Results

1. Comparative Isotopic and Elemental Profiles:

Isotopic differences were observed between organic and conventional tomato products, whereas basic elemental composition broadly overlaps. For δ13C (Figure 1, top left), δ13C was slightly higher in organic tomatoes (mean –29.2 ± 1.0‰) than in conventional ones (–30.5 ± 1.1‰), indicating δ13C values were ~1.4‰ higher in organic management. Along with partial overlap between groups, the trend was found as (t = 2.10, p = 0.070).

In contrast, (Figure 1, top right), δ¹⁵N showed a pronounced difference: organic tomatoes averaged around +5.9 ± 2.0‰, while conventional tomatoes were near +0.1 ± 0.6‰, a gap of ~5–6‰ that was highly significant (t = 6.12, p = 0.002). There was essentially no overlap in δ15N between the two groups.

Elemental traits (%N and C:N ratio; Figure 1, bottom panels) did not differ significantly between farming systems. Both groups, Organic and Conventional products, had similar %N (1.7 ± 0.2% vs. 1.7 ± 0.3%, p = 0.761) and overlapping C:N ratios (24.4 ± 3.1 vs. 28.3 ± 8.35, p = 0.367).

1. δ¹³C and δ¹⁵N across Farming Types and Regions: