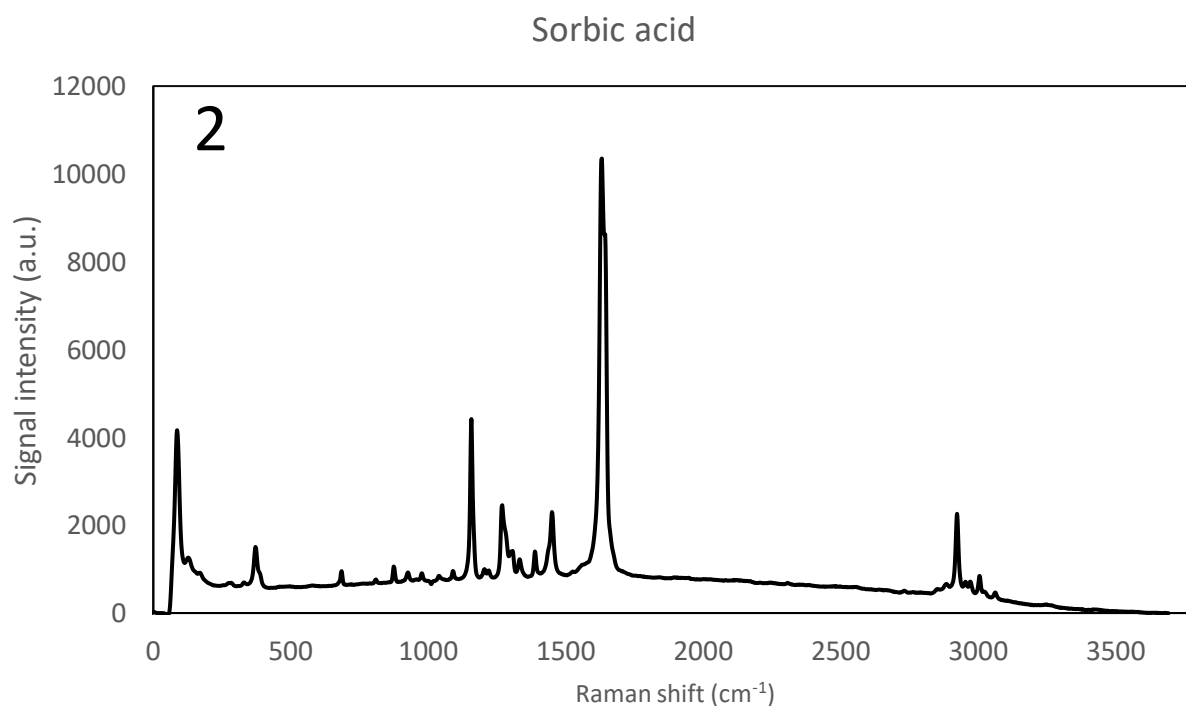
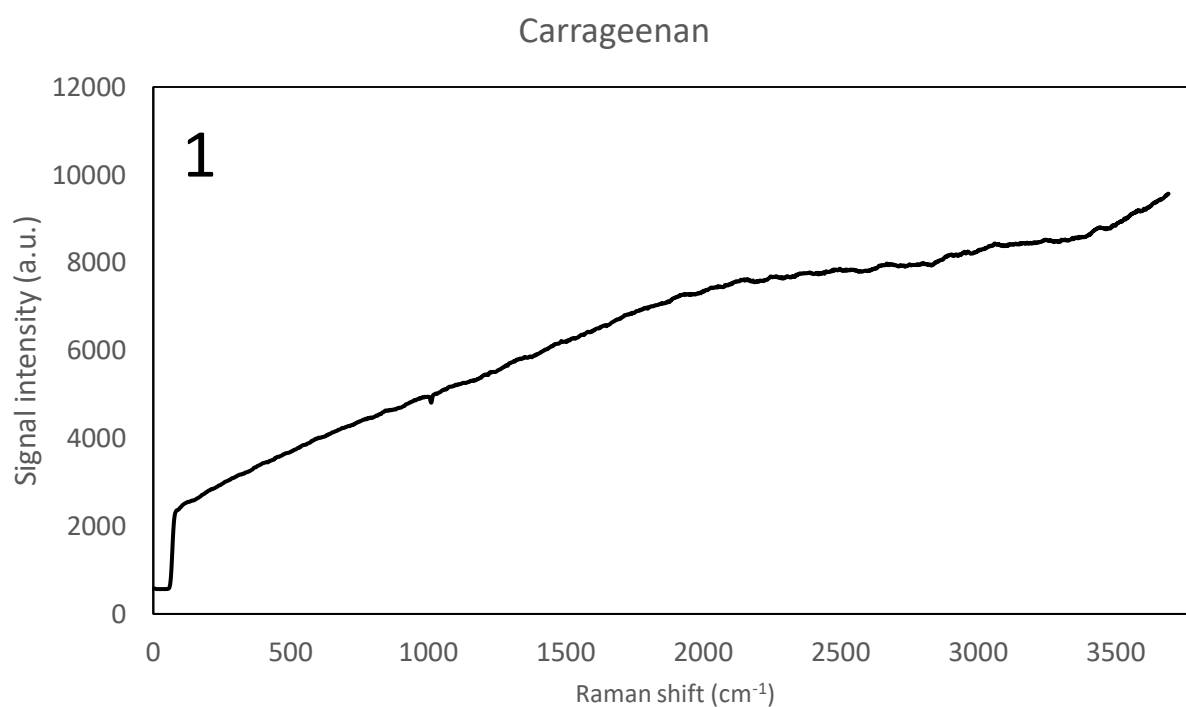


