**Supplementary material to *"Unveiling the environmental costs of lignocellulosic film production with ionic liquids: The case of 1-ethyl-3-methylimidazolium acetate."***

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**Contents**



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**Supplementary information S1: LCA inventories**

**Table S1-1. Inventory data of the foreground production system. 1-ethyl-3-methylimidazolium acetate (ionic liquid).**

| **Products** | **Amount** | **Unit** |
|---|---|---|
| *Outputs to technosphere: Products and co-products* | | |
| 1-ethyl-3-methylimidazolium acetate | 1.00 | kg |
| **Inputs** | **Amount** | **Unit** |
| *Inputs from technosphere: materials/fuels* | | |
| Dimethyl carbonate | 0.53 | kg |
| Acetic acid, 98% solution state | 0.09 | kg |
| 1-ethylimidazole [1] | 0.57 | kg |
| *Inputs from technosphere: electricity/heat* | | |
| Electricity, high voltage | 0.19 | kWh |
| Heat, district or industrial, natural gas | 6.20 | MJ |
| **Outputs** | **Amount** | **Unit** |
| *Emissions to air* | | |
| Carbon dioxide, process | 0.13 | kg |
| *Outputs to technosphere: Waste treatment* | | |
| Wastewater | 0.05 | kg |

**Table S1-2. Inventory data of the foreground production system. Dope solution.**

| **Products** | **Amount** | **Unit** |
|---|---|---|
| *Outputs to technosphere: Products and co-products* | | |
| Dope solution | 1.00 | kg |
| **Inputs** | **Amount** | **Unit** |
| *Inputs from technosphere: materials/fuels* | | |
| Cellulose fibre | 0.08 | kg |
| Lignin [2] | 0.01 | kg |
| Dimethyl sulfoxide | 0.21 | kg |
| 1-ethyl-3-methylimidazolium acetate | 0.70 | kg |
| *Inputs from technosphere: electricity/heat* | | |
| Electricity, high voltage | 1.58 | kWh |
| **Outputs** | **Amount** | **Unit** |
| *Outputs to technosphere: Waste treatment* | | |
| Wastewater | 0.05 | kg |

**Table S1-3. Inventory data of the foreground production system. Lignocellulose film.**

| **Products** | **Amount** | **Unit** |
|---|---|---|
| *Outputs to technosphere: Products and co-products* | | |
| Lignocellulosic film | 1.00 | kg |
| *Outputs to technosphere: Products and co-products* | | |
| 1-ethyl-3-methylimidazolium acetate | 8.06 | kg |
| Dimethyl sulfoxide | 2.41 | kg |
| **Inputs** | **Amount** | **Unit** |
| *Inputs from technosphere: materials/fuels* | | |
| Dope solution | 11.49 | kg |
| Water, deionised | 1137.95 | kg |
| *Inputs from technosphere: electricity/heat* | | |
| Electricity, high voltage | 568.51 | kWh |
| **Outputs** | **Amount** | **Unit** |
| *Outputs to technosphere: Waste treatment* | | |
| Wastewater | 1137.95 | kg |

**Supplementary information S2: LCA comparison of produced lignocellulose film and commercial cellophane**

**Table S2-1. LCA results. Lignocellulose thin film vs Cellophane production.**

| **Impact Category** | ***Lignocellulose film*** | ***Cellophane*** [3] |
|---|---|---|
| GWP | 183 kg $CO_2$ eq/kg film | 5.94 kg $CO_2$ eq/kg film* |
| Human Health | $2.94 \times 10^{-4}$ DALY/kg film | $8.02 \times 10^{-6}$ DALY/kg film* |
| Ecosystem Quality | $8.08 \times 10^{-7}$ species.yr/kg film | $2.99 \times 10^{-8}$ species.yr/kg film* |
| Resource Scarcity | 20.3 $USD_{2013}$/kg film | $2.62 \times 10^{-4}$ $USD_{2013}$/kg film* |

* Assuming a unit weight of 36.9 g $m^2$ of cellophane [4].

**References**


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