**Supplemental Tables: Unravelling prehispanic island economies through organic residue analysis: the case of Mocha Island (southern Chile)**

Supplemental Table 1: Mocha Island potsherds.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Site | Sample | Excavation unit | Level | External surface’ treatment | Fragment’s shape |
| P5-1 | P5-1.1 | 05.02.03 | 0-5cm | Smoothed | Neck-body |
| P5-1 | P5-1.2 | 05.02.03 | 10-15cm | Smoothed | Body |
| P5-1 | P5-1.3 | 05.02.03 | 25-30cm | Smoothed | Body |
| P5-1 | P5-1.4 | 05.02.03 | 25-30cm | Smoothed | Body |
| P5-1 | P5-1.5 | 05.02.03 | 30-35cm | Polished | Body |
| P5-1 | P5-1.6 | 05.02.03 | 30-35cm | Polished | Base |
| P5-1 | P5-1.7 | 05.02.03 | 30-40cm | Smoothed | Body |
| P5-1 | P5-1.8 | 05.02.03 | 50-55cm | Polished | Body |
| P5-1 | P5-1.9 | 05.02.03 | 50-55cm | Polished | Body |
| P5-1 | P5-1.10 | 05.02.03 | 55-60cm | Polished | Body |
| P5-1 | P5-1.11 | 05.02.03 | 55-60cm | Polished | Neck-body |
| P5-1 | P5-1.12 | 05.02.03 | 60-65cm | Polished | Body |
| P5-1 | P5-1.13 | 05.02.03 | 65-70cm | Polished | Neck |
| P5-1 | P5-1.14 | 05.02.03 | 80-85cm | Polished | Neck-body |
| P5-1 | P5-1.15 | 05.02.03 | 85-90cm | Polished | Body |
| P5-1 | P5-1.16 | 05.02.03 | 95-100cm | Polished | Body |
| P5-1 | P5-1.17 | 05.02.03 | 95-100cm | Polished | Body |
| P23-2 | P23-2.1 | 23.01.02 | 0-5cm | Polished | Base |
| P23-2 | P23-2.2 | 23.03.01 | 20-25cm | Polished | Body |
| P23-2 | P23-2.3 | 23.03.01 | 20-25cm | Polished | Neck-body |
| P23-2 | P23-2.4 | 23.03.01 | 20-25cm | Polished | Rim |
| P23-2 | P23-2.5 | 23.03.01 | 25-30cm | Polished | Base |
| P23-2 | P23-2.6 | 23.03.01 | 35-40cm | Smoothed | Body |
| P23-2 | P23-2.7 | 23.03.01 | 35-40cm | Polished | Neck |
| P23-2 | P23-2.8 | 23.03.01 | 40-45cm | Polished | Body |
| P23-2 | P23-2.9 | 23.03.01 | 40-45cm | Polished | Body |
| P23-2 | P23-2.10 | 23.03.01 | 50-55cm | Polished | Neck-body |
| P23-2 | P23-2.11 | 23.03.01 | 60-65cm | Polished | Body |
| P23-2 | P23-2.12 | 23.03.01 | 65-70cm | Polished | Body |
| P23-2 | P23-2.13 | 23.03.01 | 65-70cm | Polished | Body |
| P23-2 | P23-2.14 | 23.03.01 | 100-105cm | Polished | Body |
| P23-2 | P23-2.15 | 23.03.01 | 100-105cm | Polished | Body |
| P25-1 | P25-1.1 | 25.02.02 | 10-15cm | Polished | Body |
| P25-1 | P25-1.2 | 25.02.02 | 20-25cm | Polished | Neck-body |
| P25-1 | P25-1.3 | 25.02.02 | 55-60cm | Smoothed | Body |
| P25-1 | P25-1.4 | 25.02.02 | 55-60cm | Smoothed | Rim |
| P25-1 | P25-1.5 | 25.02.02 | 60-65cm | Smoothed | Rim |
| P25-1 | P25-1.6 | 25.02.02 | 60-65cm | Polished | Body |
| P25-1 | P25-1.7 | 25.02.02 | 70-75cm | Polished | Rim |
| P25-1 | P25-1.8 | 25.03.01 | 95-100cm | Polished | Body |
| P25-1 | P25-1.9 | 25.03.04 | 0-5cm | Polished | Body |
| P25-1 | P25-1.10 | 25.03.04 | 85-90cm | Polished | Rim |
| P25-1 | P25-1.11 | 25.03.04 | 115-120cm | Polished | Body |
| P25-1 | P25-1.12 | 25.04.02 | 50-55cm | Polished | Body |
| P25-1 | P25-1.13 | 25.04.02 | 75-80cm | Smoothed | Body |
| P25-1 | P25-1.14 | 25.04.03 | 50-55cm | Eroded | Base |
| P25-1 | P25-1.15 | 25.04.03 | 65-70cm | Polished | Body |
| P25-1 | P25-1.16 | 25.04.03 | 65-70cm | Polished | Body |
| P25-1 | P25-1.17 | 25.04.03 | 65-70cm | Polished | Body |
| P25-1 | P25-1.18 | 25.04.03 | 70-75cm | Smoothed | Body |
| P25-1 | P25-1.10 | 25.03.04 | 115-120cm | Polished | Body |

*Note:* Details for 51 pottery sherds from three different sites from Mocha Island: P5-1; P23-2; P25-1.