## SUPPLEMENTARY MATERIAL

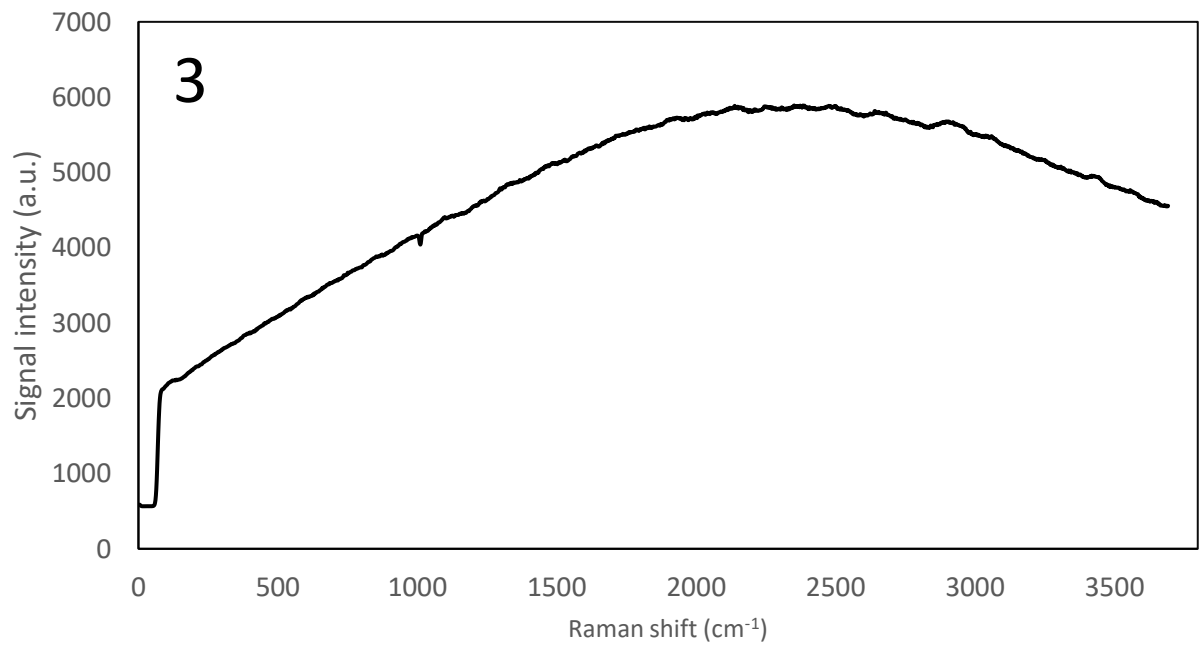
**Table S1.** Reference samples used to acquire Raman spectroscopy peaks.

| Sample                   | Company/Producer | Component/Ingredient         | State  |
|--------------------------|------------------|------------------------------|--------|
| MilliQ Water             | Arla             | Water                        | liquid |
| Clarified butter         | Arla             | Fat                          | solid  |
| Rapeseed oil             | Arla             | Fat                          | liquid |
| Micellar casein isolate  | Arla             | Caseins                      | powder |
| Calcium Caseinate        | Arla             | Caseins                      | powder |
| Whey protein concentrate | Arla             | Whey proteins                | powder |
| Alpha lactalbumin        | Sigma Aldrich    | -                            | powder |
| Beta lactoglobulin       | Sigma Aldrich    | -                            | powder |
| Lactose                  | Arla             | -                            | powder |
| Sucrose                  | Sigma-Aldrich    | -                            | powder |
| Carrageenan              | Arla             | -                            | powder |
| Locust bean gum          | Arla             | Locust bean gum, sorbic acid | powder |
| Citrus fibre             | Arla             | -                            | powder |
| Gelatine                 | Arla             | -                            | powder |
| Skimmed milk powder      | Arla             | Proteins, lactose            | powder |

