

Whole crop valorization and process innovation for a circular and sustainable hemp-based bioeconomy



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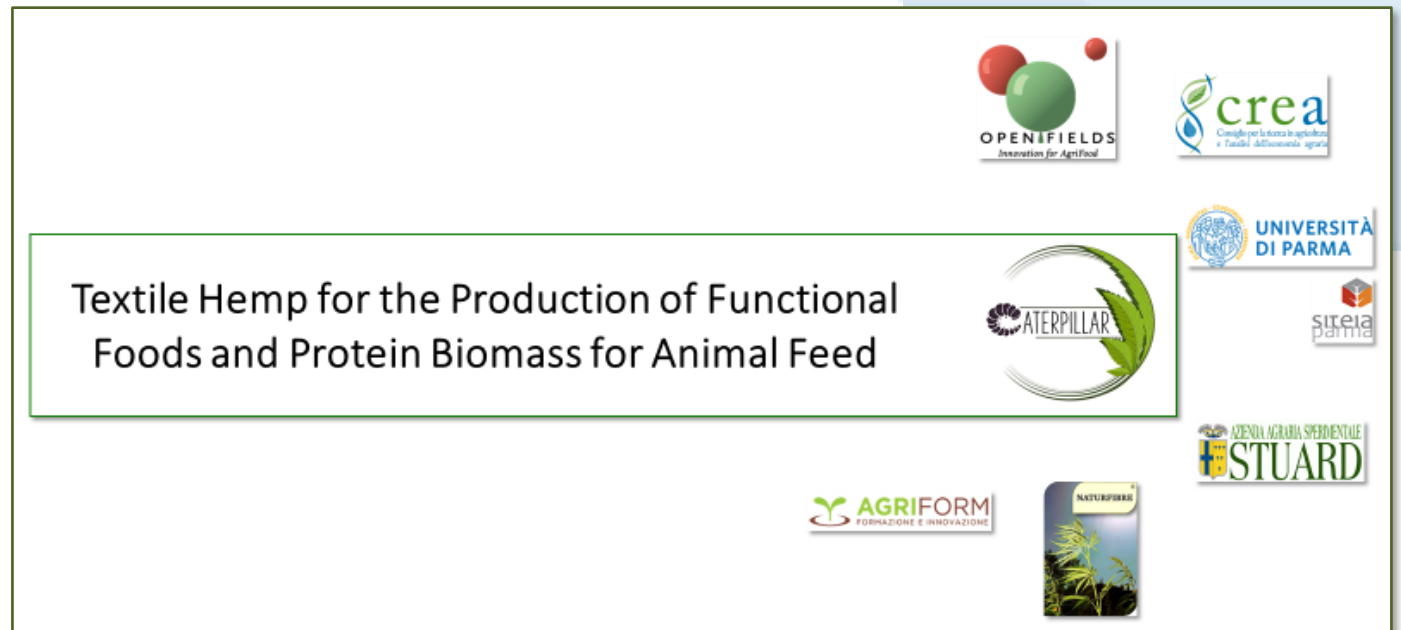
Rural development 2014-2020
for Operational Groups
(Art 56 of Reg.1305/2013)




Cannabis waste - Food reuse
and Energy Bio-valorisation of Oils

SCARABEO 

Logos: AZIENDA AGRARIA SPERIMENTALE STUARD, crea, UNIVERSITÀ DI PARMA, sifeia parma, UNIVERSITÀ CATTOLICA del Sacro Cuore, CENTRO DI FORMAZIONE SPERIMENTAZIONE E INNOVAZIONE VITTORIO TADINI S.C.A.R.L., SSICA

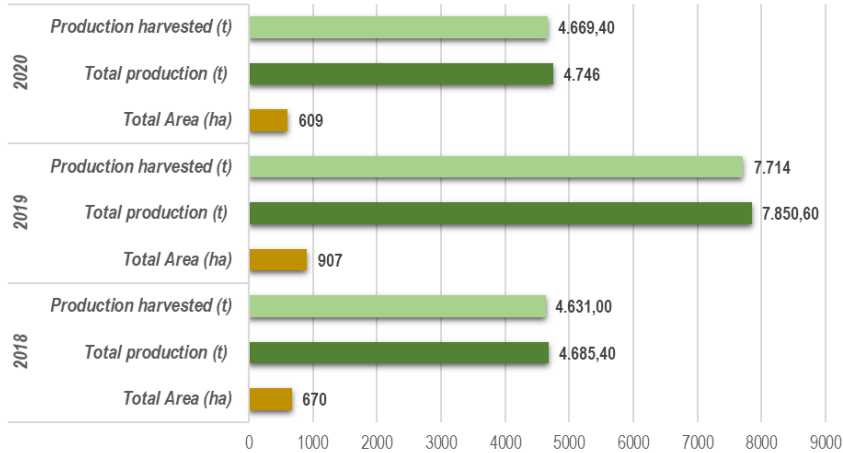


Textile Hemp for the Production of Functional
Foods and Protein Biomass for Animal Feed