Supplemental Table 2: List of products

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Product | Species | Origin | Shop place | Place for cooking experiment |
| Maize | *Zea mays* | Chile | Local market, Concepción city. | Open area, Concepción, Chile. |
| Quinoa | *Chenopodium quinoa* | Chile | Local market, Villarica city | Open area, Concepción, Chile. |
| Chilean hazelnut | *Gevuina avellana* | Chile | Local market, Talca city | Open area, Concepción, Chile. |
| Llama meat | *Lama glama* | Argentina | Kezie ltd | YEAR Centre University of York |
| Llama meat | *Lama glama* | Argentina | Kezie ltd | YEAR Centre University of York |

*Note*: Modern products used in cooking experiments for molecular and δ13C isotopic references.

Supplemental Table 3: Summary of the molecular and isotopic data

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sample ID** | **Site** | **Exc. unit** | **Exc.**  **Level** | **Lipid concentration (µg g-1)** | **Main compounds detected** | **P/S** | **PA SRR%** | **APAA C18E/H** | **APAA C20/C18** | **δ13C16:0 (‰)** | **δ13C18:0 (‰)** | **Δ13C (‰)** | **ALK CPI** |
| **P5-1.1** | P5-1 | 05.02.03 | 0-5cm | 38 | SFA( C14:0 - C21:0), UFA (C16:1 - C22:1), br, phy, tmtd, pri | 1.0 | 70 | N.P | N.P | -27.3 | -29 | -1.7 | N.P |
| **P5-1.2** | P5-1 | 05.02.03 | 10-15 cm | 61 | SFA (C8:0 - C28:0), UFA (C14:1 - C24:1), DC (C8 - C11), ALK (C27 - C33), br, tmtd, pri, APAA-C18 | 1.0 | N.P | 2.5 | N.P | -30.6 | -31.3 | -0.7 | 2.2 |
| **P5-1.3** | P5-1 | 05.02.03 | 25-30 cm | 19 | SFA (C10:0 - C28:0), UFA (C16:1 - C24:1), DC (C8 - C10), br, tmtd, pri | 1.0 | N.P | N.P | N.P | -22.4 | -22.7 | 0.4 | N.P |
| **P5-1.4** | P5-1 | 05.02.03 | 25-30 cm | 20 | SFA (C8:0 - C24:0), UFA (C16:1 - C24:1), DC (C8 - C9), br, pri | 1.2 | N.P | N.P | N.P | -29.3 | -30 | -0.7 | N.P |
| **P5-1.5** | P5-1 | 05.02.03 | 30-35 cm | 13 | SFA (C8:0 - C24:0), UFA (C18:1 - C22:1), DC (C9 - C10), pri | 1.0 | N.P | N.P | N.P | -31.3 | -31.6 | -0.4 | N.P |
| **P5-1.6** | P5-1 | 05.02.03 | 30-35 cm | 146 | SFA (C12:0 - C30:0), UFA (C14:1 - C24:1), DC (C9 - C10), ALK (C27 - C33), br | 0.9 | N.P | N.P | N.P | -29.6 | -29.1 | 0.4 | 0.9 |
| **P5-1.7** | P5-1 | 05.02.03 | 30-40 cm | 166 | SFA (C8:0 - C28:0), UFA (C16:1 - C24:1), DC (C9 - C14), br, phy, tmtd, pri, PL\_St | 1.6 | 8.4 | N.P | N.P | -25.2 | -27.3 | -2.1 | N.P |
| **P5-1.8** | P5-1 | 05.02.03 | 50-55 cm | 64 | SFA (C12:0 - C26:0), UFA (C16:1 - C24:1), tmtd, pri | 1.0 | N.P | N.P | N.P | -29.3 | -29.7 | -0.4 | N.P |
| **P5-1.9** | P5-1 | 05.02.03 | 50-55 cm | 32 | SFA (C12:0 - C30:0), UFA (C16:1 - C22:1), ALK (C27 - C31), br, phy, tmtd, pri, APAA-C18 | 0.9 | 77.2 | 4.6 | N.P | -29.1 | -29 | 0.1 | 5.2 |
| **P5-1.10** | P5-1 | 05.02.03 | 55-60 cm | 110 | SFA (C12:0 - C30:0), UFA (C16:1 - C24:1), DC (C9 - C10), VLCOH (C26 - C28), ALK (C27 - C31), br, tmtd, pri, PL\_St | 1.4 | N.P | N.P | N.P | -29.2 | -29.5 | -0.3 | 10.1 |
| **P5-1.11** | P5-1 | 05.02.03 | 55-60 cm | 39 | SFA (C12:0 - C30:0), UFA (C18:1 - C24:1), VLCOH (C22:0 - C30:0), ALK (C27 - C29),, br, tmtd, APAA-C18 | 0.8 | N.P | 1.9 | N.P | -29.9 | -29.2 | 0.7 | 2.8 |
| **P5-1.12** | P5-1 | 05.02.03 | 60-65 cm | 70 | SFA (C12:0 - C30:0), UFA (C16:1 - C24:1), DC (C9), pri, APAA-C18 | 1.1 | N.P | 7.8 | N.P | -26.7 | -27.6 | -0.9 | N.P |
| **P5-1.13** | P5-1 | 05.02.03 | 65-70 cm | 171 | SFA (C12:0 - C30:0), UFA (C16:1 - C24:1), DC (C9 - C10), br, phy, tmtd, pri, APAAs (C18, C20). | 1.2 | 74.7 | 3.5 | 0.3 | -21.9 | -22.3 | -0.3 | N.P |
