<u>**Supplementary Material**</u>

"Upscaling via a Prospective LCA: A Case Study on Tomato Homogenate Using a Near-to-Market Pasteurisation Technology"

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**Table S1.** Characteristics of the equipment and processing time of the pilot plant.

| Unit process at pilot scale | Power (kW) | Processing time |
|---|---|---|
| Grinding | 6 | 30 s for 20 kg |
| Sieving | 0.65 | 10 s for 1 kg |
| Mixing | 0.35 | 30 min |
| Homogenisation | 5.50 | 5 min |
| 2 Pumps | 1.1 | - |

**Table S2.** Inventory data for organic waste management at large scale scenario.

| Data | Value | Inventory process (source) |
|---|---|---|
| Landfill (kg waste) | 0.05 | Municipal solid waste on landfill (GaBi DB v.9) |
| Valorisation: | | |
| Natural gas (kWh · kg waste$^{-1}$) | 0.5346 | Heat production, natural gas, at boiler condensing modulating <100kW (Ecoinvent 3.6) |
| Soybean (kg · kg dried waste$^{-1}$) | 0.0922 | Soybean meal and crude oil production (Ecoinvent 3.6) |
| Barley (kg · kg dried waste$^{-1}$) | 0.0184 | Barley production, Swiss integrated production, intensive (Ecoinvent 3.6) |
| Wheat (kg · kg dried waste$^{-1}$) | 0.0089 | Wheat grain processing, dry milling (Ecoinvent 3.7.1) |

**Table S3.** Processing capacity (throughput) and power of RF machines [65].

| Name | Throughput (l·h$^{-1}$) | Power (kW) |
|---|---|---|
| RF270 | 10000 | 270 |
| RF135 | 5000 | 135 |

| | | |
|---|---|---|
| RF70 | 3000 | 70 |
| RF45 | 2000 | 45[1] |
| RF20 | 300 | 20 |

[1]RF equipment used in the pilot plant.
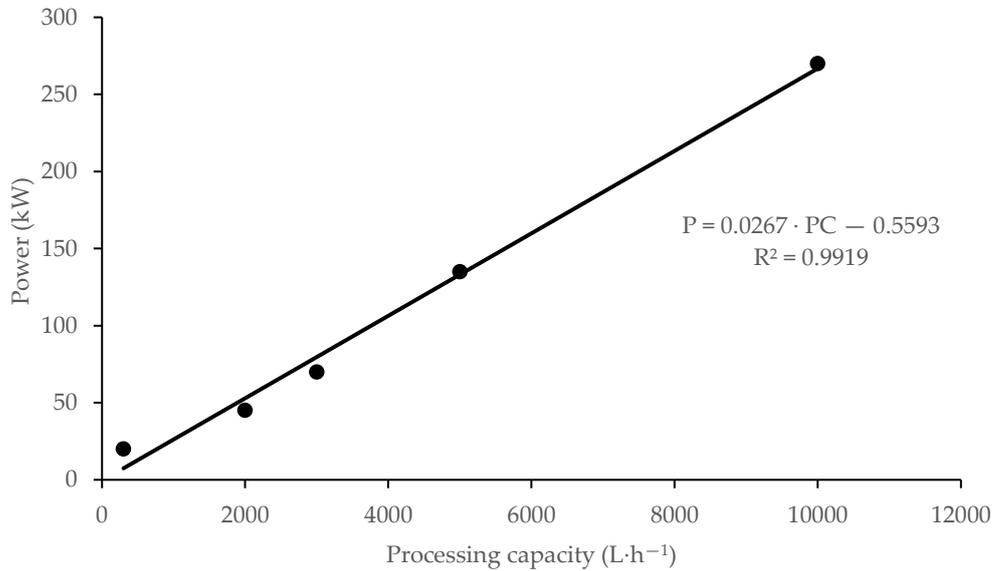


**Figure S1.** Linear relationship between power (P, kW) and processing capacity (PC, L·h^{-1}).

The chart contains the equation:

$$P = 0.0267 \cdot PC - 0.5593$$
$$R^2 = 0.9919$$

**Table S4.** Spanish electric mix in 2020 and 2040 and inventory processes used in the prospective LCA. Data of the shares of the electricity mix have been taken from Navas-Anguita [85].

| | Share 2020 | Share2040 | Type of electricity (data source) |
|---|---|---|---|
| Oil combustion turbine plant | 3.4% | 0.0% | Electricity production, oil (Ecoinvent 3.6) |
| NGCC plant | 15.0% | 0.8% | Electricity production, natural gas, combined cycle power plant (Ecoinvent 3.6) |
| Cogeneration plant | 7.1% | 5.3% | Heat and power co-generation, oil (Ecoinvent 3.6) |
| Nuclear fission plant | 20.4% | 0.0% | Electricity production, nuclear boiling water reactor (Ecoinvent 3.6) |
| Hydropower plant | 11.9% | 10.6% | Electricity production, hydro, run-of-river (Ecoinvent 3.6) |
| Solar PV plant | 12.9% | 28.8% | Electricity production, photovoltaic, 570kWp open ground installation, multi-Si (Ecoinvent 3.6) |

| | | | |
|---|---|---|---|
| Solar thermal plant | 6.5% | 11.7% | Electricity production, solar thermal parabolic trough, 50MW (Ecoinvent 3.6) |
| Wind onshore plant | 18.7% | 27.7% | Electricity production, wind, 1-3MW turbine, onshore (Ecoinvent 3.6) |
| Wind offshore plant | 0.7% | 7.8% | Electricity production, wind, 1-3MW turbine, offshore (Ecoinvent 3.6) |
| Biomass plant | 2.0% | 2.2% | Electricity from biomass (GaBi DB v9) |
| Biogas plant | 0.3% | 0.3% | Heat and power co-generation, biogas, gas engine (Ecoinvent 3.6) |
| Waste-to-energy plant | 0.3% | 2.5% | Electricity from municipal solid waste incineration to generic market for electricity, medium voltage (Ecoinvent 3.6) |
| Geothermal plant | 0.3% | 2.0% | Electricity production, deep geothermal (Ecoinvent 3.6) |
| Coal thermal plant | 0.3% | 0.3% | Electricity production, hard coal (Ecoinvent 3.6) |