Carbon footprint assessment of Santa Maria original medium

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Abbreviations

CO2e	Carbon dioxide equivalents
DEFRA	Department for Environment, Food and Rural Affairs
DC	Distribution central
NTM	Network for Transport Measures
RISE CDB	Research Institute of Sweden Climate data base
SKU	Stock keeping unit (for customers)

1 Goal and scope of the assessment

Paulig Group commissioned RISE to assess the carbon footprint assessment of one SKU of tortilla bread, Santa Maria Tortilla Original Medium 8PCS (see Table 1). The assessment was conducted in April 2023, in line with the ISO standard 14 067 for measuring the carbon footprint of products. The assessment was based on 2022 as the baseline year.

Table 1. Summary of project details

Project details	
Client company	Paulig Group
Performing company	RISE Food and Agriculture
Goal	Assessing the carbon footprint of one package of tortilla bread
SKU	Santa Maria Tortilla Original Medium 8PCS
Scope	From cradle to gate to transport (including distribution transport)
Standard for calculation	ISO 14067 Carbon footprint of products
Base year	Production year 2022 from 1st January to 31st of December.

The **functional unit** of the assessment was 1 kg of Santa Maria Tortilla Original Medium 8PCS (SM Tortilla Original) including packaging.

The assessment considered the emissions from cradle-to-gate-to-transport, from primary production to market distribution, including processing, transport, and packaging, as shown in Figure 1. The “gate” refers to the point at which the product leaves the production facility and enters the market supply chain, while the "transport" refers to the movement of the product from the gate to the market.

The carbon footprint contribution from the production plant for the SKU was mass allocated based on the product weight leaving the site, since only tortilla is produced at the site. The results were reported as kg CO2e/kg tortilla. Emissions from market distribution to consumer and grave were excluded, such as consumer transport, energy use at retail, and waste treatment at the consumer level (Figure 1).

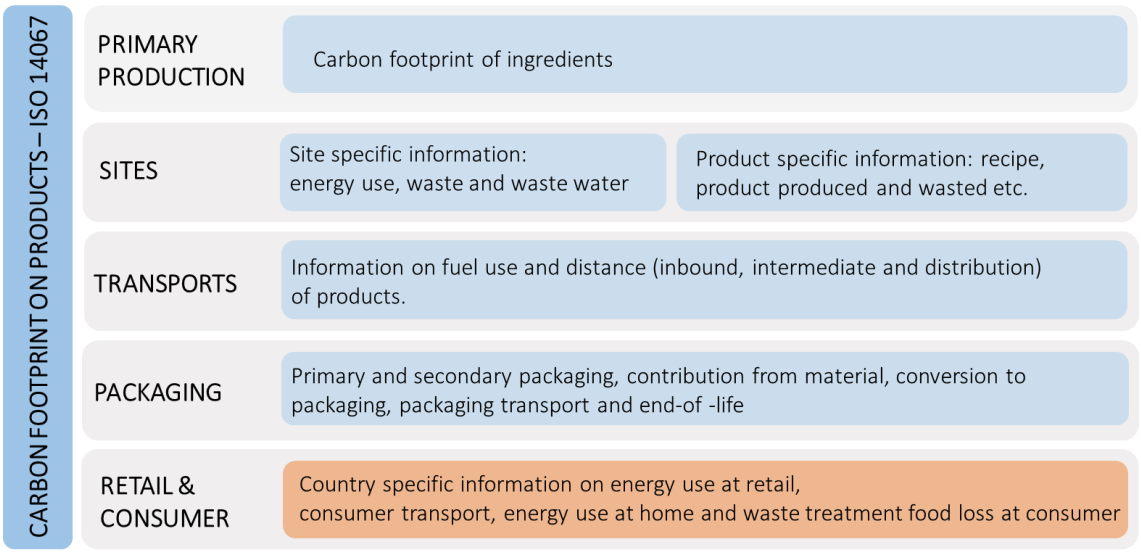

Figure 1. Scope of the accessed system, blue boxes were included, and orange box was excluded.