| **P5-1.14** | P5-1 | 05.02.03 | 80-85 cm | 70 | SFA (C12:0 - C30:0), UFA (C16:1 - C22:1), ALK (C27 - C31), tmtd, pri, APAA-C18 | 0.9 | N.P | N.P | N.P | -29.4 | -29.7 | -0.4 | 47.9 |
| **P5-1.15** | P5-1 | 05.02.03 | 85-90 cm | 30 | SFA (C14:0 - C30:0), UFA (C16:1 - C22:1), ALK (C27 - C31), br, tmtd | 0.8 | N.P | N.P | N.P | -30.1 | -29 | 1.1 | 1.6 |
| **P5-1.16** | P5-1 | 05.02.03 | 95-100cm | 33 | SFA (C12:0 - C30:0), UFA (C16:1 - C24:1), DC (C11), ALK (C27 - C31), br, phy, tmtd, pri, APAA-C18 | 1.6 | 81.7 | 2.7 | N.P | -23.3 | -25.9 | -2.5 | 2.6 |
| **P5-1.17** | P5-1 | 05.02.03 | 95-100cm | 560 | SFA (C12:0 - C28:0), UFA (C16:1 - C22:1), DC (C8 - C9), br, phy, tmtd, pri | 0.5 | 77.7 | N.P | N.P | -29.5 | -31.6 | -2.1 | N.P |
| **P23-2.1** | P23-2 | 23.01.02 | 0-5 cm | 29 | SFA (C12:0 - C28:0), UFA (C14:1 - C24:1), DC (C9), br, tmtd, pri, APAA-C18 | 1.0 | N.P | 1.9 | N.P | -29.8 | -29.4 | 0.4 | N.P |
| **P23-2.2** | P23-2 | 23.03.01 | 20-25 cm | 33 | SFA (C12:0 - C30:0), UFA (C16:1 - C24:1), DC (C9), br, tmtd, pri, APAAs (C18, C20), PL\_St | 1.5 | N.P | 5.3 | 0.3 | -29.4 | -29.8 | -0.4 | N.P |
| **P23-2.3** | P23-2 | 23.03.01 | 20-25 cm | 8 | SFA (C14:0 - C22:0), UFA (C16:1 - C22:1), br, tmtd, pri | 1.0 | N.P | N.P | N.P | -29.7 | -29.4 | 0.3 | N.P |
| **P23-2.4** | P23-2 | 23.03.01 | 20-25 cm | 69 | SFA (C12:0 - C30:0), UFA (C16:1 - C24:1), DC (C8 - C10), br, tmtd, pri, PL\_St | 1.0 | N.P | N.P | N.P | -27.5 | -28.2 | -0.7 | N.P |
| **P23-2.5** | P23-2 | 23.03.01 | 25-30 cm | 27 | SFA (C12:0 - C30:0), UFA (C16:1 - C24:1), DC (C8 - C11), br, tmtd | 1.4 | N.P | N.P | N.P | -30.5 | -27.8 | 2.6 | N.P |
| **P23-2.6** | P23-2 | 23.03.01 | 35-40 cm | 46 | SFA (C12:0 - C30:0), UFA (C16:1 - C24:1), DC (C8 - C10), VLCOH (C26 - C28), ALK (C27 - C33), br, pri, APAA-C18, PL\_St | 1.3 | N.P | 7.2 | N.P | -29.7 | -29.7 | 0.1 | 16.2 |
| **P23-2.7** | P23-2 | 23.03.01 | 35-40 cm | 58 | SFA (C12:0 - C30:0), UFA (C16:1 - C24:1), DC (C8 - C10), ALK (C27 - C31), br, pri, PL\_St | 1.2 | N.P | N.P | N.P | -24.7 | -27.8 | -3.1 | 5.1 |
| **P23-2.8** | P23-2 | 23.03.01 | 40-45 cm | 58 | SFA (C12:0 - C28:0), UFA (C16:1 - C24:1), DC (C8), br, tmtd, pri | 1.0 | N.P | N.P | N.P | -24.8 | -24.4 | 0.06 | N.P |
| **P23-2.9** | P23-2 | 23.03.01 | 40-45 cm | 12 | SFA (C12:0 - C30:0), UFA (C16:1 - C24:1), DC (C9), br, pri | 1.2 | N.P | N.P | N.P | -28.9 | -27.9 | 1 | N.P |
| **P23-2.10** | P23-2 | 23.03.01 | 50-55 cm | 24 | SFA (C12:0 - C30:0), UFA (C16:1 - C24:1), ALK (C27 - C33), br, pri | 1.0 | N.P | N.P | N.P | -29.6 | -29 | 0.5 | 1.7 |
| **P23-2.11** | P23-2 | 23.03.01 | 60-65 cm | 15 | SFA (C12:0 - C20:0), UFA (C16:1 - C22:1), DC (C9), br, pri | 2.4 | N.P | N.P | N.P | -28.9 | -28.9 | 0 | N.P |
| **P23-2.12** | P23-2 | 23.03.01 | 65-70 cm | 7 | SFA (C12:0 - C30:0), UFA (C16:1 - C22:1), br, pri | 1.1 | N.P | N.P | N.P | -29.3 | -28.8 | 0.5 | N.P |
| **P23-2.13** | P23-2 | 23.03.01 | 65-70 cm | 52 | SFA (C12:0 - C30:0), UFA (C16:1 - C24:1), DC (C9 - C11), ALK (C27 - C33), br, pri, APAA-C18 | 0.9 | N.P | 2.2 | N.P | -29.4 | -28.4 | 1 | 4.2 |
| **P23-2.14** | P23-2 | 23.03.01 | 100-105 cm | 16 | SFA (C12:0 - C26:0), UFA (C16:1 - C22:1), DC (C8), br, phy, tmtd, pri, APAA-C18 | 1.1 | 74.7 | 2.5 | N.P | -31.6 | -28.8 | 2.7 | N.P |
| **P23-2.15** | P23-2 | 23.03.01 | 100-105 cm | 29 | SFA (C12:0 - C30:0), UFA (C16:1 - C24:1), ALK (C27 - C33), br, pri, APAA-C18 | 0.9 | N.P | 1.3 | N.P | -28.9 | -28.2 | 0.8 | 5.2 |
