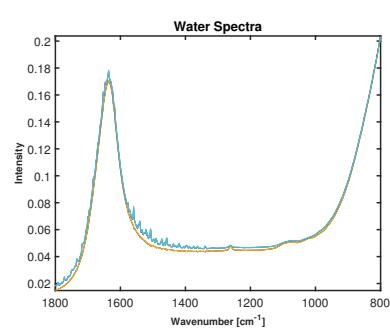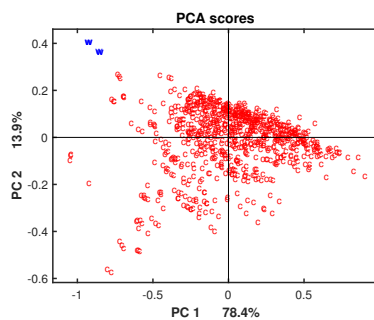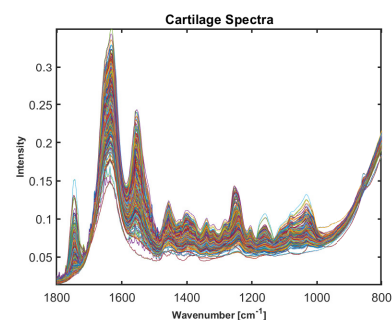**MDPI**