ATERPILLAR 

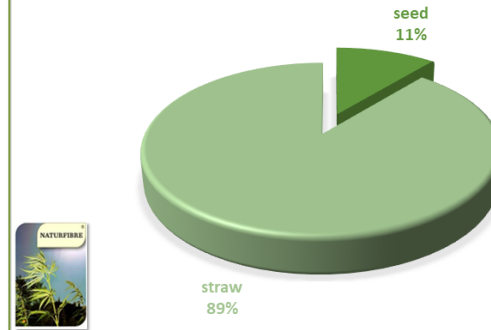
Logos: OPENIFIELDS, crea, UNIVERSITÀ DI PARMA, sifeia parma, AZIENDA AGRARIA SPERIMENTALE STUARD, AGRIFORM FORMAZIONE E INNOVAZIONE, SACTURPAPER

Hemp cultivation dataset 2018-2020 -ITALY

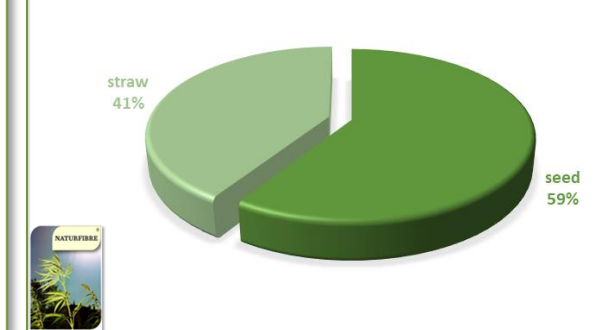


<http://dati.istat.it/Index.aspx?QueryId=33707#>

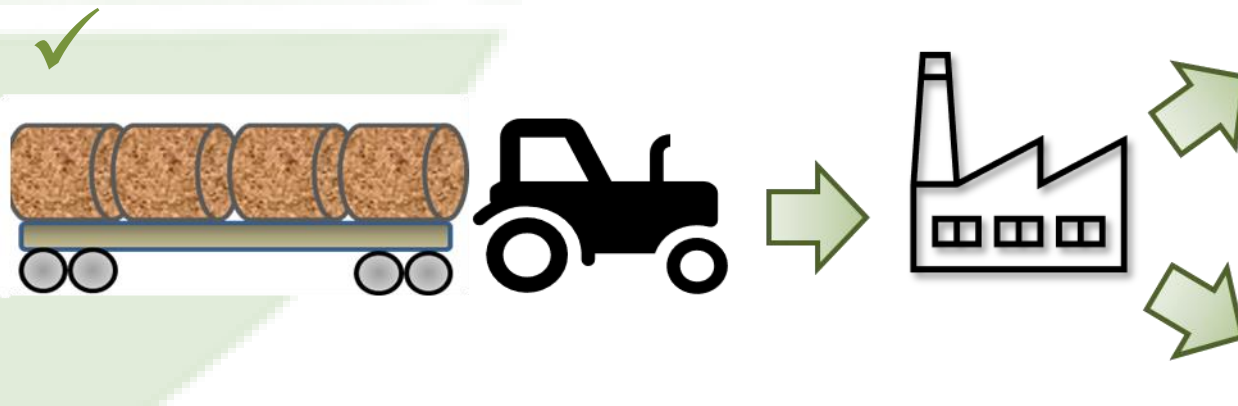
PRODUCTION



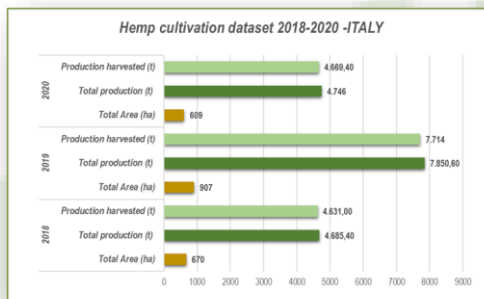
REVENUES



Crop under-exploitation



First transformation centralization



<http://dati.istat.it/Index.aspx?QueryId=33707#>



Active involvement and coaching of organic farms residing in inland areas



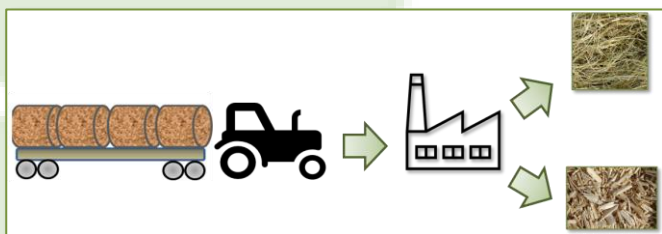
Valorization of crop products
(long textile fibres)