| **P25-1.1** | P25-1 | 25.02.02 | 10-15 cm | 27 | SFA (C12:0 - C24:0), UFA (C14:1 - C24:1), DC (C9), br, pri, PL\_St | 2.9 | N.P | N.P | N.P | -30.1 | -29.9 | 0.2 | N.P |
| **P25-1.2** | P25-1 | 25.02.02 | 20-25 cm | 9 | SFA (C12:0 - C30:0), UFA (C16:1 - C24:1), DC (C9), ALK (C27 - C33), br, phy, pri | 0.7 | 27.1 | N.P | N.P | -29.9 | -31.5 | -1.6 | 4.6 |
| **P25-1.3** | P25-1 | 25.02.02 | 55-60 cm | 55 | SFA (C12:0 - C30:0), UFA (C14:1 - C24:1), DC (C8 - C10), VLCOH (C26 - C28), ALK (C27 - C33), br, pri, PL\_St | 1.6 | N.P | N.P | N.P | -29.8 | -29.8 | 0 | 3.9 |
| **P25-1.4** | P25-1 | 25.02.02 | 55-60 cm | 255 | SFA (C12:0 - C30:0), UFA (C16:1 - C24:1), DC (C9 - C11), br, phy, pri | 0.7 | 30.4 | N.P | N.P | -26.5 | -29.2 | -2.7 | N.P |
| **P25-1.5** | P25-1 | 25.02.02 | 60-65 cm | 60 | SFA (C10:0 - C30:0), UFA (C16:1 - C24:1), DC (C8 - C10), VLCOH (C22 - C34), ALK (C27 - C31), br, pri, APAA-C18, PL\_St | 2.1 | N.P | 7.9 | N.P | -23.8 | -24.6 | -0.8 | 7.7 |
| **P25-1.6** | P25-1 | 25.02.02 | 60-65 cm | 9 | SFA (C12:0 - C26:0), UFA (C16:1 - C22:1), br, pri | 1.0 | N.P | N.P | N.P | -29.1 | -28.8 | 0.3 | N.P |
| **P25-1.7** | P25-1 | 25.02.02 | 70-75 cm | 34 | SFA (C12:0 - C26:0), UFA (C16:1 - C22:1), DC (C8 - C10), VLCOH (C22 - C28), br, APAA-C18, PL\_St | 2.1 | N.P | 8.4 | N.P | -18.8 | -22.6 | -3.8 | N.P |
| **P25-1.8** | P25-1 | 25.03.01 | 95-100 cm | 11 | SFA (C12:0 - C28:0), UFA (C16:1 - C22:1), ALK (C27 - C33), br, pri, APAA-C18 | 1.0 | N.P | 4.4 | N.P | -29.3 | -29.4 | -0.1 | 5.3 |
| **P25-1.9** | P25-1 | 25.03.04 | 0-5 cm | 58 | SFA (C12:0 - C30:0), UFA (C14:1 - C24:1), DC (C8 - C12), VLCOH (C22 - C28), ALK (C27 - C31), br, phy, tmtd, pri, PL\_St | 1.5 | 93.9 | N.P | N.P | -29.7 | -29.4 | 0.2 | 0.7 |
| **P25-1.10** | P25-1 | 25.03.04 | 85-90 cm | 150 | SFA (C10:0 - C26:0), UFA (C14:1 - C24:1), DC (C8 - C14), VLCOH (C26), br, phy, tmtd, pri, APAAs (C18, C20, C22) | 1.5 | 93.3 | 5.1 | 0.12 | -26.3 | -27.6 | -1.3 | N.P |
| **P25-1.11** | P25-1 | 25.03.04 | 115-120 cm | 22 | SFA (C12:0 - C28:0), UFA (C16:1 - C22:1), VLCOH (C22 - C26), br, pri, APAA-C18, PL\_St | 0.9 | N.P | 7.3 | N.P | -28.8 | -28.9 | -0.2 | N.P |
| **P25-1.12** | P25-1 | 25.04.02 | 50-55 cm | 14 | SFA (C12:0 - C20:0), UFA (C16:1 - C22:1), br, pri, APAA-C18 | 1.4 | N.P | 1.8 | N.P | -28.9 | -29.1 | -0.1 | N.P |
| **P25-1.13** | P25-1 | 25.04.02 | 75-80 cm | 18 | SFA (C12:0 - C28:0), UFA (C16:1 - C22:1), DC (C8 - C10), br, phy, tmtd, pri, APAAs (C18, C20, C22), PL\_St | 1.0 | 97.6 | 4.8 | 0.06 | -28 | -28.9 | -0.9 | N.P |
| **P25-1.14** | P25-1 | 25.04.03 | 50-55 cm | 28 | SFA (C10:0 - C26:0), UFA (C16:1 - C22:1), DC (C8 - C13), ALK (C27 - C31), br, tmtd, pri | 1.9 | N.P | N.P | N.P | -27 | -26.5 | 0.5 | 8 |
| **P25-1.15** | P25-1 | 25.04.03 | 65-70 cm | 7 | SFA (C12:0 - C30:0), UFA (C16:1 - C24:1), ALK (C27 - C33), br | 1.7 | N.P | N.P | N.P | N.P | N.P | N.P | 8.4 |
| **P25-1.16** | P25-1 | 25.04.03 | 65-70 cm | 11 | SFA (C12:0 - C20:0), UFA (C16:1 - C22:1), DC (C9), br | 1.2 | N.P | N.P | N.P | -29.7 | -29.4 | 0.4 | N.P |
| **P25-1.17** | P25-1 | 25.04.03 | 65-70 cm | 10 | SFA (C12:0 - C24:0), UFA (C16:1 - C22:1), br, phy | 1.4 | 50.8 | N.P | N.P | -28.7 | -28.9 | -0.2 | N.P |
| **P25-1.18** | P25-1 | 25.04.03 | 70-75 cm | 15 | SFA (C12:0 - C28:0), UFA (C16:1 - C22:1), DC (C9), ALK (C27 - C33), br | 1.4 | N.P | N.P | N.P | -27.4 | -27.7 | -0.3 | 8.8 |
| **P25-1.19** | P25-1 | 25.03.04 | 115-120 cm | 3 |  |  | N.P | N.P | N.P | N.P | N.P | N.P | N.P |

