

## Supplementary information

Figure S1 to S4 show spectra of lactate, glycogen, glucose and cortisol in solution phase along with corresponding spectra of spiked samples. For data analysis, the replicate spectra were compared and analysed using Origin Pro 2016 software. Data processed using Origin peak analyser function where it created a baseline according to second derivatives and then subtracted the baseline. Apart from baselining, the data has been smoothed using smoothing function in Origin software (using FFT filter, 5 points).

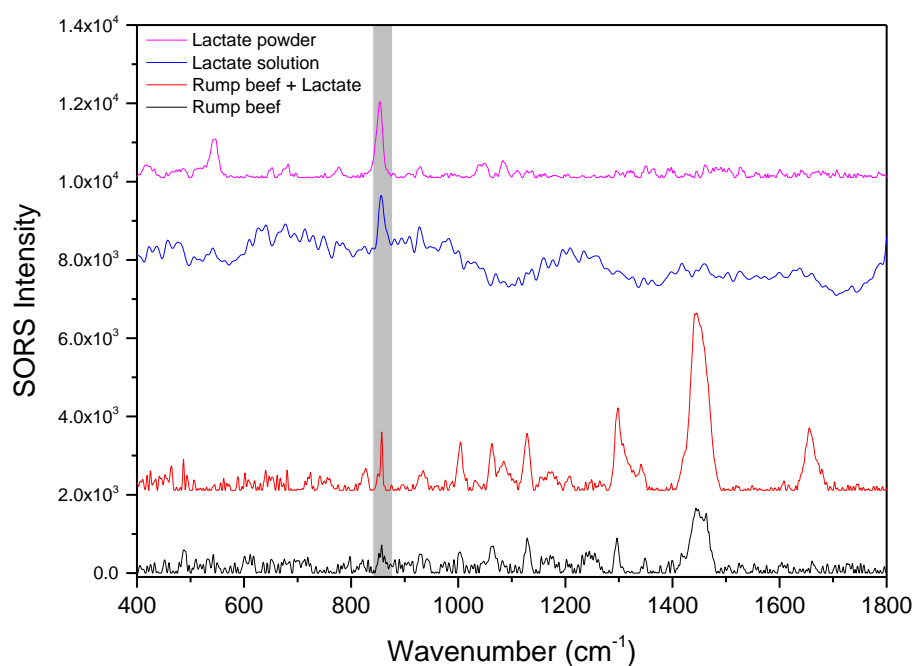


Figure S1: SORS spectra beef rump lean meat without (black line) and with addition of lactate (red line) along with lactate solution with 10 mg/ml concentration (blue line) and pure powder (pink line) which was measured at 830 nm. The rectangular shade shows the marker band positions and regions in the spectra.

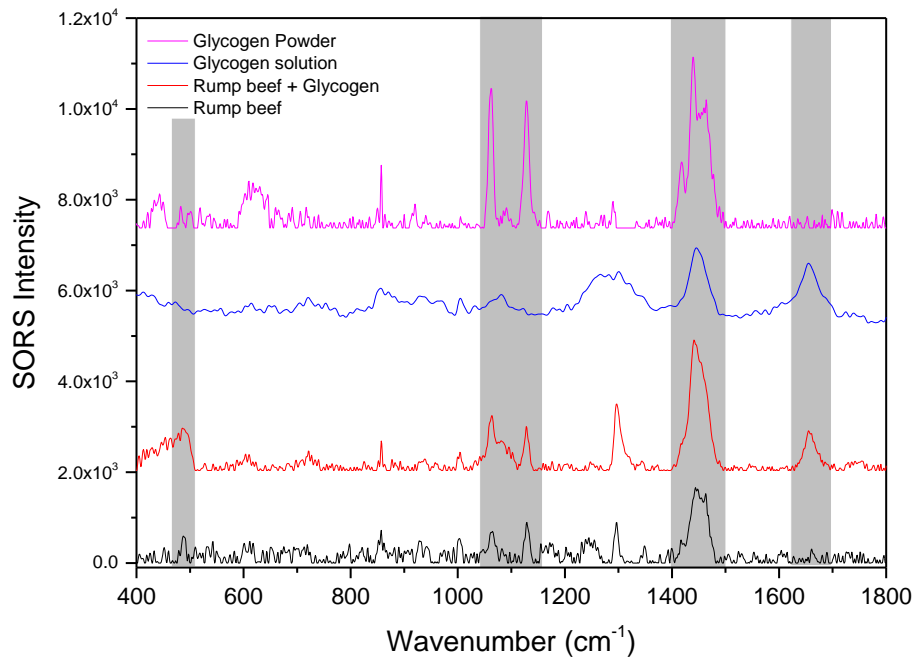


Figure S2: SORS spectra beef rump lean meat without (black line) and with addition of glycogen (red line) along with glycogen solution with 10 mg/ml concentration (blue line) and pure powder (pink line) which was measured at 830 nm. The rectangular shade shows the marker band positions and regions in the spectra.