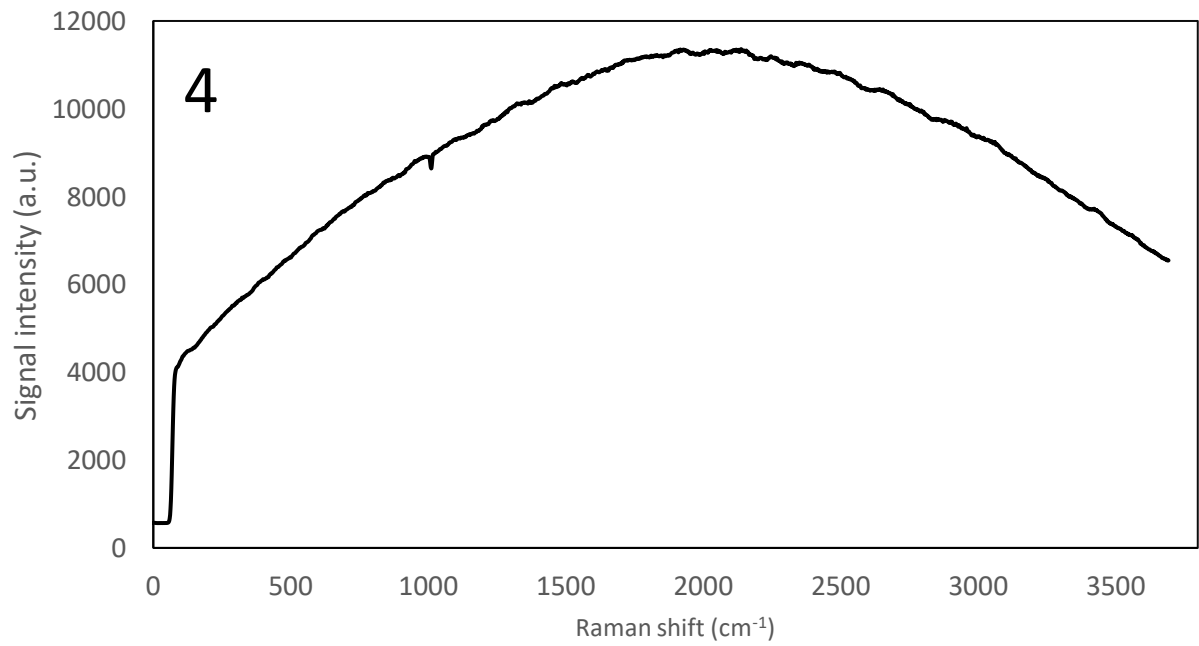
**Figure S1-12.** Raman spectra of reference samples: 1) Carrageenan, 2) Sorbic acid, 3) Citrus fibre, 4) Gelatine, 5)  $\alpha$ -lactalbumin, 6)  $\beta$ -lactoglobulin 7) Whey protein concentrate, 8) Sucrose, 9) Lactose, 10) Skim milk powder, 11) Micellar casein isolate, 12) Calcium caseinate.