*Note:* Data for the recovered residues from the 51 samples analysed in this work. In red is sample P25-1.19 which was removed from this study due to the low lipid yield. SFA=Saturated fatty acids; UFA= Unsaturated fatty acids; DC= Diacids; VLCOH= Very long chain fatty alcohols; ALK= Alkanes (odd-numbered); br= Branched fatty acids; phy= Phytanic acid; tmtd = 4, 8, 12-Trimethyltridecanoic acid; pr=Pristanic aids; APAA= ⍵-(o-alkylphenyl) alkanoic acids; PL\_St= Plant sterols. ALK CPI value based on [(Diefendorf et al. 2011)](https://paperpile.com/c/d4CWgG/AxWF).

Supplemental Table 4: Phytanic acid SRR-isomer references.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Class | Common name | Species | SRR % | Reference |
| Ruminant | Llama | *Lama glama* | 59.4 | This study |
| Ruminant | Llama | *Lama glama* | 55.5 | This study |
| Ruminant | Bos taurus | *Cervus elaphus* | 59.4 | Lucquin et al 2016 |
| Ruminant | Red deer | *Cervus elaphus* | 50.0 | Lucquin et al 2016 |
| Ruminant | Red deer | *Cervus elaphus* | 61.4 | Lucquin et al 2016 |
| Ruminant | Red deer | *Cervus elaphus* | 49.6 | Lucquin et al 2016 |
| Ruminant | Red deer | *Cervus elaphus* | 60.0 | Lucquin et al 2016 |
| Ruminant | Red deer | *Cervus elaphus* | 48.5 | Lucquin et al 2016 |
| Ruminant | Red deer | *Cervus elaphus* | 51.0 | Lucquin et al 2016 |
| Ruminant | Red deer | *Cervus elaphus* | 54.5 | Lucquin et al 2016 |
| Ruminant | Red deer | *Cervus elaphus* | 68.8 | Lucquin et al 2016 |
| Ruminant | Serow | *Capricornis crispus* | 54.3 | Lucquin et al 2016 |
| Ruminant | Sika deer | *Cervus nippon* | 74.8 | Lucquin et al 2016 |
| Ruminant | Sika deer | *Cervus nippon* | 54.3 | Lucquin et al 2016 |
| Ruminant | Sika deer | *Cervus nippon* | 64.0 | Lucquin et al 2016 |
| Aquatic | Marine gastropod | *Babylonia sp.* | 94.5 | Lucquin et al 2016 |
| Aquatic | Pilot whale | *Globicephala sp.* | 69.1 | Lucquin et al 2016 |
| Aquatic | Marine bivalve | *Venerupis philippinarum* | 36 | Lucquin et al 2016 |
| Aquatic | Salmon | *Salmonidae sp.* | 80.8 | Lucquin et al 2016 |
| Aquatic | Salmon | *Salmonidae sp.* | 74.9 | Lucquin et al 2016 |
| Aquatic | Salmon | *Salmonidae sp.* | 88.5 | Lucquin et al 2016 |

