

Table S1. Concentration of the identified compounds in the beef samples analyzed after irradiation during 4 days of storage at 4 °C (mg/kg); n=3 - number of repeats, relative error was 20% with confidence level P=0.95.

| Category | Compound | Dose (kGy) | Storage time (day) | | | | |
|-----------|---------------------|------------|--------------------|-------|-------|-------|--------|
| | | | 0 | 1 | 2 | 3 | 4 |
| Aldehydes | Acetaldehyde | 0 | 24.8 | 8.8 | 2.9 | 0.45 | 0.67 |
| | | 0.25 | 23.45 | 15.6 | 10.9 | 0.073 | 0.85 |
| | | 0.5 | 20.9 | 21.1 | 14.7 | 0.41 | 0.95 |
| | | 1 | 19.4 | 17.9 | 3.0 | 0.42 | 0.54 |
| | | 5 | 25.0 | 15.4 | 18.7 | 4.1 | 1.1 |
| | Propanal, 2-methyl- | 0 | 0.31 | 0.14 | ND | ND | ND |
| | | 0.25 | 0.43 | 0.31 | ND | ND | ND |
| | | 0.5 | 0.24 | 0.38 | 0.18 | ND | ND |
| | | 1 | 0.28 | 0.31 | 0.19 | ND | ND |
| | | 5 | 0.62 | 0.52 | 0.48 | 0.18 | 0.2 |
| | Butanal, 3-methyl- | 0 | ND | ND | ND | ND | ND |
| | | 0.25 | 0.08 | ND | ND | ND | ND |
| | | 0.5 | 0.062 | 0.14 | ND | ND | ND |
| | | 1 | 0.19 | 0.22 | ND | ND | ND |
| | | 5 | 0.45 | 0.28 | 0.48 | 0.33 | 0.14 |
| | Pentanal | 0 | 0.031 | 0.053 | 0.037 | ND | 0.0042 |
| | | 0.25 | 0.084 | 0.12 | 0.092 | 0.017 | 0.011 |
| | | 0.5 | 0.17 | 0.19 | 0.27 | ND | 0.021 |
| | | 1 | 0.12 | 0.31 | 0.29 | 0.02 | 0.038 |
| | | 5 | 0.19 | 0.24 | 0.42 | 0.11 | 0.055 |
| | Hexanal | 0 | 0.30 | 0.57 | 0.64 | 0.066 | 0.14 |
| | | 0.25 | 0.75 | 1.2 | 1.2 | 0.27 | 0.22 |
| | | 0.5 | 1.2 | 1.9 | 2.5 | 0.41 | 0.33 |
| | | 1 | 0.83 | 3.0 | 3.2 | 0.57 | 0.57 |
| | | 5 | 2.2 | 3.5 | 6.9 | 2.5 | 1.2 |
| | Heptanal | 0 | 0.20 | 0.33 | 0.23 | 0.45 | 0.097 |
| | | 0.25 | 0.67 | 0.8 | 0.66 | 0.14 | 0.15 |
| | | 0.5 | 1.3 | 1.2 | 1.8 | 0.19 | 0.22 |
| | | 1 | 0.81 | 1.7 | 2.1 | 0.22 | 0.39 |
| | | 5 | 1.1 | 1.2 | 1.9 | 0.72 | 0.5 |
| | Octanal | 0 | ND | 0.045 | 0.14 | ND | ND |
| | | 0.25 | 0.27 | 0.31 | 0.3 | ND | ND |
| | | 0.5 | 0.38 | 3.7 | 0.59 | ND | ND |
| | | 1 | 0.24 | 0.58 | 0.67 | ND | 0.11 |
| | | 5 | 0.43 | 0.43 | 0.72 | 0.26 | 0.24 |
| | Nonanal | 0 | 0.095 | 0.033 | 0.15 | ND | ND |
| | | 0.25 | 0.28 | 0.21 | 0.23 | ND | ND |
| | | 0.5 | 0.39 | 0.77 | 0.48 | 0.10 | 0.091 |
| | | 1 | 0.3 | 0.44 | 0.58 | 0.15 | 0.21 |
| | | 5 | 0.56 | 0.47 | 0.71 | 0.34 | 0.31 |

