

ABSTRACT

Characterization of lactones in Wagyu (Japanese beef) and imported beef by combining solvent extraction and gas chromatography–mass spectrometry

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Highlights

- Lactone content of Wagyu beef was quantified by solvent extraction and GC-MS/MS.
- The main lactones were δ -hexadecalactone, δ -tetradecalactone, and δ -dodecalactone.
- The lactone content increased by cooking processes, such as boiling and roasting.
- The method enables to quantify lactone content sensitively and estimate beef quality.

The lactone content of Wagyu beef and imported beef in Japan was estimated using a combination of solvent extraction and gas chromatography–tandem quadrupole mass spectrometry. This method revealed that the total lactone content was higher in Wagyu than in the imported beef. The most abundant lactone in the Wagyu and imported beef was δ -hexadecalactone, followed by δ -tetradecalactone, δ -dodecalactone, and δ -decalactone. The total lactone content in the Wagyu and imported beef increased approximately twofold or threefold when the extracted fats from the beef were heated. In addition, the raw beef was heated under actual cooking conditions, such as boiling at 80 °C for 2 min and roasting at 180 °C for 30 s, and found with the increased amounts of lactones. The results showed that the cooking processes increased the lactone content in the Wagyu and imported beef, and the change in the lactone content was greater in the roasted beef than in the boiled beef. These results suggest that considerable amounts of lactone precursors remain in the raw beef.