(**a**) Analyte-poor Spectra

(**b**) Analyte-rich Spectra

Figure S1. Visual presentation of broadband spectrum after using MSC preclassification approach (Collagen as reference spectrum), (**a**) Water/Analyte-poor Spectra (**b**) Cartilage/Analyte-rich Spectra.
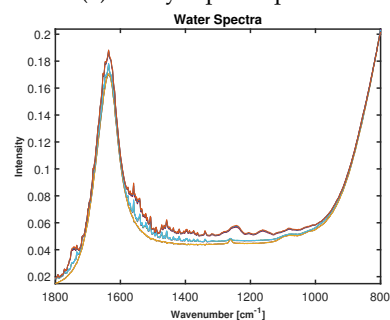
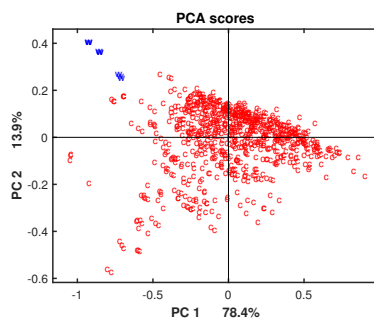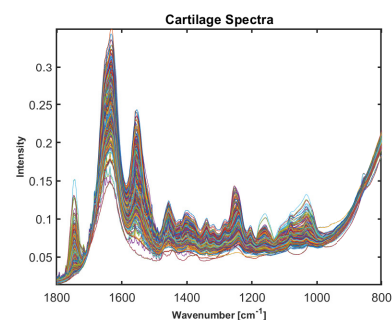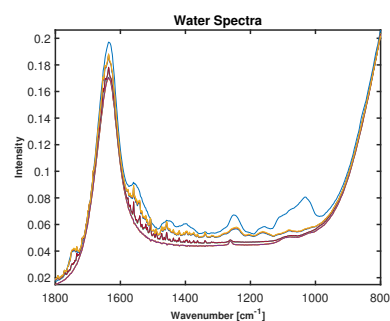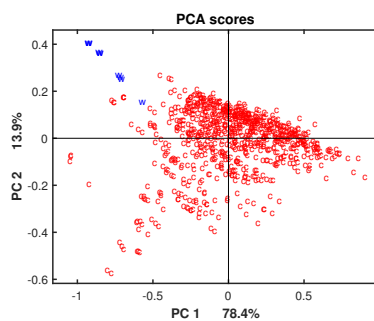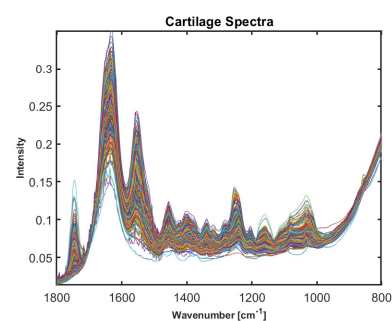**Figure S2.** Visual presentation of Human 12 (set 2) broadband spectra after using MSC preclassification approach, (**a**,**d**,**g**) Water/Analyte-poor Spectra (**c**,**f**,**i**) Cartilage/Analyte-rich Spectra and (**b**,**e**,**h**) are PCA scores obtained by different *RMSE* thresholds, 0.1 for (**b**), 0.2 for (**c**) and 0.22 for (**h**). c and w in PCA scores correspond to cartilage and water spectrum.
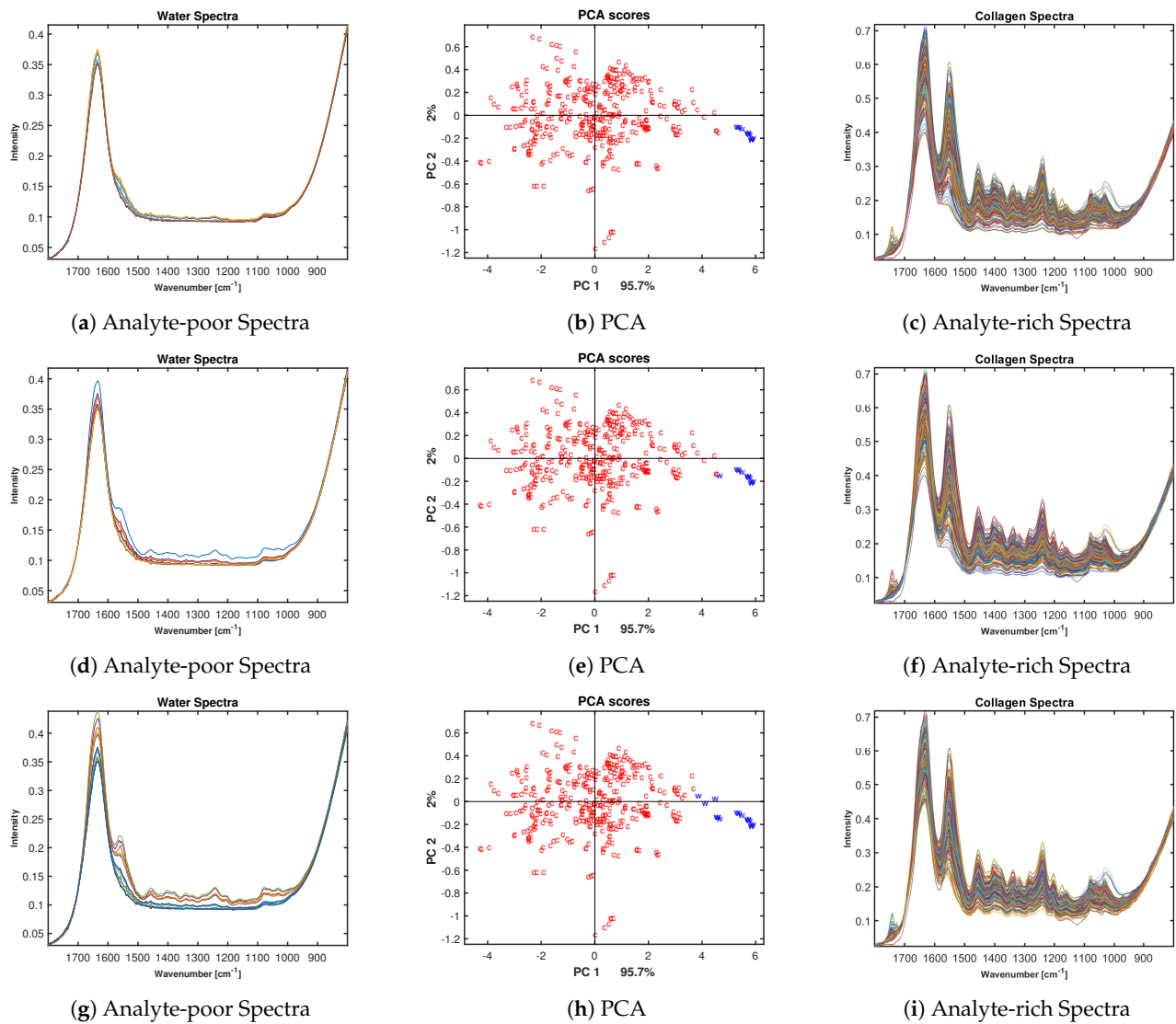
Figure S3. Visual presentation of Bovine (set 3) broadband spectra after using MSC preclassification approach, (**a**,**d**,**g**) Water/Analyte-poor Spectra (**c**,**f**,**i**) Cartilage/Analyte-rich Spectra and (**b**,**e**,**h**) are PCA scores obtained by different *RMSE* thresholds, 0.5 for (**b**), 0.6 for (**c**) and 0.12 for (**h**). c and w in PCA scores correspond to cartilage and water spectrum.