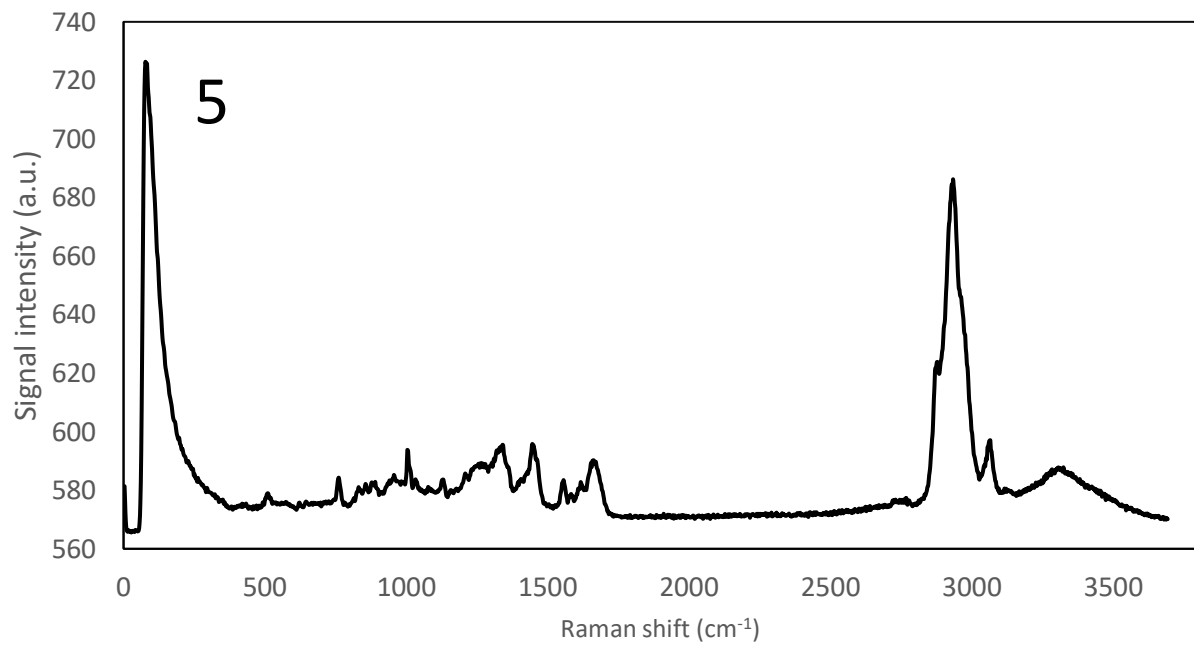
Citrus fibre



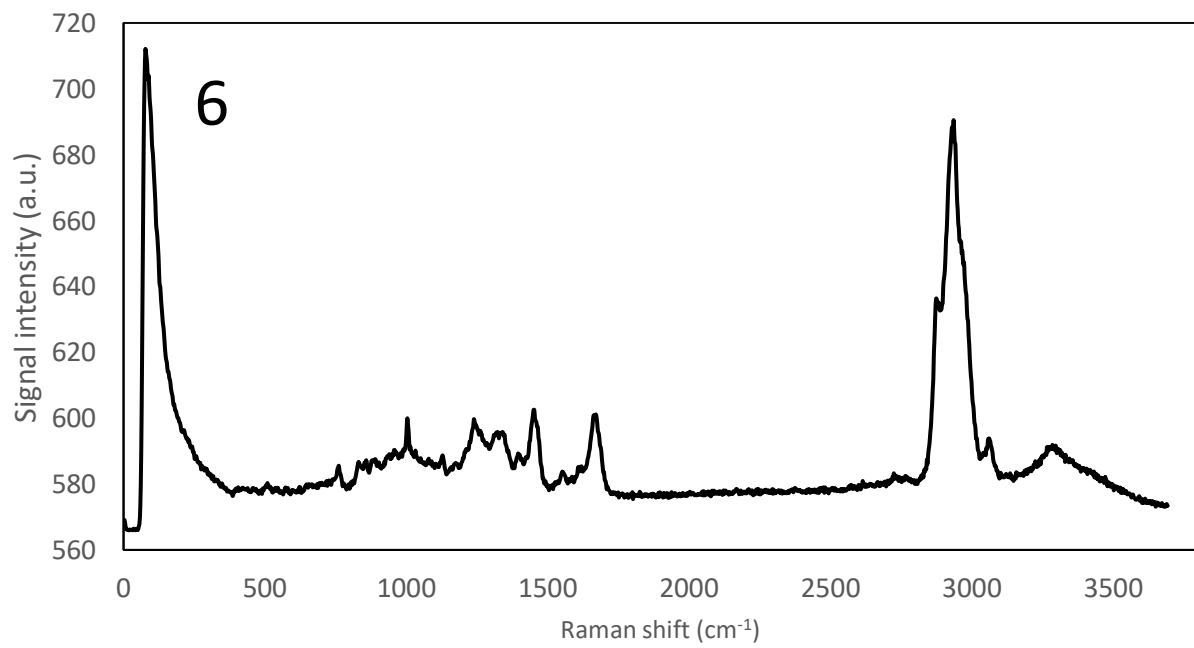
Gelatine



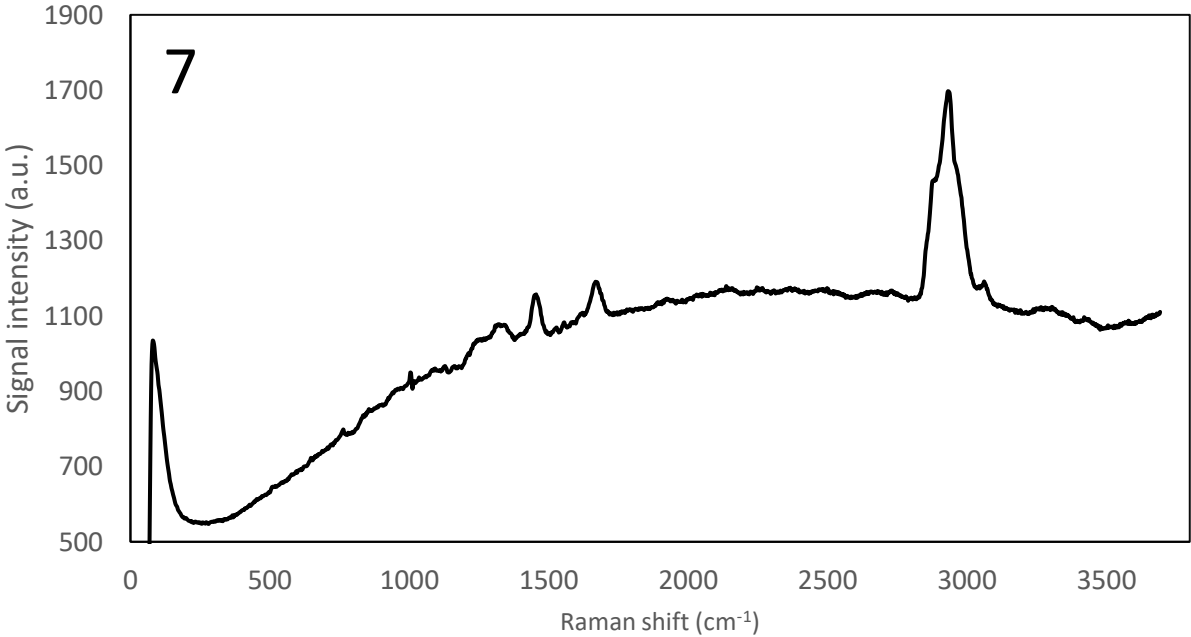
