Supplementary

Optimizing the Environmental Profile of Fresh-Cut Produce: Life Cycle Assessment of Novel Decontamination and Sanitation Techniques

Inventory data for LCA

Table S1. Inventory concerning the reference scenario within the analysis.

Inputs	Units	Value per FU	Data source
Sodium hypochlorite	kg	11.2	[1]
Chlorination infrastructure			[2]
Glass fibre reinforced plastic. polyamide. injection moulded	kg	2.97×10^{-4}	
Polyvinylchloride. bulk polymerised		2.31×10^{-4}	
Polyvinylchloride. suspension polymerised		1.75×10^{-6}	
Blow moulding		2.31×10^{-4}	
Concrete. normal		9.25×10^{-6}	
Steel. unalloyed		1.25×10^{-6}	
Steel. chromium steel 18/8		6.05×10^{-6}	
Wire drawing. copper		1.32×10^{-7}	
Washing water	kg	8.00×10^{-3}	Primary data
Electricity consumption	KWh	$1.63 \times 10^{+2}$	[3]
Outputs	**Units**	**Value per FU**	**Fuente**
Unreacted sodium hypochlorite	kg	2.2	Autho stimation
Wastewater treatment	m^3	8	Primary data

Table S2. Inventory within the NF-PCD scenario.

Inputs	Units	Value per FU	Data source
PCD device			[4]
Wire drawing. copper	kg	1.752×10^{-7}	
Steel. chromium steel 18/8	kg	8.68×10^{-4}	
Filtering membrane	m^2	4.6×10^{-3}	Ecoinvent
Washing water	m^3	4	Primary data
Energy consumption	kWh	98.8	[3,4]; Primary data
Outputs	Units	Value per FU	Data source
PCD device recycling	kg	8.68×10^{-4}	[4]
Membrane disposal	kg	4.984×10^{-3}	Ecoinvent
Wastewater treatment	m^3	4	Primary data

Table S3. Inventory of the washing process within the NF-AgNP scenario.

Inputs	Units	Value per FU	Data source
Filtering membrane	m^2	4.6×10^{-3}	[4]
AgNP	kg	8.28×10^{-5}	[5]
Washing water	kg	4053	Primary data
Energy consumption	kWh	83.8	[3]; Primary data

Outputs	Units	Value per FU	Data source
Membrane disposal	kg	4.984×10^{-3}	Ecoinvent
Wastewater treatment	m^3	4.053	Primary data

Table S4. Inventory regarding the manufacturing of AgNP for the NF-AgNP scenario. modeled from [5].

Inputs	Units	Value per FU
Oxygen	kg	2.77×10^{-3}
Methane	m^3	1.93×10^{-4}
Water	kg	5.20×10^{-3}
Silver	kg	8.36×10^{-5}
Xylene	kg	5.21×10^{-4}
Electricity consumption	KWh	2.08×10^{-3}
Outputs	**Units per FU**	**Value**
Air emmisions		
Nitric oxide	kg	3.20×10^{-5}
CO_2	kg	3.63×10^{-3}
Water emmisions		
Water	kg	1.39×10^{-3}
Wastewater	m^3	5.22×10^{-6}

Table S5. Inventory for the UF scenario.

Inputs	Units	Value per FU	Data source
Filtering membrane	m^2	2.3×10^{-3}	[4]
Washing water	kg	4000	Primary data
Energy consumption	kWh	81.4	[3]; Primary data
Outputs	**Units**	**Value per FU**	**Data source**
Wastewater treatment	m^3	4.000	Primary data

Table S6. Inventory concerning the cellulose acetate production. obtained from [6].

Inputs	Units	Value per FU
Corn starch	kg	1.09×10^{-3}
Acetic acid	kg	3.72×10^{-4}
Water	kg	9.30×10^{-3}
Sulfuric acid	kg	3.72×10^{-5}
Acetic anhydride	kg	7.44×10^{-4}
Electricity consumption	kWh	2.42×10^{-4}
Steam	kg	2.79×10^{-3}

Table S7. Inventory for the manufacturing on cellulose acetate membrane. modeled from [6].

Inputs	Units	Value per FU
Glass-reinforced plastic	kg	2.28×10^{-4}
Stainless Steel	kg	2.24×10^{-4}
High-density polyethylene	kg	1.52×10^{-3}
Cast iron	kg	1.56×10^{-4}
Polyurethane	kg	1.44×10^{-4}
Polyvinyl chloride	kg	1.20×10^{-4}
Rubber	kg	2.00×10^{-5}
Polypropylene	kg	1.20×10^{-5}
Polyethylene	kg	1.20×10^{-5}
Cellulose acetate	kg	3.72×10^{-4}
Electricity	kWh	1.56×10^{-2}
Heat from natural gas	MJ	3.00×10^{-2}
Organic solvent	kg	7.60×10^{-4}
Glycerol	kg	1.84×10^{-4}
Water for Backwashing	kg	$1.00 \times 10^{+1}$
Chitin	kg	1.86×10^{-5}

Table S8. Inventory concerning chitin production. derived from [7].

Inputs	Units	Value per FU
Dried crab residue	l	9.17×10^{-5}
Water	kg	5.58×10^{-3}
Electricity consumption	kWh	2.23×10^{-5}
Heat from natural gas	MJ	3.23×10^{-3}
Factory land occupation	M2a	1.30×10^{-6}
Factory infrastructure	p	7.44×10^{-15}
Outputs	**Units**	**Value per FU**
Protein paste byproduct	kg	5.28×10^{-5}
Fossil CO_2 emmisions	kg	1.69×10^{-5}
Wastewater treatment	l	5.89×10^{-3}

References

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