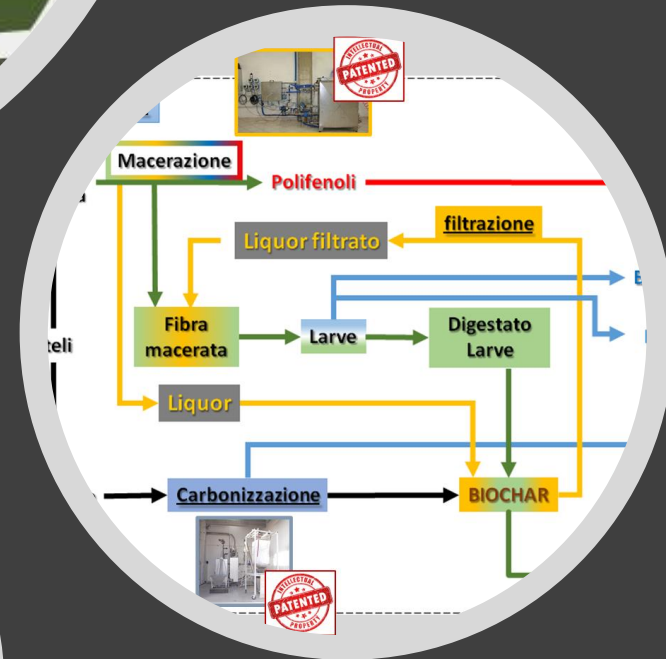
Valorization of crop by-products
(hurds)