Cut-offs used in the system, was various waste streams that were either recycled waste, sent to a biogas facility or used as feed. Cut-off was also applied to energy recovery from waste incineration, i.e., the user gets the contribution. Finally, no emissions for water in the recipe have been accounted for.

2 Inventory

The assessment is based on specific data representing the production of SM Tortilla Original supplied by Paulig Group, Table 2. The production site is located in Sweden, Landskrona and emission factors representing Swedish conditions has been chosen. Emissions from the factory is allocated to the SKU by its relative weight percentage to the total production.

RISE provided additional transportation data, including transport distances and vehicle types (Table 2). To determine the transport of ingredients, RISE modelled the distance from the capital of the country of origin to the factory site in Landskrona. Short haul trips (Europe) were modelled diesel-fuelled trucks (NTM), and distances were obtained from Google Maps. For long-haul or overseas trips, a container ship was modelled using NTM, and distances were obtained from Sea-Distances.org. Similar approaches were used for transporting packaging materials to the Landskrona factory and the transportation of SKUs to markets.

Table 2. Summary of data collection including data from Paulig Group, RISE, and emissions factors.

Data inventory	Data collected from Paulig Group	Data added by RISE	Reference for emission factors
Production site	Total amount of tortilla and SKU produced, energy usage and waste generated		Vattenfall[1] (electricity), Swedish energy agency[2] (biogas), Ecoinvent[3] (waste)
Product information	Product size, recipe and origin of ingredients, amount of SKU sold to each market	Transport of each ingredient, from capital of country of origin to Landskrona factory	RISE CDB[4] (ingredients), Ecoinvent[3] (ingredients), NTM[5] (transport)
Packaging	Amount and type of primary, secondary and tertiary packaging, and supplier location	Transport from supplier to Landskrona factory	Ecoinvent[3] (all types), DEFRA[6] (primary), NTM[5] (transport)
Transport of product	Transport to DC, amount of SKU, distance, vehicle, and fuel type	Transport from DC to capital of each market's country	NTM[5] (transport)

[1] Vattenfall, 2020. https://www.environdec.com/library/_?Epd=7468
[2] Swedish Energy Agency, 2022. https://www.energimyndigheten.se/fornybart/hallbarhetskriterier/drivmedelslagen/vaxthusgasutslapp/
[3] Ecoinvent v3.8, 2023. https://ecoinvent.org/the-ecoinvent-database/data-releases/ecoinvent-3-8/
[4] RISE CDB, 2023. https://www.ri.se/sv/vad-vi-gor/expertiser/rise-klimatdatabas-for-livsmedel
[5] NTMCalc Advanced 4.0, 2023. https://www.transportmeasures.org/en/
[6] DEFRA, 2021. https://laqm.defra.gov.uk/air-quality/air-quality-assessment/emissions-factors-toolkit/

3 Results

The carbon footprint for Santa Maria Tortilla Original Medium 8PCS from production to market in 2022 was 0.544 kg CO2e/kg (Table 3). Excluding the market transport was the carbon footprint 0.513 kg CO2e/kg.

Table 3. Climate impact divided on the different life cycle stages for SM Tortilla Original in kg CO2e/kg. IPCC 2021 emission factors with feedback loops. Baseline year 2022.

Area of life cycle	Climate impact (kg CO2e/kg)
Factory	0.01
Ingredients	0.40
Packaging, primary	0.08
Packaging, secondary and tertiary	0.01
Transport, distribution central	0.01
Transport, market	0.03
Total	0.54
Total, gate (excluding transport market)	0.51

Table 4 displays the total carbon footprint for different areas of the life cycle of SM Tortilla original production, including the production at the Landskrona factory, packaging materials and transportation.