$\alpha$ -Lactalbumin



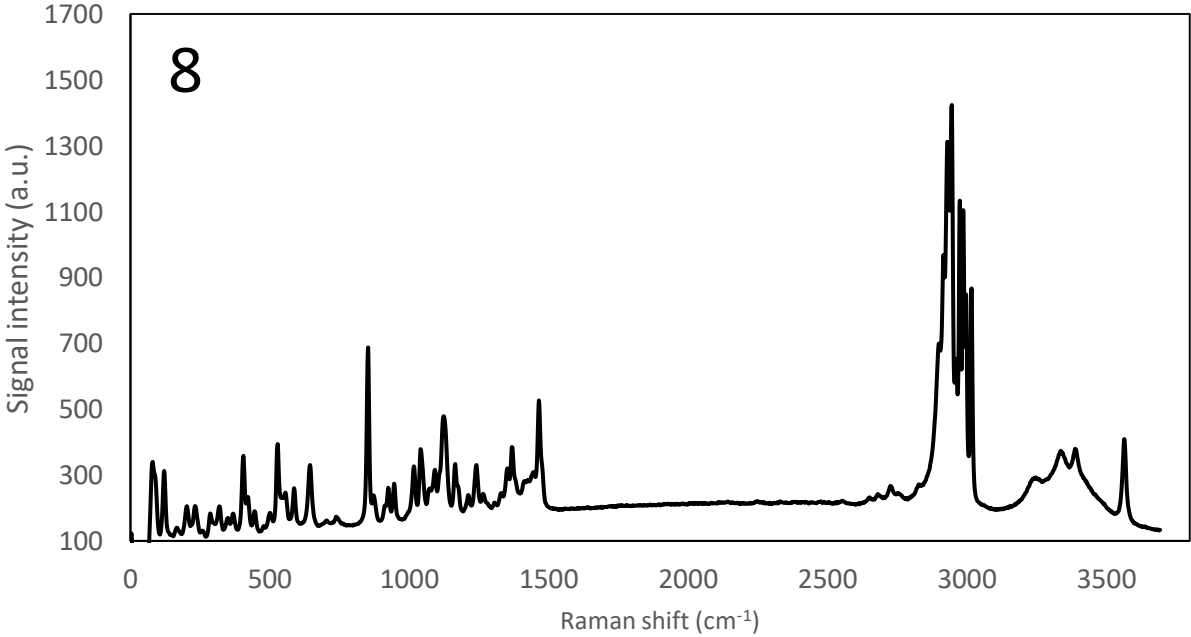
$\beta$ -Lactoglobulin



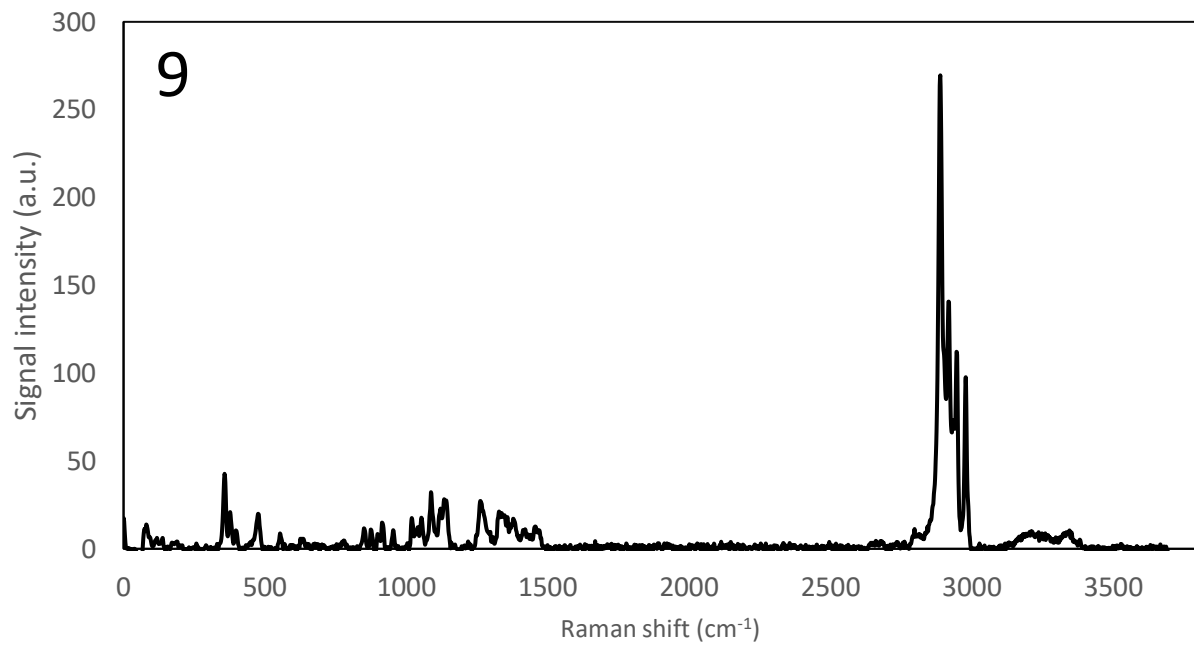