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|----------|-----------------------|------|-------|-------|-------|-------|-------|
| Alcohols | Ethanol | 0 | 0.033 | 0.044 | 0.54 | 2.3 | 9.4 |
| | | 0.25 | 0.11 | 0.088 | 0.31 | 1.4 | 4.6 |
| | | 0.5 | 0.061 | 0.056 | 0.17 | 2.1 | 3.2 |
| | | 1 | 0.034 | 0.13 | 0.18 | 1.9 | 6.4 |
| | | 5 | 0.18 | 0.17 | 0.12 | 1.1 | 3.0 |
| | 1-butanol, 3-methyl- | 0 | ND | ND | 1.4 | 0.6 | 1.5 |
| | | 0.25 | ND | ND | 1.2 | 1.7 | 1.1 |
| | | 0.5 | ND | ND | 0.82 | 1.2 | 0.69 |
| | | 1 | ND | ND | 1.2 | 1.5 | 1.3 |
| | | 5 | ND | ND | ND | 2.0 | 1.5 |
| | 1-butanol, 2-methyl- | 0 | ND | ND | 0.2 | ND | 0.25 |
| | | 0.25 | ND | ND | 0.25 | ND | 0.19 |
| | | 0.5 | ND | ND | 0.38 | 0.18 | 0.13 |
| | | 1 | ND | ND | 0.77 | 0.33 | 0.18 |
| | | 5 | ND | 0.03 | 0.27 | 0.5 | 0.33 |
| | 1-propanol, 2-methyl- | 0 | ND | ND | 0.26 | 0.14 | 0.38 |
| | | 0.25 | ND | ND | 0.19 | 0.21 | 0.16 |
| | | 0.5 | ND | ND | ND | 0.22 | 0.14 |
| | | 1 | ND | ND | 0.086 | 0.38 | 0.40 |
| | | 5 | ND | ND | ND | 0.55 | 0.60 |
| | 1-pentanol | 0 | 0.081 | 0.14 | 0.47 | 0.085 | 0.25 |
| | | 0.25 | 0.14 | 0.28 | 0.56 | 0.26 | 0.26 |
| | | 0.5 | 0.18 | 0.29 | 0.68 | 0.41 | 0.18 |
| | | 1 | 0.17 | 0.64 | 0.90 | 0.43 | 0.50 |
| | | 5 | 0.37 | 0.42 | 1.0 | 0.81 | 0.82 |
| Ketones | 1-hexanol | 0 | ND | 0.034 | 0.59 | 0.1 | 0.33 |
| | | 0.25 | 0.086 | 0.094 | 0.34 | 0.42 | 0.50 |
| | | 0.5 | 0.11 | 0.087 | ND | 0.48 | 0.37 |
| | | 1 | 0.069 | 0.20 | 0.51 | 0.54 | 0.94 |
| | | 5 | 0.16 | 0.13 | 0.44 | 1.6 | 2.2 |
| | 1-octen-3-ol | 0 | ND | ND | 0.25 | 0.14 | ND |
| | | 0.25 | ND | ND | 0.16 | 0.18 | 0.43 |
| | | 0.5 | ND | ND | 0.23 | 0.32 | 0.15 |
| | | 1 | ND | ND | 0.79 | 0.3 | 0.35 |
| | | 5 | ND | ND | 1.5 | 1.3 | 0.66 |
| | 1-hexanol, 2-ethyl- | 0 | ND | ND | 0.36 | 0.098 | 0.36 |
| | | 0.25 | 0.13 | 0.088 | 0.12 | 0.28 | 0.46 |
| | | 0.5 | 0.16 | ND | ND | 0.38 | 0.093 |
| | | 1 | ND | 0.14 | 0.18 | 0.16 | 0.10 |
| | | 5 | ND | 0.096 | 0.27 | 0.24 | 0.18 |
| | Acetone | 0 | 0.74 | 0.4 | 0.42 | 0.023 | 0.07 |
| | | 0.25 | 0.74 | 0.6 | 0.60 | 0.059 | 0.036 |
| | | 0.5 | 0.58 | 0.76 | 0.63 | 0.095 | 0.035 |
| | | 1 | 0.67 | 0.68 | 0.63 | 0.13 | 0.066 |
| | | 5 | 0.77 | 0.56 | 0.86 | 0.47 | 0.36 |
| | 2,3-butandione | 0 | 0.50 | 1.1 | 15.8 | 0.48 | 1.1 |
| | | 0.25 | 0.99 | 0.80 | 22.51 | 1.1 | 0.59 |
| | | 0.5 | 0.74 | 0.98 | 15.9 | 2.5 | 0.53 |
| | | 1 | 0.72 | 1.1 | 11.2 | 2.7 | 1.1 |

