

MULTI-WAY DATA STUDIES OF NIR AND NMR RELATED TO BEEF TENDERISATION WITH TIME

OBJECTIVE

The experiment described in Chapter 9 studied the pre-rigor conditions at 8 different time intervals. Here an N-dimensional study of the NIR and NMR data is presented with the time development as the third dimension. Please refer to Chapter 9 for a description of the methods and experimental design.

CONCLUSION

- Figure 1 and 3 displays the three dimensional data structure for one sample (time \times wavelength \times 1/log(R) for NIR and time \times tau \times intensity for NMR)
- The time dimension represent the following 8 time intervals post-mortem, 1.5 hr, 3 hr, 5 hr, 8 hr, 24 hr, 3 days, 7 days, 14 days.
- A 4 component PARAFAC model of NIR is shown in Figure 2
- A 2 component PARAFAC model of NMR is shown in Figure 4
- Rigor occurs at approximately 24 hr (5th time variable). The second factor clearly shift level at this time. For the NMR model, the second factor increases with time, but the increase seems to cease at rigor.
- Figure 5 shows scatterplot of Mode 1 of the PARAFAC models. The points are labelled according to three pH drop groups, fast, medium and slow. NIR seem to contain little information of these groups, whereas NMR presents a close to complete separation relative to the speed of the pH drop.

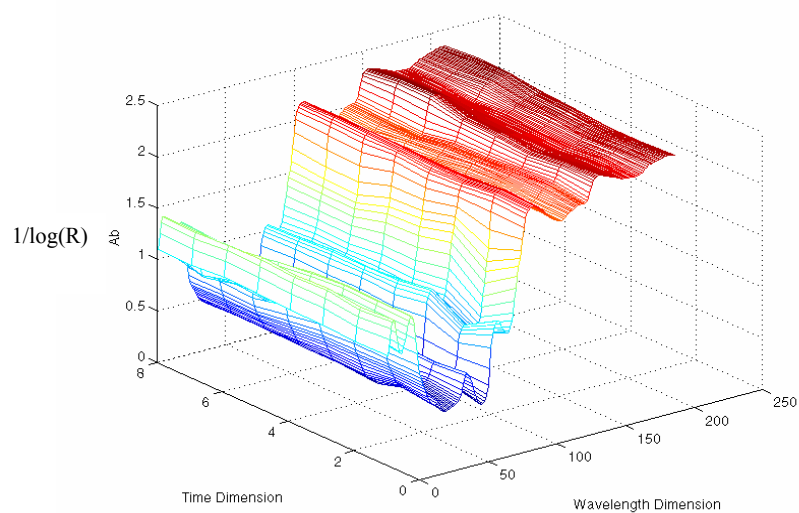


Figure 1. Three-way NIR data.

