement to how and how accurate the amount of water in the cells has been recorded: most current techniques are time consuming, require complex sample preparation and cannot detect very low water levels.

Fig. 1. Terahertz imaging profiles of dry, 90% relative humidity and wet cell samples

As such, we propose the use of terahertz (THz) pulsed imaging, a simple and non-destructive technique that relies on the use of a relatively unexplored portion of electromagnetic spectrum: THz radiation. THz radiation possesses unique properties that are important when it interacts with water. On drying a number of different cell samples using a range of techniques, it was demonstrated that it was possible to detect extremely low levels of water within the sample but, more importantly, also be able to identify the distribution of that water using THz radiation. In short, we report on the use of THz pulsed imaging as a possible complimentary technique for use in the detection of water in biological samples.

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## **Publication**

[Determination of Water Content in Dehydrated Mammalian Cells Using Terahertz Pulsed Imaging:  
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