Whey protein concentrate



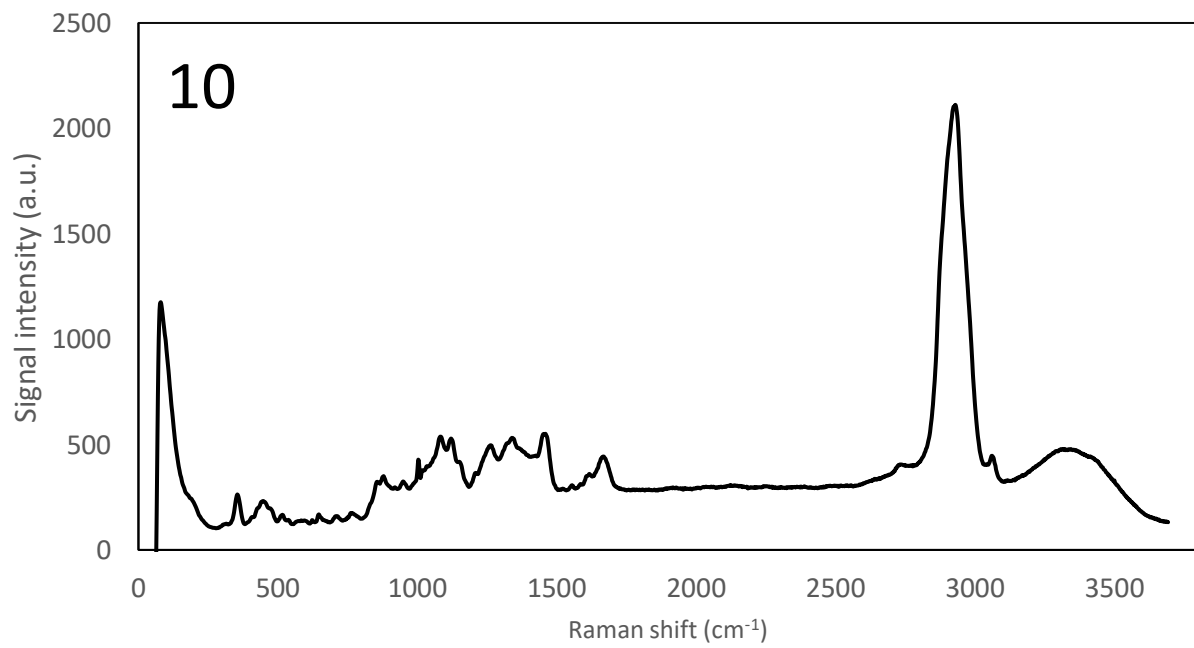
Sucrose



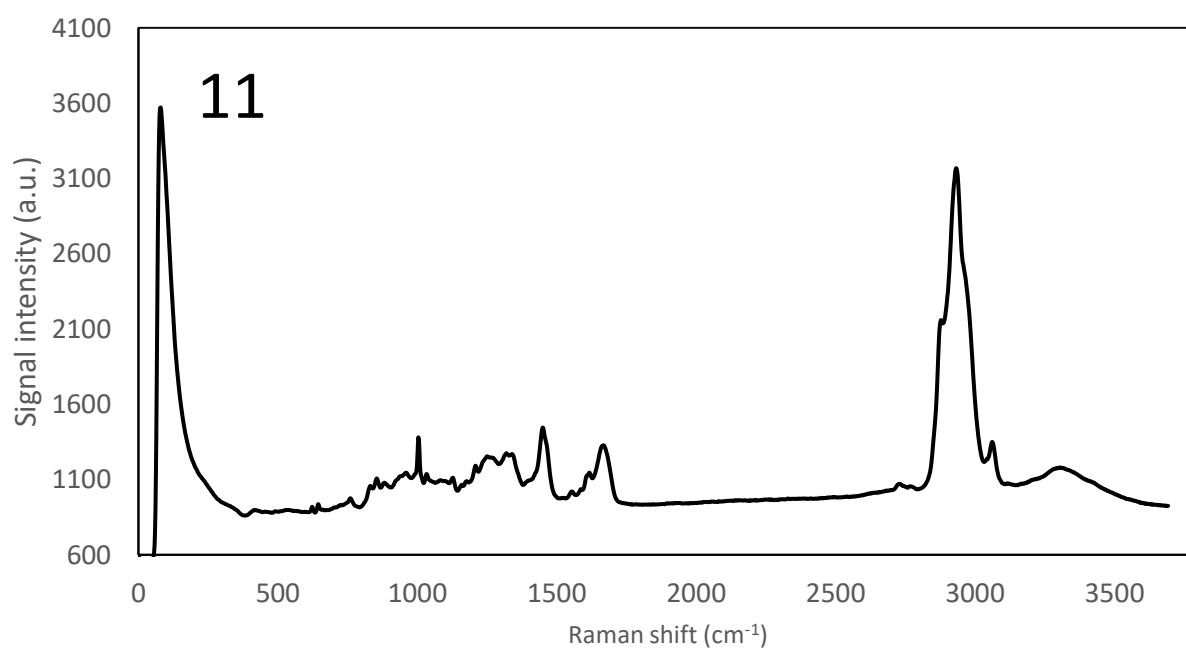
Lactose



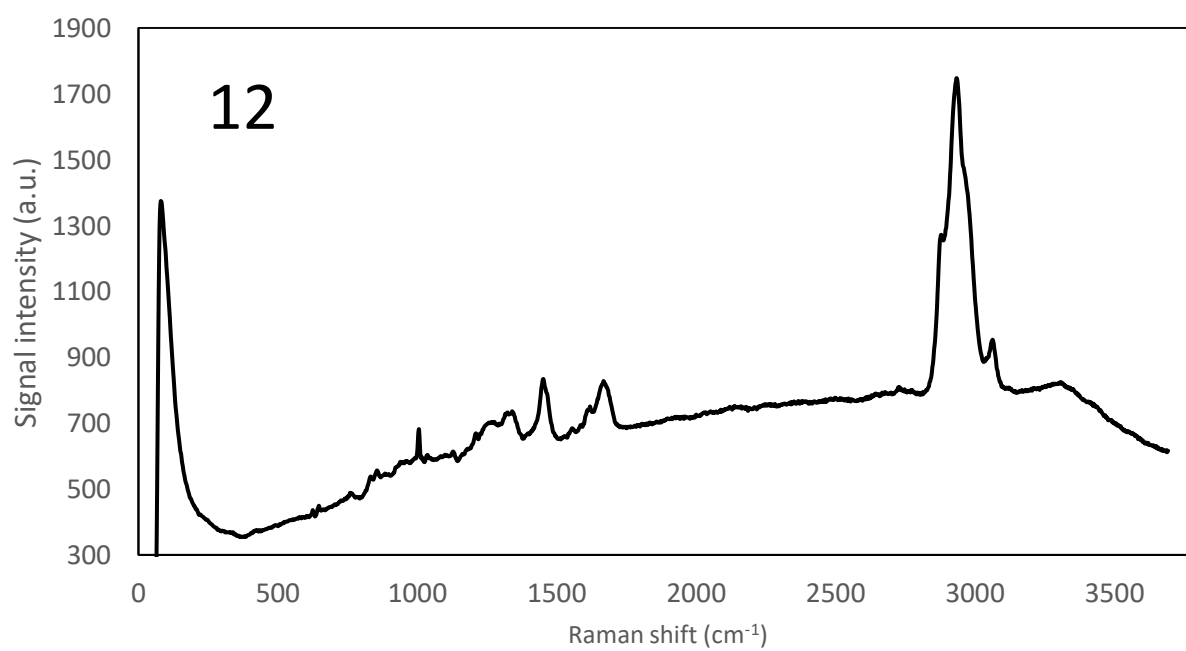