*Note:* Phytanic acid SRR-isomer contribution indicating a possible aquatic or ruminant origin. References were obtained from [(Lucquin et al. 2016)](https://paperpile.com/c/d4CWgG/Mm5R) and data from this study.

Supplemental Table 5: Modern references for the APAA-C18 E/H ratio.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Category | Common name | APAA-C18 E | APAA-C18 H | APAA-C18 E/H | References |
| Cereal/fruit/non-leafy vegetable | Maize | 9569 | 1368 | 7 | This study |
| Cereal/fruit/non-leafy vegetable | Maize | 1438 | 217 | 6.6 | This study |
| Cereal/fruit/non-leafy vegetable | Quinoa | 1472 | 239 | 6.2 | This study |
| Cereal/fruit/non-leafy vegetable | Quinoa | 1011 | 233 | 4.3 | This study |
| Cereal/fruit/non-leafy vegetable | Chilean hazelnut | 628 | 73 | 8.6 | This study |
| Cereal/fruit/non-leafy vegetable | Chestnut Flour | 25.6 | 6.8 | 3.8 | Bondetti et al. 2020 |
| Cereal/fruit/non-leafy vegetable | Hazelnut Oil | 25.7 | 9.2 | 2.8 | Bondetti et al. 2020 |
| Cereal/fruit/non-leafy vegetable | Hemp Oil | 28.8 | 5.1 | 5.6 | Bondetti et al. 2020 |
| Cereal/fruit/non-leafy vegetable | Rice Bran Oil | 31.1 | 5.2 | 6.0 | Bondetti et al. 2020 |
| Cereal/fruit/non-leafy vegetable | Walnut Oil | 28.1 | 7.7 | 3.6 | Bondetti et al. 2020 |
| Cereal/fruit/non-leafy vegetable | Leek white part | 28.8 | 7.5 | 3.8 | Bondetti et al. 2020 |
| Cereal/fruit/non-leafy vegetable | Onion | 28.6 | 6.1 | 4.7 | Bondetti et al. 2020 |
| Cereal/fruit/non-leafy vegetable | Almond | 34.9 | 4.0 | 8.7 | Bondetti et al. 2020 |
| Cereal/fruit/non-leafy vegetable | Walnut | 31.6 | 5.4 | 5.9 | Bondetti et al. 2020 |
| Cereal/fruit/non-leafy vegetable | Wheat | 31.9 | 5.1 | 6.3 | Bondetti et al. 2020 |
| Cereal/fruit/non-leafy vegetable | Barley | 32.3 | 5.5 | 5.9 | Bondetti et al. 2020 |
| Cereal/fruit/non-leafy vegetable | Carrot | 28.1 | 7.4 | 3.8 | Bondetti et al. 2020 |
| Cereal/fruit/non-leafy vegetable | Olive oil | 22.1 | 6.2 | 3.6 | Bondetti et al. 2020 |
| Cereal/fruit/non-leafy vegetable | Pistachio | 31.6 | 4.0 | 7.9 | Bondetti et al. 2020 |
| Cereal/fruit/non-leafy vegetable | Viburnum | 29.3 | 5.6 | 5.2 | Bondetti et al. 2020 |
| Cereal/fruit/non-leafy vegetable | Millet seed | 29.9 | 5.1 | 5.9 | Bondetti et al. 2020 |
| Cereal/fruit/non-leafy vegetable | Quinoa seed | 29.3 | 6.4 | 4.6 | Bondetti et al. 2020 |
| Cereal/fruit/non-leafy vegetable | Rice grain | 31.4 | 4.6 | 6.8 | Bondetti et al. 2020 |
| Cereal/fruit/non-leafy vegetable | Sesame seed | 31.6 | 4.7 | 6.7 | Bondetti et al. 2020 |
| Cereal/fruit/non-leafy vegetable | Acorn seed | 26.6 | 7.5 | 3.5 | Bondetti et al. 2020 |
| Leafy plant | Spinach | 11.8 | 23.5 | 0.5 | Bondetti et al. 2020 |
| Leafy plant | Carrot leave | 24.3 | 12.4 | 2.0 | Bondetti et al. 2020 |
| Leafy plant | Cabbage | 15.0 | 19.0 | 0.8 | Bondetti et al. 2020 |
| Leafy plant | Leek leave | 20.7 | 14.3 | 1.4 | Bondetti et al. 2020 |
| Animal | Red Deer1 | 27.8 | 9.3 | 3.0 | Bondetti et al. 2020 |
| Animal | Organic Butter | 22.6 | 7.5 | 3.0 | Bondetti et al. 2020 |
| Animal | Elk | 22.6 | 8.5 | 2.7 | Bondetti et al. 2020 |
| Animal | Red Deer2 | 28.9 | 8.1 | 3.6 | Bondetti et al. 2020 |
| Animal | Beaver-6 | 29.6 | 6.4 | 4.6 | Bondetti et al. 2020 |
| Animal | Pork | 25.1 | 4.3 | 5.8 | Bondetti et al. 2020 |
| Animal | Cod Liver Oil | 22.4 | 9.5 | 2.4 | Bondetti et al. 2020 |
| Animal | Salmon Fat | 26.5 | 13.6 | 1.9 | Bondetti et al. 2020 |
| Animal | Salmon Oil | 28.3 | 8.7 | 3.3 | Bondetti et al. 2020 |
| Animal | Duck | 24.4 | 12.2 | 2.0 | Bondetti et al. 2020 |
| Animal | Catfish | 29.3 | 7.7 | 3.8 | Bondetti et al. 2020 |
| Animal | Sturgeon | 29.4 | 5.8 | 5.1 | Bondetti et al. 2020 |
| Animal | Unio Shellfish | 24.2 | 10.1 | 2.4 | Bondetti et al. 2020 |
| Animal | Viviparus Shellfish | 23.2 | 13.0 | 1.8 | Bondetti et al. 2020 |
| Animal | Perch | 23.1 | 9.9 | 2.3 | Bondetti et al. 2020 |

