





## Chicken: from soy and insects to eggs and meat

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### **DIL OVERVIEW: FACTS AND FIGURES**



- Founded 1983
- Employees 200
- Locations
   Quakenbrück (GER), Brussels (BEL), Karlsruhe (GER), Berlin (GER),
- Legal status registered association



#### **DIL MEMBERS: OUR GREATEST REFERENCE**

105

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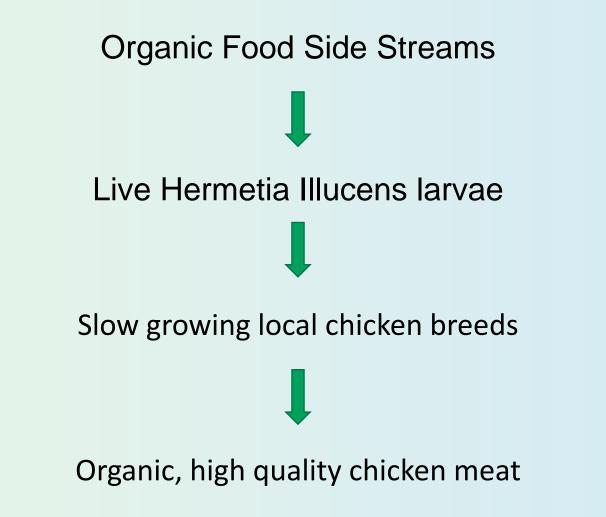


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Dusan Ristic - Food Data Group, DIL

### **POULTRYNSECT – PROJECT OVERVIEW**





### **POULTRYNSECT – PROJECT OVERVIEW**



#### Project objectives:

- 1. Optimization of *Hermetia Illucens* diet
- 2. Valorization of agronomic potential of the frass
- 3. Finding out the optimal level of *Hermetia Illucens* larvae in chicken diet
- 4. Larval influence on the bird welfare status
- 5. The impact of larvae bioactive compounds on chicken gut
- 6. Larval influence on poultry meat quality

## 7. The environmental impact of the chicken meat

#### SOY OR INSECTS? CHICKEN OR EGGS?



- Protein of animal origin high environmental costs
- Can we use insects to minimize the use of resources?
- How can we get the most protein from chicken production?

#### **LCA STAGES**



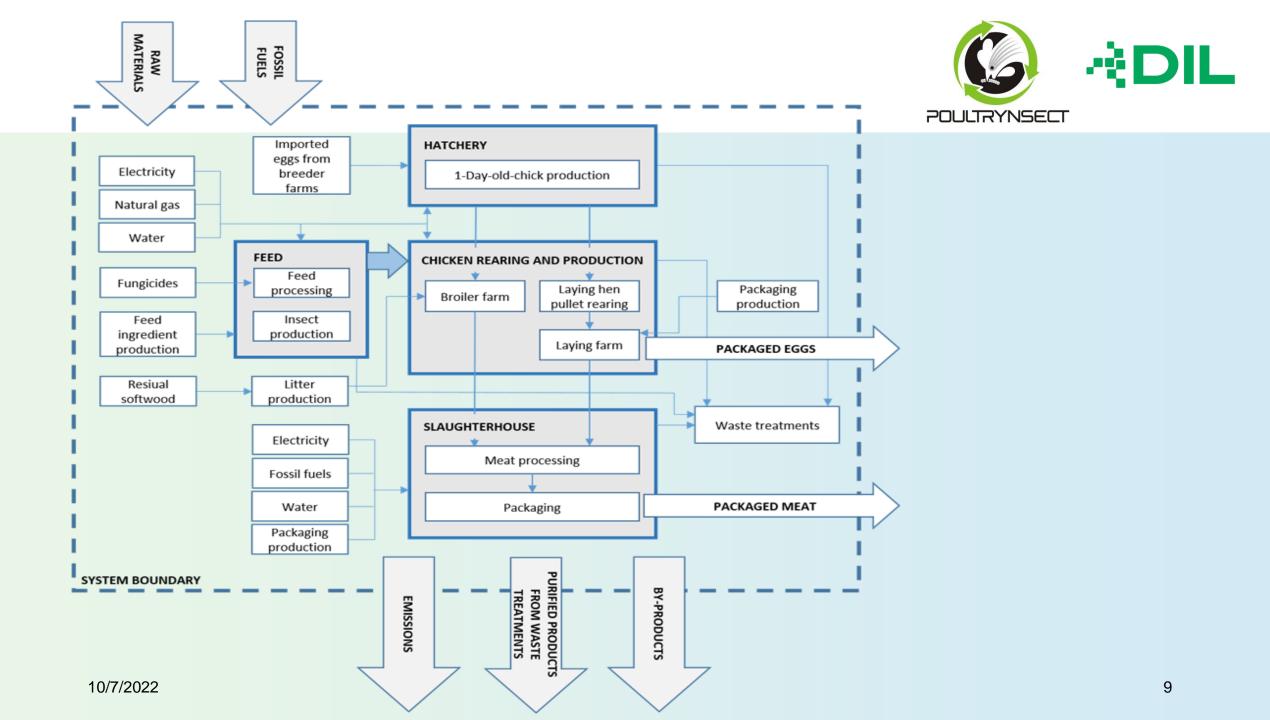


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- Environmental impact and efficiency of 2 types of chicken protein production
- Chicken were considered to be fed with and without 10% inclusion of insects into feed
- Insects were considered to be fed on 2 different diets
- 6 different scenarios were considered, 3 for each protein production system
- It was hypothesized that environmental footprint of protein production can be lowered by inclusion of insects into the commercial feed