Valorization of processing waste

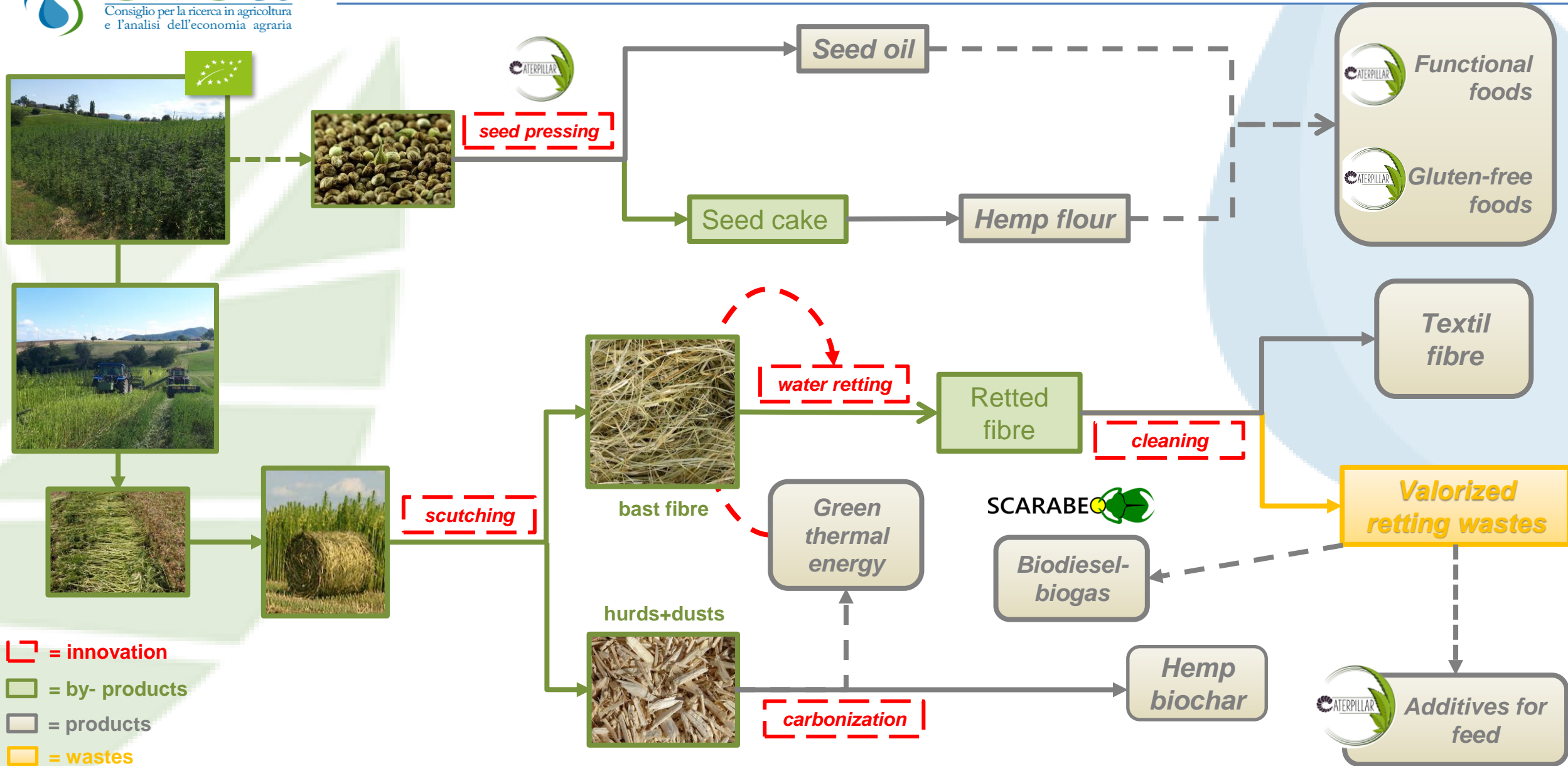


First transformation decentralization





Whole crop exploitation and agro industrial chain **innovation** to increase **sustainability** and **crop profitability** in a circular economy perspective



Innovation points

- scutching
- water retting
- cleaning
- carbonization



scutching



water retting



Retted fibre

cleaning

Textil fibre

Valorized retting wastes



Biodiesel-biogas

Green thermal energy

hurds+dusts

carbonization

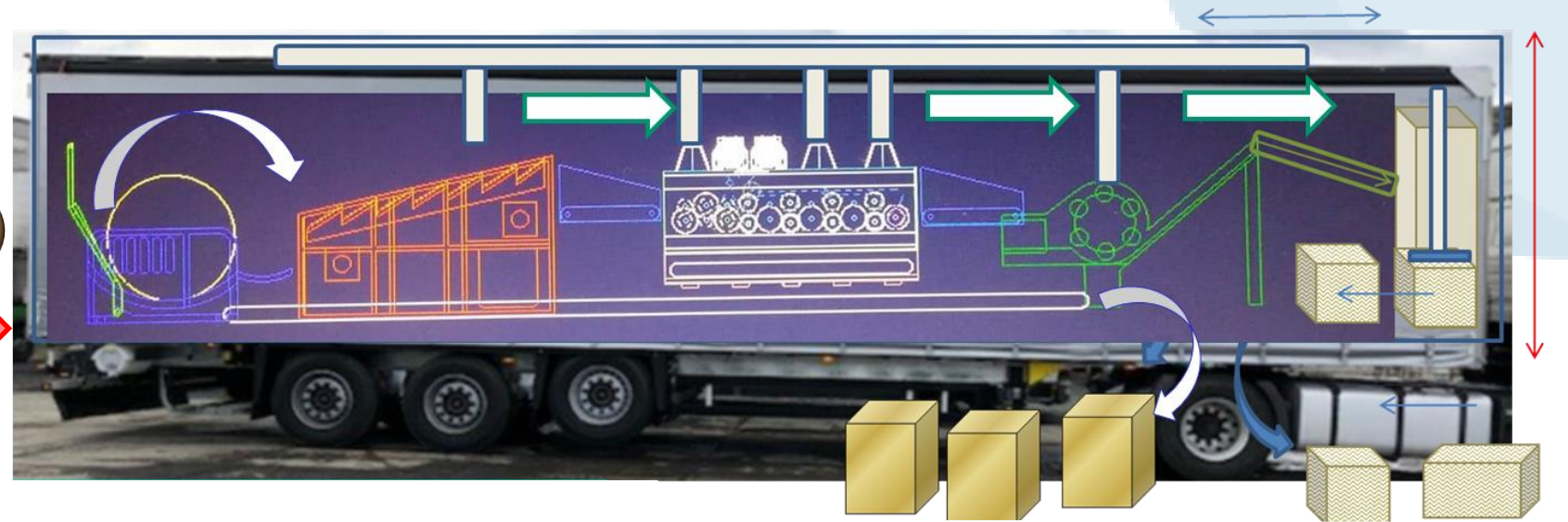
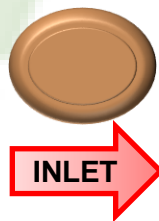
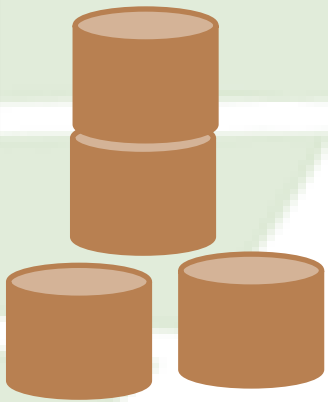


