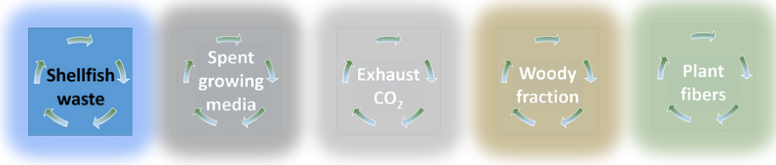
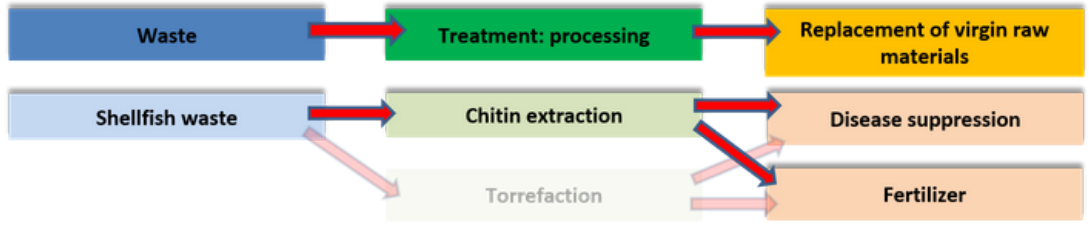
VALORISATION CHAIN 2

Production of chitin from shrimp shells



BASELINE SCENARIO

In the North Sea alone, 20,000 tons of brown shrimp are caught per year. Two thirds of the shrimp shells end up in the garbage, so there is only limited valorization of the shrimp shells.



NEW SOLUTION 1

Chitin can be extracted by chemical or enzymatic treatment from the shrimp shells and can then be used as an amendment in growing media.

Watch the video, read the scientific paper, try out the decision tool or check the website for more relevant information.

STRENGTHS

- Shrimp shells have a simple matrix
- Production of chitin is easy and relatively cheap: enzymes for extraction are not expensive and easy extraction procedure (but not green)
- Easy to implement at large scale
- Starts from a residual material (i.e., not from purpose-built insect farming)

WEAKNESSES

- Shells not locally available: peeling activities outside the project area
- Highly priced waste material: 300 euro/100 kg
- Other (potential) applications for shells: demand higher than supply
- Chitin characterization difficult (molecular weight & deacytilation)
- Chitin purity and activity depend on extraction method & are difficult to measure
- Low yield of extraction: chemically max. 20%, enzymatically max 10%
- Environmentally unfriendly production

OPPORTUNITIES

- Stimulation of local peeling
- Shells purer material than whole Chinese Mitten Crab
- Using phosphoric acid produces chitin with high P-content: N and P fertilizer
- Possibility to transfer process to other shellfish 'waste' material
- Procedure for green extraction
- High potential for chitin valorization in other fields (food, industry, ...)
- Enzymatic extraction process generates liquid fraction rich in peptides, minerals and astaxanthin

THREATS

- Use of chemical products
- Risk for insufficient amounts of feedstock for chitin if all valorization routes are implemented

This project has received funding from the Interreg 2 Seas programme 2014-2020 co-funded by the European Regional Development Fund under subsidy contract No 2S03-046.
Both the Province of Antwerp and the Province of East-Flanders are co-funding ILVO for this project.

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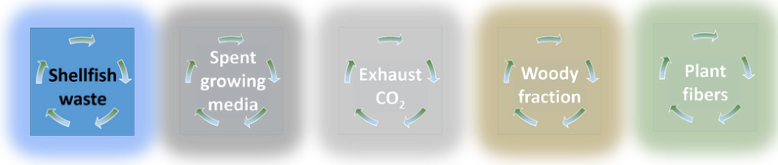

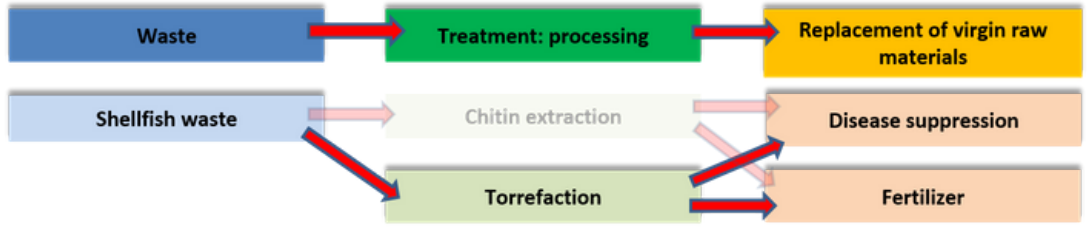

BASELINE SCENARIO

In the North Sea alone, 20,000 tons of brown shrimp are caught per year. Two thirds of the shrimp shells end up in the garbage, so there is only limited valorization of the shrimp shells.

NEW SOLUTION 2

Shrimp shells can be treated thermally (torrefaction) and then be used as chitin amendment in growing media.

Watch the video, read the scientific paper, try out the decision tool or check the website for more relevant information.

STRENGTHS

- Cheap processing and stabilization
- May also act as a liming agent and as a source of other nutrients than N

WEAKNESSES

- Limited effects at higher temperatures: slow N release and lower disease suppression effect compared to chemically extracted chitin
- May also act as a source of salts

OPPORTUNITIES

- High extraction yield on dry matter basis (yield > 70%)

THREATS

- Thermal treatment at temperatures higher than 250°C may induce thermal decomposition of chitosan and chitin

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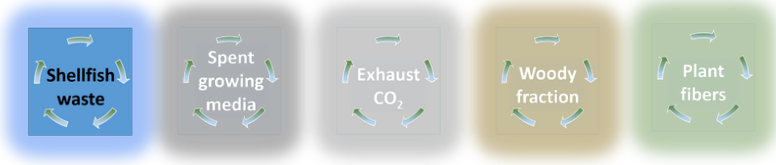

BASELINE SCENARIO

In the North Sea alone, 20,000 tons of brown shrimp are caught per year. Two thirds of the shrimp shells end up in the garbage, so there is only limited valorization of the shrimp shells.

NEW SOLUTION 3

Shellfish waste can be simply ground and then directly used as amendment in the soil/growing medium. This scenario has not been tested in the Horti-BlueC project.

Watch the video, read the scientific paper, try out the decision tool or check the website for more relevant information.

STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
• Cheap processing method • May also act as a liming agent and as a source of other nutrients than N	• No data on N release • No data on effects on disease suppression • May also act as a source of salts		• Legal status of untreated shellfish waste to be directly used as soil amendment?

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