*Note*: References based on cooking experiments from this study, and Bondetti and others (2020).

Supplemental Table 6: Archaeological maize from Iluga Túmulos site

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sample | Mound | Stratigraphic layer | Number of kernels | Weight (mg) after grinding |
| B-0053 | *16* | I-capa 2 | 5 | 622.0 |
| B-0062 | *16* | I-capa 3 | 6 | 620.8 |
| B-0074 | *16* | I-capa 4 | 4 | 605.5 |
| B-0095 | *16* | I-capa 5 | 4 | 622.7 |
| B-0105 | *16* | I-capa 6 | 4 | 623.5 |

*Note*: Archaeological maize recovered from mound Nº16, Iluga Túmulos site, Tarapacá Region, Chile.

Supplemental Table 7: δ13C references.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Class** | **Species** | **Common name** | **δ13C16** | **δ13C18** | **Provenience** | **Reference** |
| C4 plant | *Zea mays* | Maize | -21.2 | -21.9 | Argentina | March 2013 |
| C4 plant | *Zea mays* | Maize | -13.3 | -14.2 | China | Guo et al. 2010 |
| C4 plant | *Zea mays* | Maize | -18.1 | -18.8 | Chile | This study |
| C4 plant | *Zea mays* | Maize | -14.7 | -15.1 | Chile | This study |
| C4 plant | *Zea mays* | Maize | -15.2 | -14.6 | Chile | This study |
| C4 plant | *Zea mays* | Maize | -15 | -15.4 | Chile | This study |
| C4 plant | *Zea mays* | Maize | -14.8 | -15.3 | Chile | This study |
| C4 plant | *Zea mays* | Maize | -14.2 | -13.9 | Chile | This study |
| C4 plant | *Zea mays* | Maize | -17.2 | -19.2 | Argentina | Lantos et al 2015 |
| C4 plant | *Zea mays* | Maize | -19.2 | -20.9 | Argentina | Lantos et al 2015 |
| C4 plant | *Zea mays* | Maize | -18.1 | -21.1 | Argentina | Lantos et al 2015 |
| C4 plant | *Zea mays* | Maize | -18.7 | -21 | Argentina | Lantos et al 2015 |
| C4 plant | *Zea mays* | Maize | -18.5 | -18.5 | Argentina | Lantos et al 2015 |
| C4 plant | *Zea mays* | Maize | -15.1 | -17.8 | Argentina | Lantos et al 2015 |
| Ruminant | *Lama glama* | Llama | -23.7 | -26.7 | Argentina | Lantos et al 2015 |
| Ruminant | *Lama glama* | Llama | -27.5 | -30.5 | Argentina | Lantos et al 2015 |
| Ruminant | *Lama glama* | Llama | -28.3 | -31.3 | Argentina | This study |
| Ruminant | *Lama glama* | Llama | -28.1 | -31.5 | Argentina | This study |
| Ruminant | Cervus nippon | Sika deer | -27.8 | -29.4 | Japan | Lucquin et al. 2016 |
| Ruminant | Cervus nippon | Sika deer | -28.1 | -31.6 | Japan | Lucquin et al. 2016 |
| Ruminant | Cervus nippon | Sika deer | -31.9 | -35.1 | Japan | Lucquin et al. 2016 |
| Ruminant | Cervus sp. | Hokkaido deer | -28.1 | -28.1 | Japan | Lucquin et al. 2016 |
| Ruminant | Cervus sp. | Hokkaido deer | -30.4 | -32.7 | Japan | Lucquin et al. 2016 |
| Ruminant | Cervus elaphus | Red deer | -31.5 | -33.2 | UK | Lucquin et al. 2016 |
| Ruminant | Cervus elaphus | Red deer | -31.4 | -33.6 | UK | Lucquin et al. 2016 |
| C3 plant | Quercus sp. | Acorn | -34 | -34.4 | Japan | Lucquin et al. 2016 |
| C3 plant | Quercus sp. | Acorn | -32.7 | -33.6 | Japan | Lucquin et al. 2016 |
| C3 plant | Quercus sp. | Acorn | -35.1 | -35.9 | Japan | Lucquin et al. 2016 |
| C3 plant | Quercus sp. | Acorn | -33.1 | -34.6 | Japan | Lucquin et al. 2016 |
| C3 plant | Quercus sp. | Acorn | -32.1 | -34 | Japan | Lucquin et al. 2016 |
| C3 plant | *Vicia faba* | Broadbean | -32.4 | -31.4 | Argentina | March 2013 |
