**DATA DESCRIPTION: Matlab (.mat) files for radiofrequency ultrasound signals from bone-mimicking materials**

The folder **Data\_RF\_Repository** contains the radiofrequency (RF) data acquired with an ArtUS EXT-1H system (Telemed, Italy) equipped with a 192 elements linear probe L15-7H40-A5 working in the frequency range 7.5-15 MHz, in the matlab format “.mat”.

Data were collected at 35% of the scanner power, with a scanning depth of 20 mm and a transmission frequency of 7.5, 10, 12 and 15 MHz, with a sampling rate of 40 MHz, adjusting the focus in the middle of the samples.

The folder **Data\_RF\_Repository** includes 4 subfolders:

* **7.5MHz** = data acquired at the transmission frequency of 7.5 MHz
* **10MHz** = data acquired at the transmission frequency of 10 MHz
* **12MHz** = data acquired at the transmission frequency of 12 MHz
* **15MHz** = data acquired at the transmission frequency of 15 MHz

Each folder contains a matlab variable (.mat), named RF\_data which includes 7 variables related to the acquisitions from the 7 different samples analysed:

1. **RF\_ag** = RF data from agarose (Ag) hydrogels
2. **RF\_caco3\_2perc**= RF data from Ag and calcium carbonate (CaCO3) particles at a concentration of 2% w/v
3. **RF\_caco3\_4perc**= RF data from Ag and calcium carbonate (CaCO3) particles at a concentration of 4% w/v
4. **RF\_caco3\_6perc**= RF data from Ag and calcium carbonate (CaCO3) particles at a concentration of 6% w/v
5. **RF\_ha\_10perc**= RF data from Ag and hydroxyapatite (HA) particles at a concentration of 10% w/v
6. **RF\_ha\_20perc**= RF data from Ag and hydroxyapatite (HA) particles at a concentration of 20% w/v
7. **RF\_ha\_50perc**= RF data from Ag and hydroxyapatite (HA) particles at a concentration of 50% w/v

Each of the seven variables is a 1xN cell, where N is the number of the analysed samples. Each cell is in turn a cell 1xM where M is the number of measurements made on each sample. Each cell relative to each measurement contains a matrix SxL where S is the number of samples for each RF line in the acquisition window, while L is the number of RF lines in the acquisition window.

In particular, a single RF frame was acquired for all the analyses. Each recorded RF frame resulted in a matrix in which the columns (101) represented the number of RF scanning lines in a specific RF window, while the rows (727) constituted the number of samples in a single scanning line.

For the details, see the articles published on scientific reports:

Sorriento, A. *et al.* A novel quantitative and reference-free ultrasound analysis to discriminate different concentrations of bone mineral content (doi: https://doi.org/10.1038/s41598-020-79365-0).