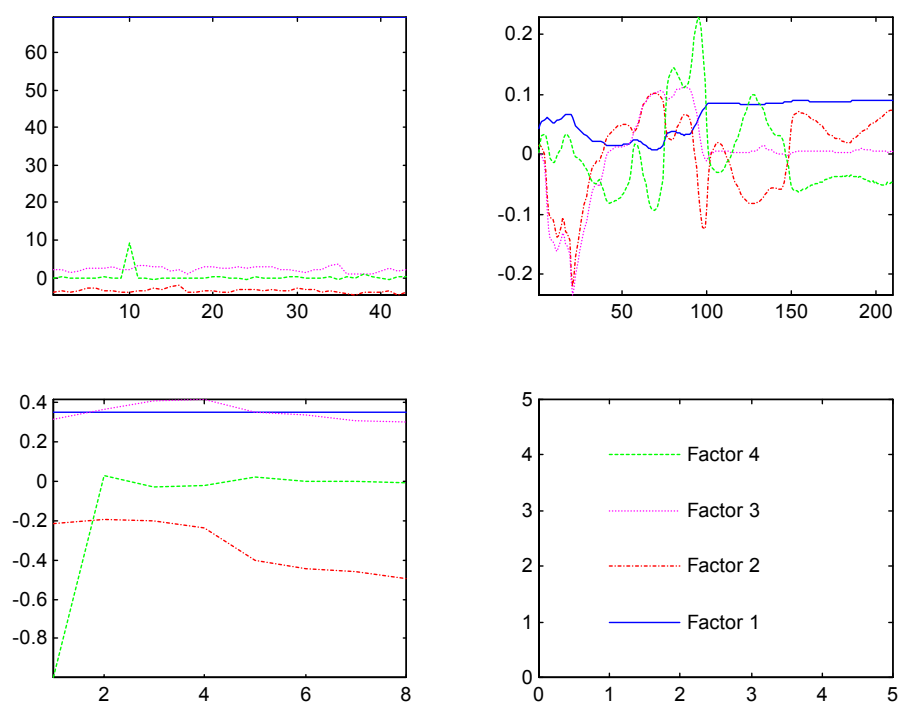


Figure 2. Three-way Parafac model with 4 factors of the NIR data.

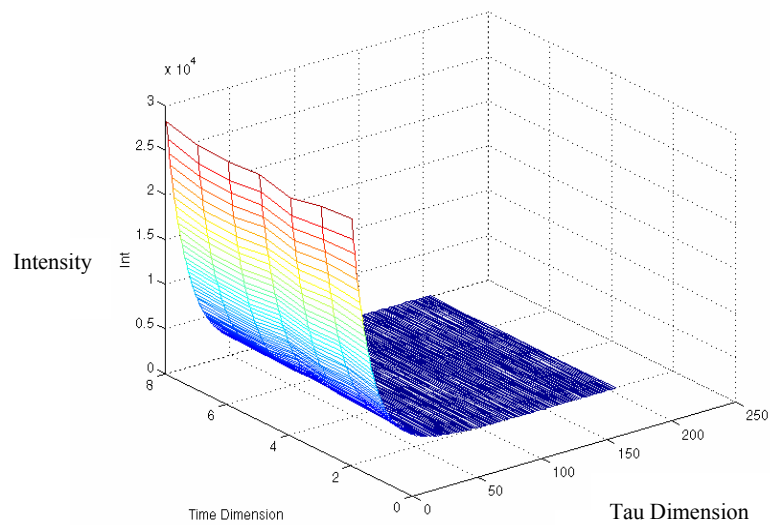


Figure 3. Three-way NIR data.

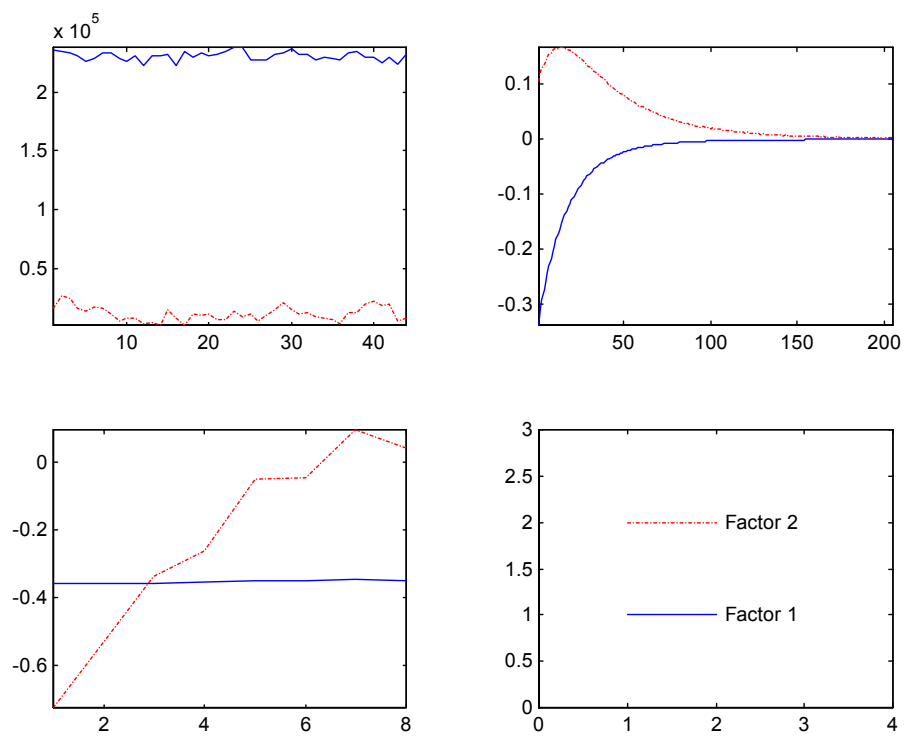


Figure 4. Three-way Parafac model with 2 factors of the NMR data.