Skimmed milk powder



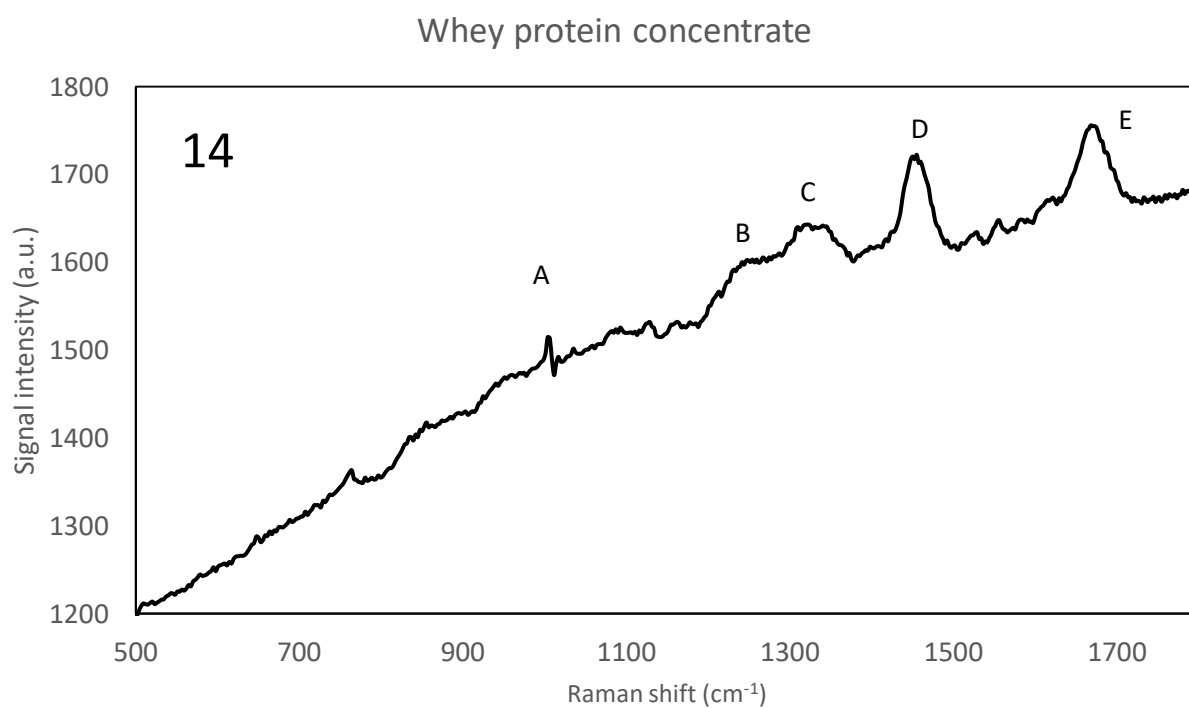
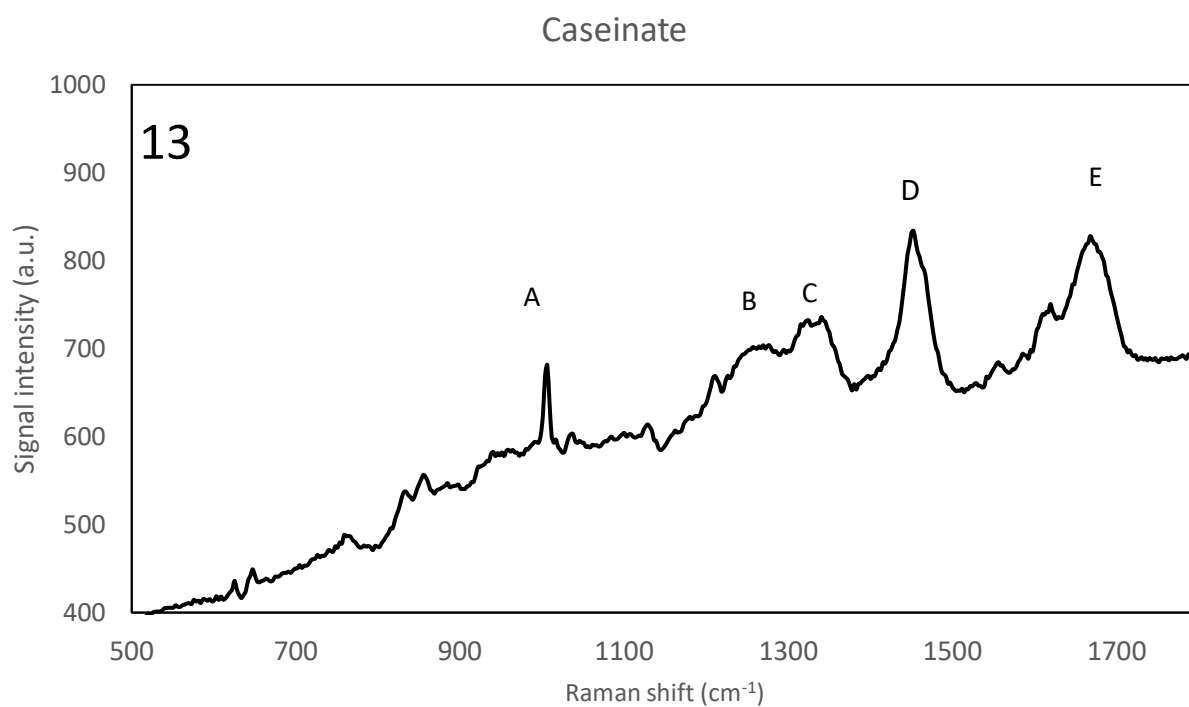
Micellar casein isolate