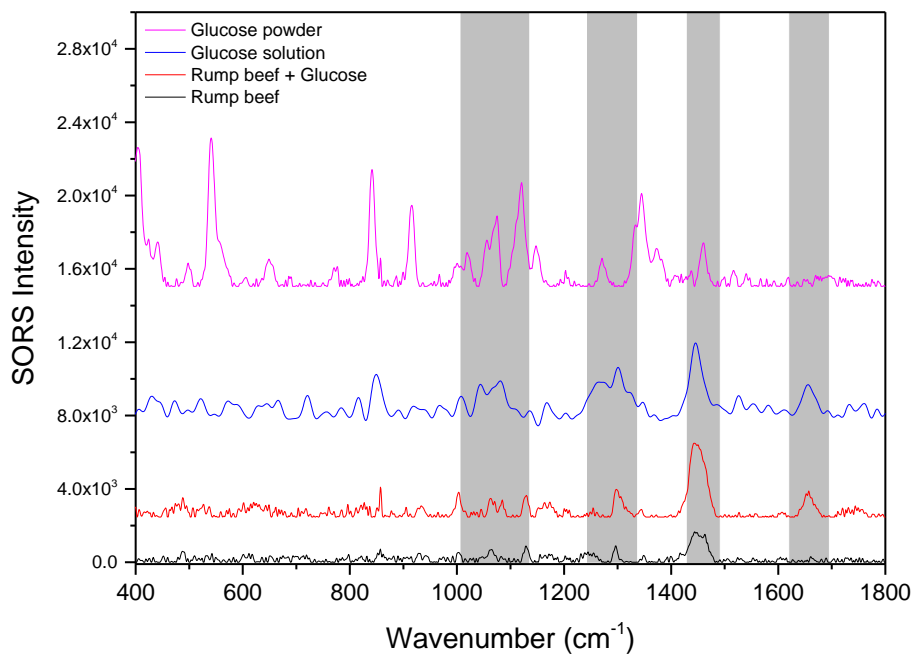


Figure S3: SORS spectra beef rump lean meat without (black line) and with addition of glucose (red line) along with glucose solution with 10 mg/ml concentration (blue line) and pure powder (pink line) which was measured at 830 nm. The rectangular shade shows the marker band positions and regions in the spectra.

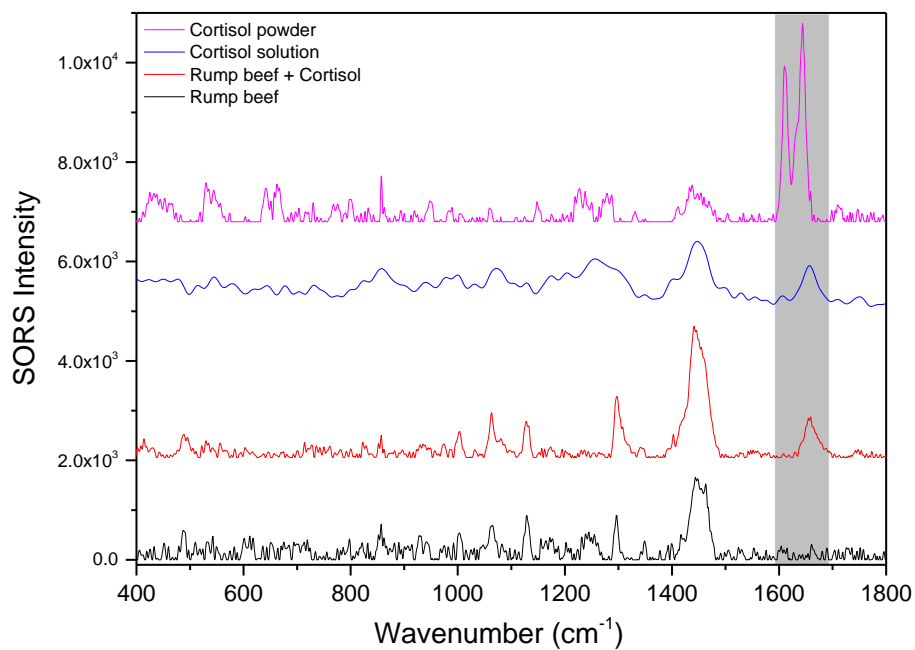


Figure S4: SORS spectra beef rump lean meat without (black line) and with addition of cortisol (red line) along with cortisol solution with 10 mg/ml concentration (blue line) and pure powder (pink line) which was measured at 830 nm. The rectangular shade shows the marker band positions and regions in the spectra.