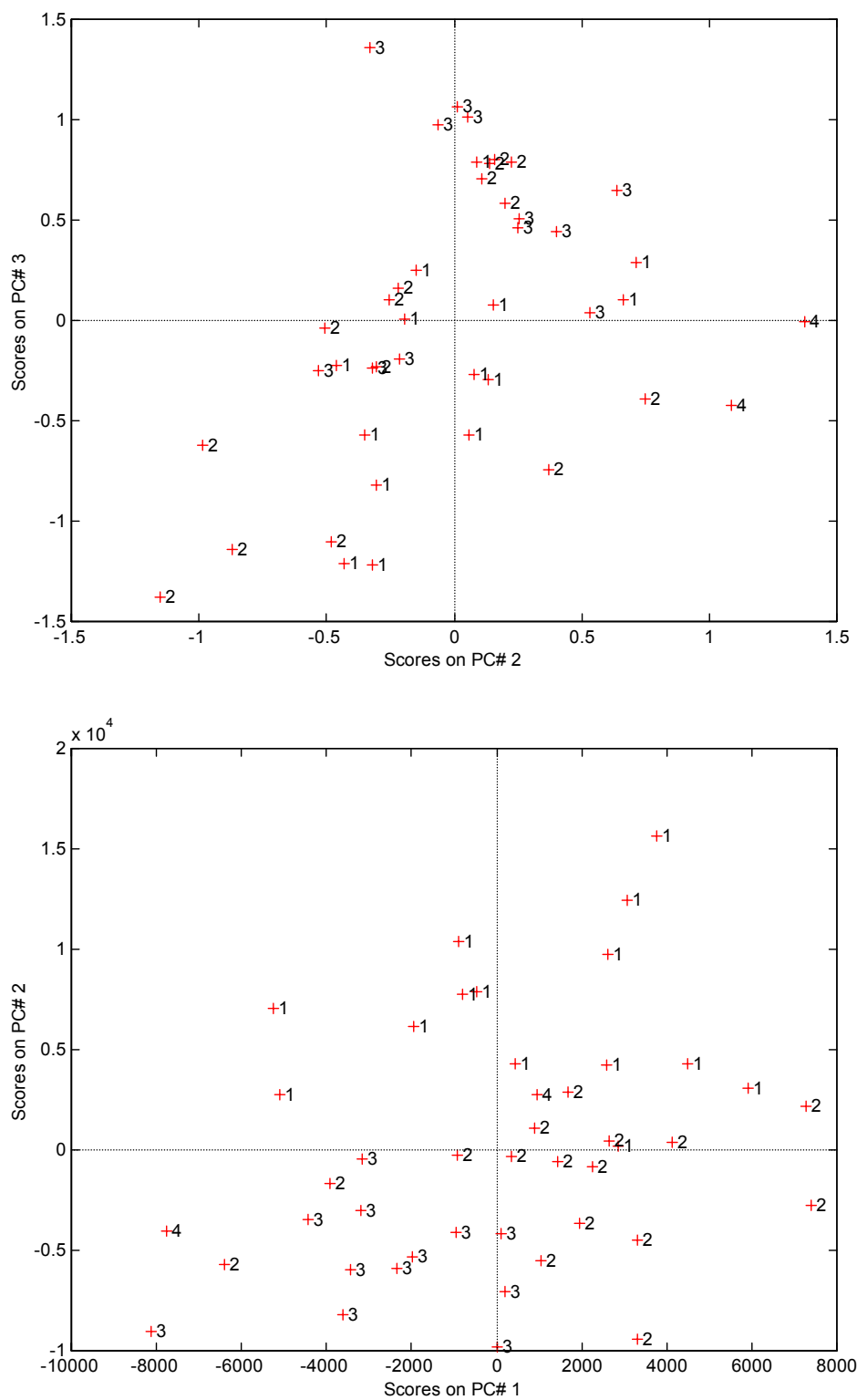


Figure 5. Scatterplot of PARAFAC models of the NIR (top) and NMR (bottom) data. The samples are labelled according to the pH decrease. 1: fast, 2: medium, 3: slow, 4: extreme.