Hemp biochar



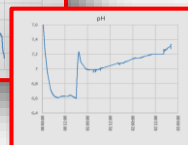
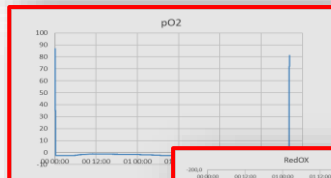
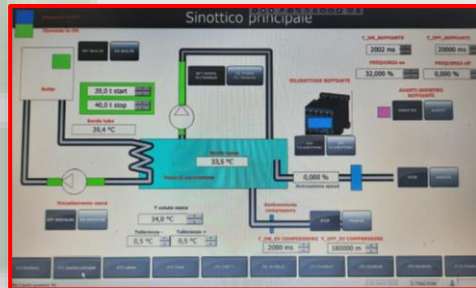
Additives for feed

- = innovation
- = by- products
- = products
- = wastes



HURDS OUTLET

BAST FIBRE OUTLET

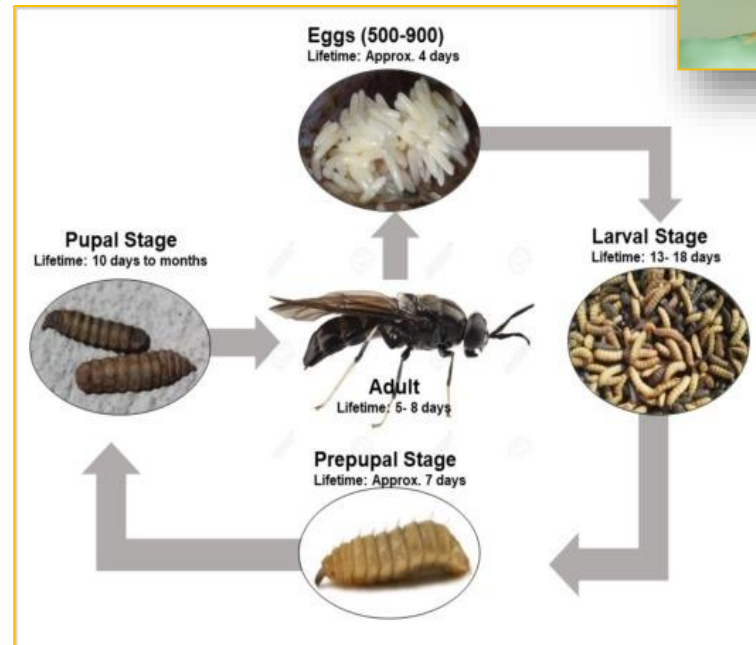
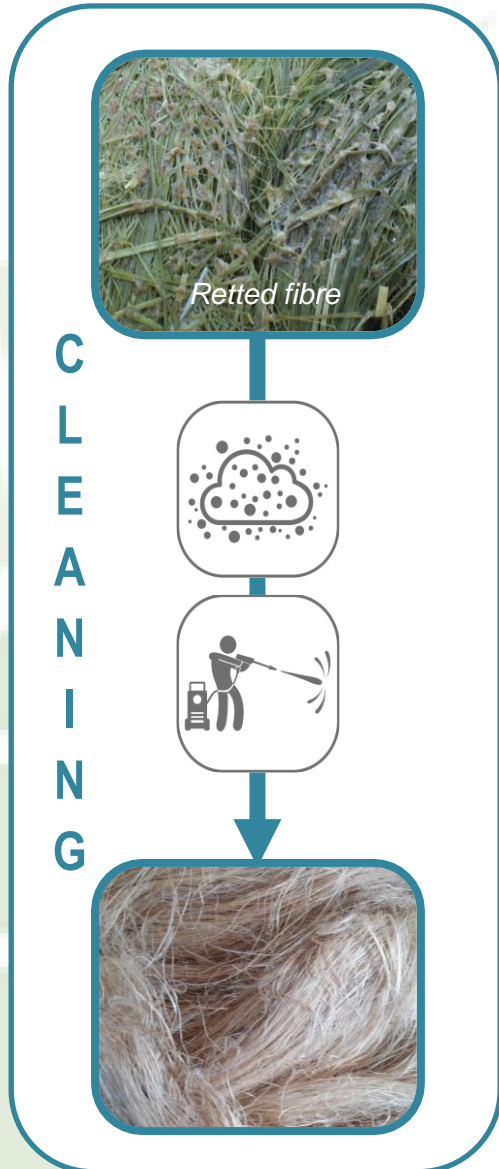


Outcomes

- ✓ *Drastic reduction of retting times (3 d)*
- ✓ *Increase in long fiber yield*
- ✓ *Increase in fiber quality (for textil uses)*