Calcium Caseinate

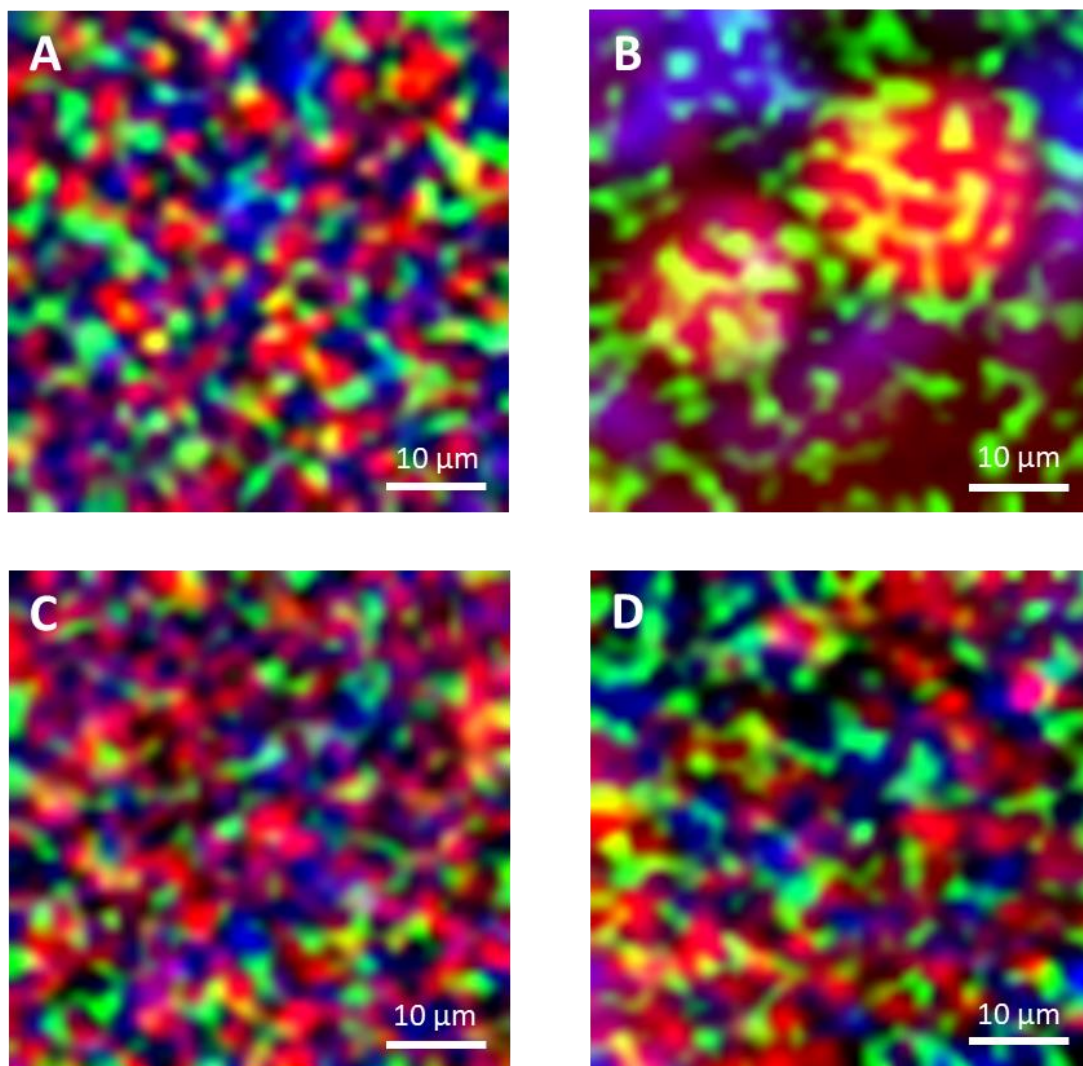


**Figure S13-14.** Raman fingerprint region (500-1800  $\text{cm}^{-1}$ ) of protein components: 13) Calcium caseinate, 14) Whey protein concentrate. A) Phenylalanine's benzene ring breathing (1000-5  $\text{cm}^{-1}$ ); B) Amide III (1270  $\text{cm}^{-1}$ ); C) Tyrosine (1614  $\text{cm}^{-1}$ ); D) Amide I (1650-70  $\text{cm}^{-1}$ ).





**Figure S15.** Supplementary Confocal Raman micrographs of cream cheeses. Cream cheese A before freezing (A), after freezing (B). Cream cheese B before freezing (C), after freezing (D). Red: fat. Green: protein. Blue: Water.



**Figure S16.** Supplementary Confocal laser scanning micrographs of cream cheeses. Cream cheese A before freezing (A), after freezing (B). Cream cheese B before freezing (C), after freezing (D). Red: fat. Green: protein.