| C3 plant | *Vicia faba* | Broadbean | -32.6 | -31.3 | Argentina | March 2013 |
| C3 plant | *Manihot esculenta* | Manioc | -37.6 | -35.9 | Bought in France | March 2013 |
| C3 plant | Avena sativa | Oat | -34.2 | -33.7 | France | March 2013 |
| C3 plant | Avena sativa | Oat | -33.7 | -33.9 | France | March 2013 |
| C3 plant | *Solanum tuberosum* | Potato | -34.2 | -34.4 | Argentina | March 2013 |
| C3 plant | *Chenopodium quinoa* | Quinoa | -31.3 | -30.4 | Chile | This study |
| C3 plant | *Gevuina avellana* | Chilean hazelnut | -26.9 | -25.6 | Chile | This study |
| C3 plant | *Prosopis alba Girseb.* | Algarrobo | -34 | -32.9 | Argentina | Lantos et al. 2015 |
| C3 plant | *Phaseolus vulgaris L.* | Alubia bean | -35 | -33.8 | Argentina | Lantos et al. 2015 |
| C3 plant | *Fabaceae* | Peanut | -26.4 | -27.1 | China | Guo et al. 2010 |
| C3 plant | *Pinaceae* | Pine nut | -24.9 | -26.2 | China | Guo et al. 2010 |
| C3 plant | *Curcubitaceae* | Pumpkin | -26.8 | -27.5 | China | Guo et al. 2010 |
| C3 plant | *Curcubitaceae* | Pumpkin | -27.1 | -27.5 | China | Guo et al. 2010 |
| C3 plant | *Fabaceae* | Soybean | -28 | -28.6 | China | Guo et al. 2010 |
| C3 plant | *Juglandaceae* | Walnut | -26.5 | -27.1 | China | Guo et al. 2010 |
| Marine | *Gadus morhua* | Atlantic cod | -22.3 | -24.8 | Denmark | Craig et al. 2011 |
| Marine | *Phoca vitulina* | Harbour seal | -18.9 | -20.5 | Germany | Craig et al. 2011 |
| Marine | *Pogonias cromis* | Black drum | -24.1 | -24.7 | Brazil | Colonese et al. 2015 |
| Marine | *Cetacea* | Cetacea | -24.2 | -25.9 | Brazil | Colonese et al. 2015 |
| Marine | *Gymnocranius euanus* | Japanese large-eye bream | -22.4 | -22.1 | Japan | Craig et al. 2013 |
| Marine | *Gymnocranius euanus* | Japanese large-eye bream | -22.7 | -22.5 | Japan | Craig et al. 2013 |
| Marine | *Sebastes sp.* | Rockfish | -23.7 | -23.1 | Japan | Craig et al. 2013 |
| Marine | *Mugil cephalus* | Flathead grey mullet | -21.9 | -21.3 | Japan | Craig et al. 2013 |
| Marine | *Genyonemus lineatus* | White croaker | -21.8 | -21.4 | Japan | Craig et al. 2013 |
| Marine | *Anguilla anguilla* | European eel | -18.5 | -15.8 | UK | Lucquin et al. 2016 |
| Marine | *Gadus morhua* | Atlantic cod | -24.8 | -24.4 | UK | Lucquin et al. 2016 |
| Marine | *Scomber scombrus* | Atlantic mackerel | -25.4 | -25.6 | UK | Lucquin et al. 2016 |
| Marine | *Thunnus sp.* | Tuna | -25.3 | -24.9 | Japan | Lucquin et al. 2016 |
| Marine | *Globicephala macrorhynchus* | Short fin pilot whale | -22.9 | -23.3 | Japan | Lucquin et al. 2016 |
| Marine | *Babylonia sp.* | Seashell (Babylonia) | -23.6 | -23.1 | Japan | Lucquin et al. 2016 |
| Marine | *Venerupis philippinarum* | Seashell (Ruditapes) | -25 | -24 | Japan | Lucquin et al. 2016 |
| Marine | *Globicephala sp.* | Pilot Whale | -23.6 | -23.8 | Japan | Lucquin et al. 2016 |

*Note*: δ13C stable isotope values of the main alkanoic acids (C16:0 and C18:0) from modern and archaeological references from this study and published data. Due to variations on the atmospheric δ13C values after the Industrial revolution (Suess effect), a correction on the δ13C results of the modern samples was applied [(Hellevang and Aagaard 2015)](https://paperpile.com/c/d4CWgG/YI5M).