Externalities

- ✓ *Free of soil microbiological contamination*



Hermetia illucens



BSF larvae growing on retted hemp

Known as “Black Soldier Fly” (BSF) in the larval stages eagerly feeds on organic matter, growing very rapidly

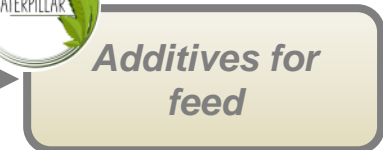
FIBER CLEANING SYSTEM

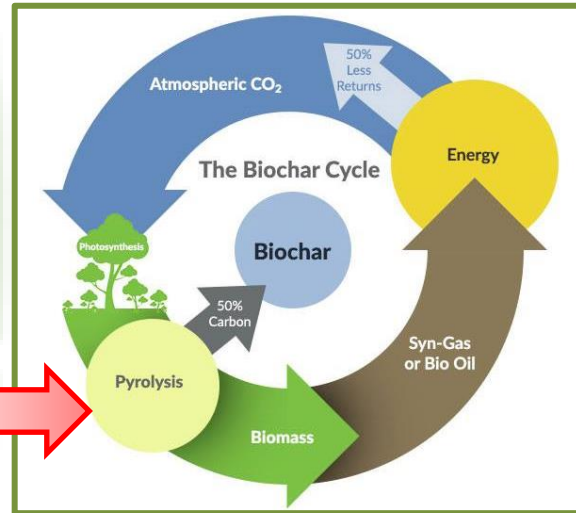


BSF growing system



Valorized retting wastes





Outcomes:

- ✓ **Green energy production**
- ✓ **New market opportunities**
- ✓ **Carbon credits**

Externalities:

- ✓ **Atmospheric CO₂ sequestration**
- ✓ **Contrast to soil degradation**
- ✓ **Improvement of soil water retention**

Inlet: 17-20 kg/h biomass (moisture content 20-80%)

Energy power: 8-10 KW

Thermal power: 100-120 KW


Biochar yield: 15-20%



SITEIA
Barma

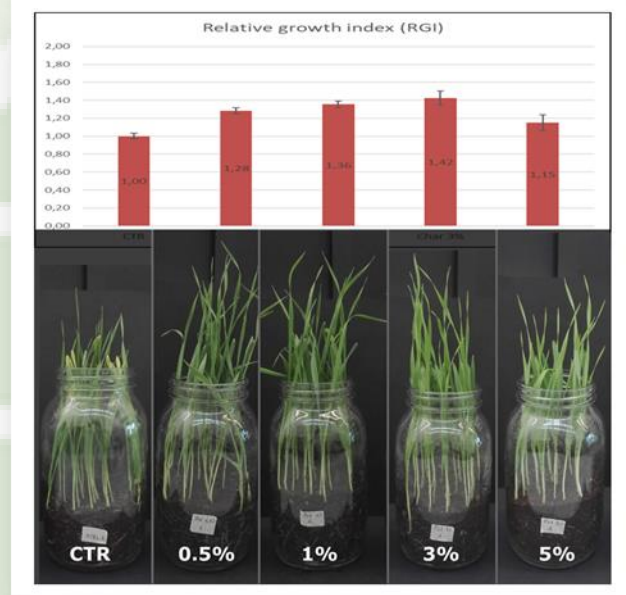


Caratteristiche del biochar da canapulo	
pH	11,44
CE	2,76 mS/cm
Densità apparente	0,19 g/cm ³
Sostanza organica	83,5%
Sostanza secca	93,8%
Contenuto metalli	Entro i limiti
Contenuto IPA	4,1 mg/kg
Classe	P4 idoneo all'uso agricolo