Table 4. Total climate impact divided on the different life cycle stages for production of SM Tortilla Original at the Landskrona factory, in tonnes CO2e. IPCC 2021 emission factors with feedback loops. Baseline year 2022.

Area of life cycle	Climate impact (tonnes CO2e)
Factory	66
Ingredients	1 823
Packaging, primary	379
Packaging, secondary and tertiary	59
Transport, distribution central	39
Transport, market	142
Total	2 508
Total, gate (excluding transport market)	2 366

According to Figure 2, the main source of emissions (73 %) in the production of tortillas are the ingredients used to make them. Among these, wheat flour is responsible for 62% of the climate impact, while rapeseed oil and glycerine contribute 21% and 9%, respectively. These three ingredients, along with water, constitute approximately 98% of the weight percentage of the tortilla. The factory has a minor contribution of the carbon footprint compared to the other areas of the life cycle such as the primary packaging and transport to the different markets (Figure 2).

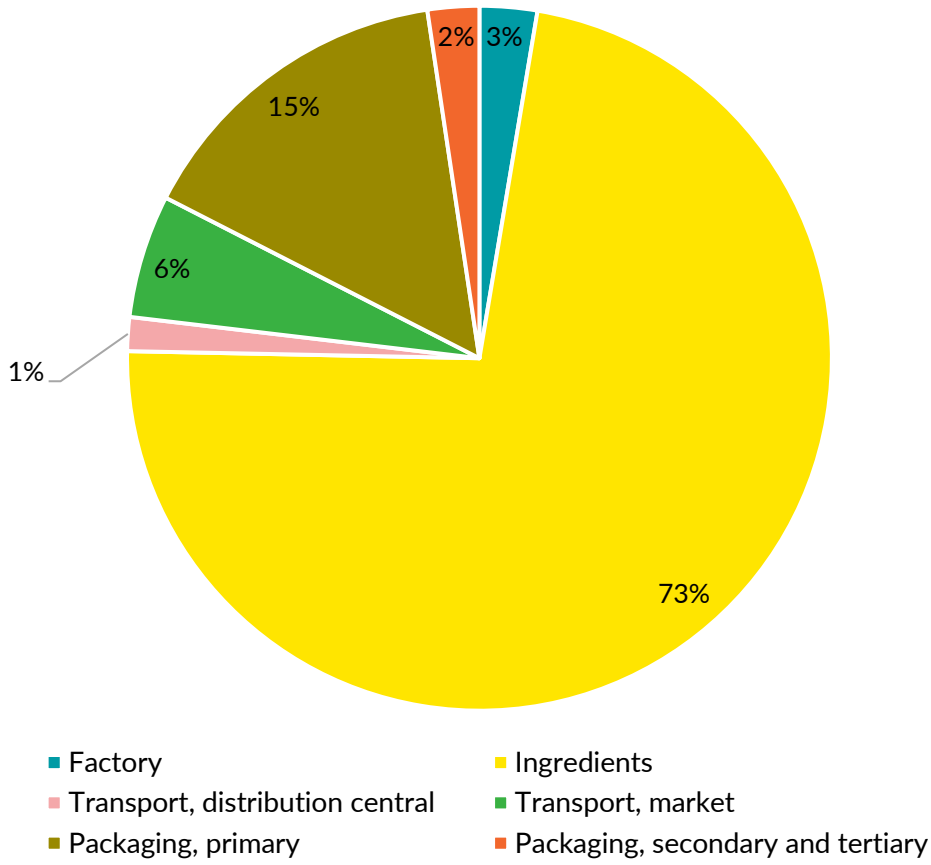

Figure 2. Share of CO2e emission for each different life cycle stages for SM Tortilla Original. Baseline year 2022.

4 References

DEFRA (2021). *Emissions Factors Toolkit*. Available at: https://laqm.defra.gov.uk/air-quality/air-quality-assessment/emissions-factors-toolkit/ (Accessed: 2023-04-24)

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