| | | | | | | | |
|------------------------|-------------------------|------|-------|-------|--------|-------|-------|
| Sulphurous Compounds | 2-butanone | 5 | 0.93 | 0.83 | 2.5 | 11.3 | 3.5 |
| | | 0 | 0.17 | 0.083 | ND | ND | ND |
| | | 0.25 | 0.29 | 0.19 | ND | ND | ND |
| | | 0.5 | 0.25 | 0.37 | ND | ND | ND |
| | | 1 | 0.44 | 0.39 | 0.37 | ND | ND |
| | | 5 | 1.7 | 1.1 | 1.7 | ND | ND |
| | | 0 | 0.004 | ND | 0.031 | 0.014 | 0.026 |
| | | 0.25 | 0.011 | ND | ND | 0.018 | 0.02 |
| | | 0.5 | 0.005 | ND | 0.018 | 0.026 | 0.018 |
| | | 1 | 0.006 | ND | ND | ND | 0.03 |
| | | 5 | 0.015 | ND | 0.02 | 0.054 | 0.057 |
| | | 0 | ND | ND | 18.6 | 0.26 | 0.21 |
| | 2-butanone, 3-hydroxy-- | 0.25 | ND | ND | 15.1 | 3.5 | 0.63 |
| | | 0.5 | ND | ND | 11.6 | 0.95 | 0.19 |
| | | 1 | ND | ND | 13.4 | 2.8 | ND |
| | | 5 | ND | ND | 0.81 | 17.0 | 1.0 |
| | 2-butanone, 4-hydroxy- | 0 | ND | ND | 2.9 | 0.30 | 0.52 |
| | | 0.25 | ND | ND | 0.49 | 0.51 | 0.28 |
| | | 0.5 | ND | ND | 0.50 | 0.91 | 0.46 |
| | | 1 | ND | ND | ND | 3.5 | 1.7 |
| | | 5 | ND | ND | ND | 9.7 | 7.9 |
| | | 0 | 2.95 | 1.1 | 0.27 | 0.19 | 0.11 |
| | | 0.25 | 2.3 | 2.1 | 0.47 | 0.95 | 1.4 |
| | | 0.5 | 2.3 | 3.1 | 1.4 | 1.0 | 0.61 |
| Hydrocarbons (Alkanes) | Methanethiol | 1 | 2.0 | 2.1 | 1.2 | 0.70 | 0.20 |
| | | 5 | 2.0 | 1.9 | 3.2 | 0.44 | 0.66 |
| | | 0 | 0.12 | 0.061 | 0.13 | 0.053 | 0.13 |
| | | 0.25 | 0.084 | 0.087 | 0.09 | 0.055 | 0.083 |
| | Dimethyl sulfide | 0.5 | 0.09 | 0.089 | 0.12 | 0.081 | 0.074 |
| | | 1 | 0.11 | 0.12 | 0.12 | 0.086 | 0.12 |
| | | 5 | 0.22 | 0.12 | 0.14 | 0.15 | 0.19 |
| | | 0 | ND | ND | ND | ND | 0.029 |
| | Hexane | 0.25 | ND | ND | ND | ND | 0.023 |
| | | 0.5 | ND | ND | ND | 0.023 | 0.031 |
| | | 1 | ND | ND | ND | 0.036 | 0.045 |
| | | 5 | ND | 0.026 | 0.0088 | 0.026 | 0.054 |
| | Heptane | 0 | ND | ND | 0.16 | 0.11 | 0.36 |
| | | 0.25 | ND | ND | 0.12 | 0.32 | 0.34 |
| | | 0.5 | ND | 0.08 | 0.16 | 0.30 | 0.40 |
| | | 1 | ND | 0.14 | 0.25 | 0.29 | 0.53 |
| | | 5 | ND | 0.24 | 0.81 | 1.1 | 0.82 |
| | | 0 | ND | ND | ND | 0.037 | 0.17 |
| | Octane | 0.25 | ND | ND | ND | 0.14 | 0.15 |
| | | 0.5 | ND | ND | 0.046 | 0.21 | 0.29 |
| | | 1 | ND | ND | 0.017 | 0.17 | 0.32 |
| | | 5 | ND | 0.11 | 0.10 | 0.17 | 0.33 |

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|-----------------|------|------|------|------|------|------|
| Total VOCs | 0 | 30.3 | 12.9 | 46.4 | 5.9 | 16.1 |
| | 0.25 | 30.8 | 22.9 | 55.9 | 11.6 | 12.6 |
| | 0.5 | 29.0 | 35.2 | 53.2 | 12.4 | 9.2 |
| | 1 | 26.4 | 30.0 | 41.8 | 17.3 | 16.2 |
| | 5 | 36.9 | 27.8 | 44.2 | 57.1 | 28.0 |
| ND—Not Detected | | | | | | |