SUITABLE FOR AGRICULTURAL USES





seed pressing

Seed oil

Seed cake

Hemp flour



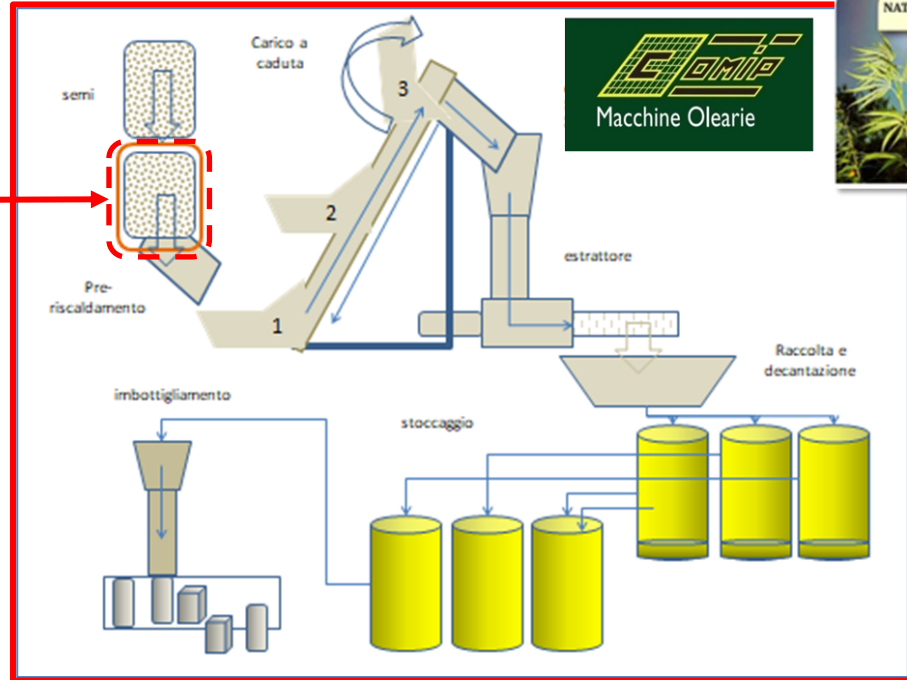
Functional foods



Gluten-free foods

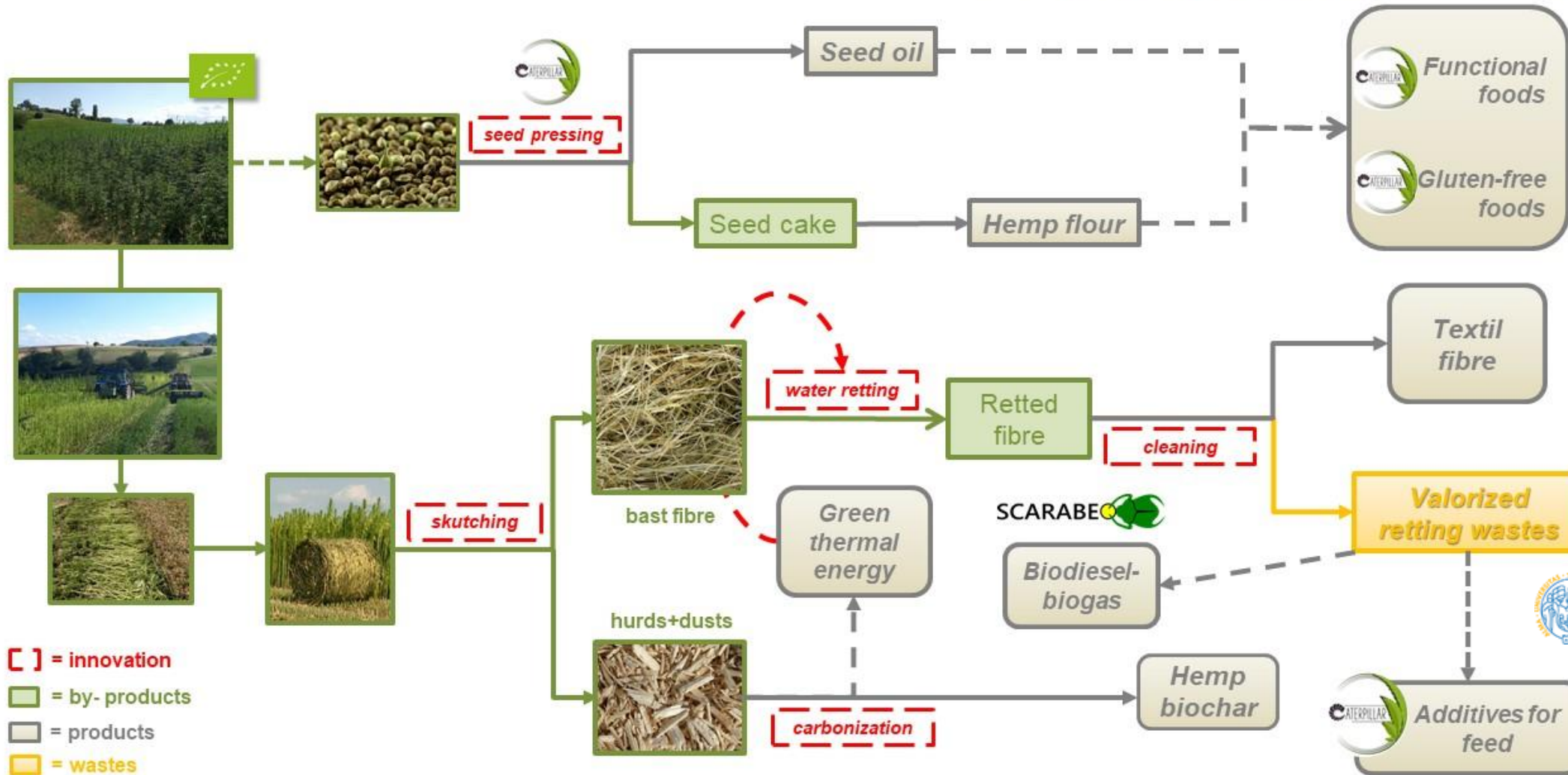


pre-warming system



- = innovation
- = by- products
- = products
- = wastes

the pilot agro-industrial chain





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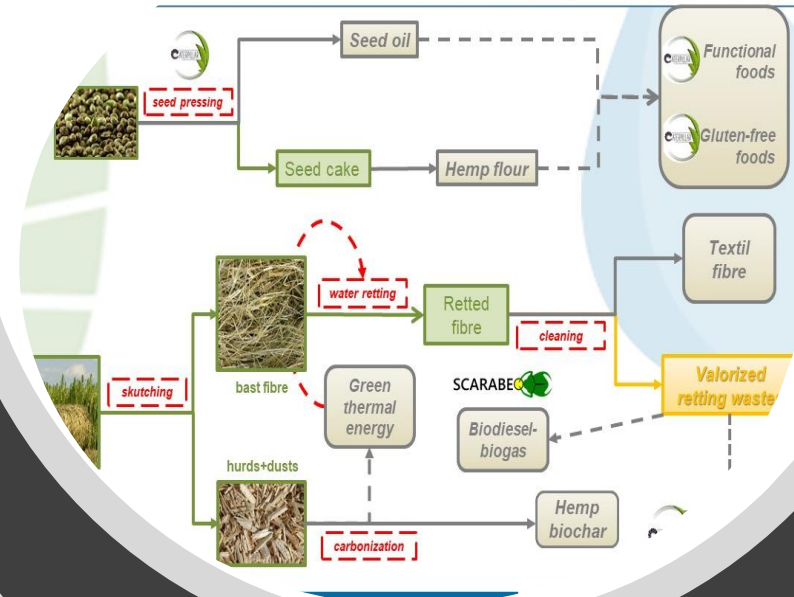
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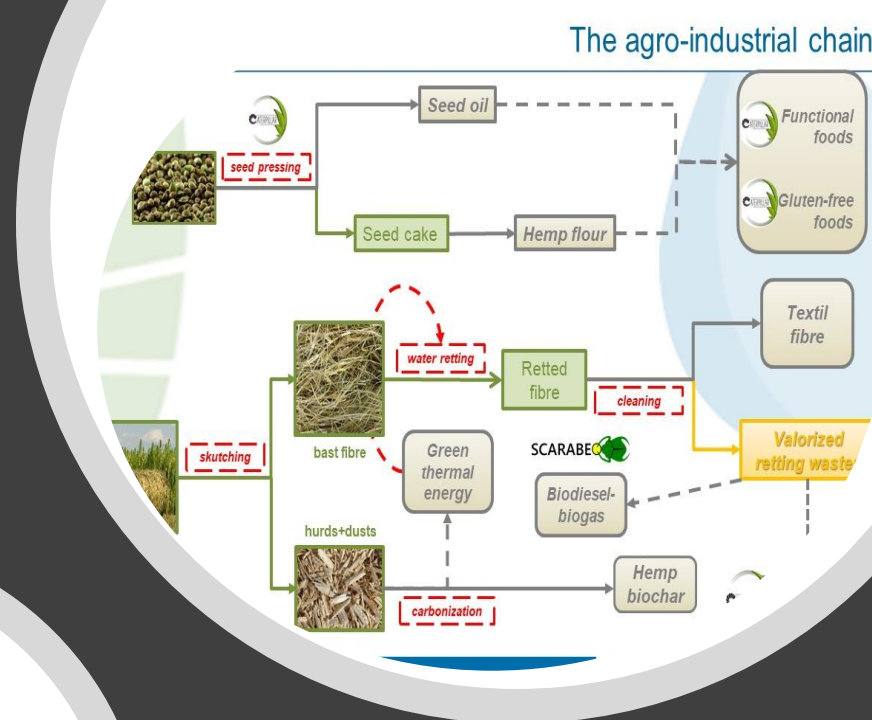


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Azienda Agricola Binelli Bruno e Ugo e C. s.s.
Società Agricola Valentina e Federico Rossi s.s.



The agro-industrial chain





<https://ec.europa.eu/eip/agriculture/en/find-connect/projects/canapa-tessile-la-produzione-di-alimenti>

<https://ec.europa.eu/eip/agriculture/en/find-connect/projects/scarti-di-canapa-riutilizzi-alimentari-e>



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