- The data were collected from the literature, mostly:
  - 1. Dekker et al. (2011) (Netherlands) for laying hen production and
  - 2. González-García et al. (2014) (Portugal) for broiler production)
- Calculations were done in SimaPro 8.5.2.0 (PRé Consultants, Netherlands)
- Background data were taken from the ecoinvent 3 (ecoinvent, Switzerland) and Agri-footprint (Agri-footprint, Netherlands) database.
- The LCA was developed using a modular and attributional approach

#### **INVENTORY ANALYSIS**



- Methodology IMPACT 2002+
- Adapted to the DIN EN ISO 14044:2006
- Two functional units:
  - 1. Protein conversion ratio, FU1 amount of chicken protein that can be produced with 20t of feed protein.
  - 2. Functional unit, FU2 estimation of production of 1 kg of chicken protein.

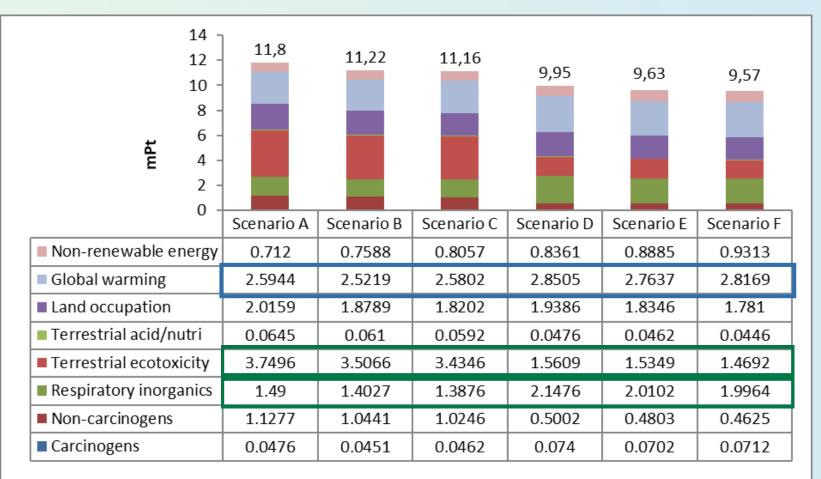


			BSFL protein, fed with Gainesville diet (t)	BSFL protein, fed with fruit and vegetable waste (t)	produced
Scenarios					(kg)
A	Egg production	20			
В	Egg production	18	2		8,335.75
С	Egg production	18		2	
D	Broiler production	20			
E	Broiler production	18	2		9,135.456
F	Broiler production	18		2	

Protein conversion efficiency: 2.4 for laying hens and 2.24 for broilers.

#### LCA RESULTS

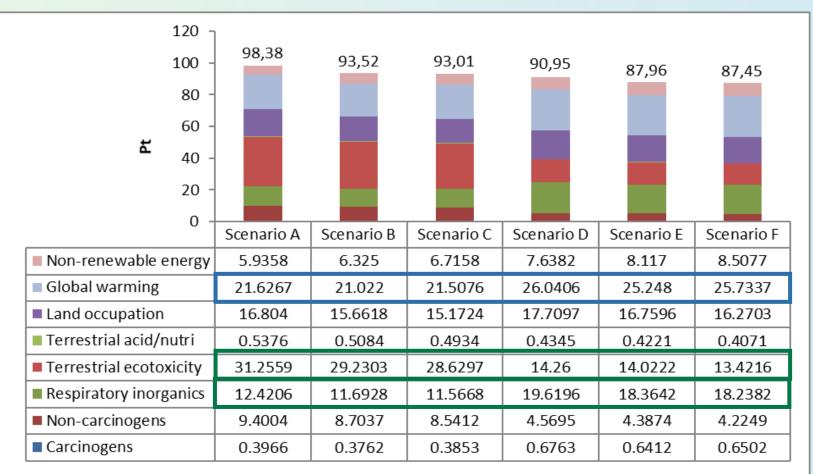




Comparing processes; FU2: 1 kg produced chicken protein Method: IMPACT 2002+ V2.14 / IMPACT 2002+ / Single score

#### **LCA RESULTS**





#### Comparing processes; FU1: use of 20 t of feed protein Method: IMPACT 2002+ V2.14 / IMPACT 2002+ / Single score



- Egg and chicken meat protein are of different quality
- Digestible Indispensable Amino Acid Score (DIAAS), determined by amino acid sequence and digestibility, is recommended as a measure of protein quality
- DIAAS of egg protein is 116.4 and of chicken meat protein 108.2
- Protein conversion efficiency was corrected accordingly: to 2.06 in laying hen production and to 2.07 in broiler chicken production.

#### 16

- Broiler production has slightly higher protein efficiency than egg production
- Laying hen production achieved higher single score results than broiler production
- Higher quality of egg protein compensates for the difference in protein conversion efficiency
- The production of feed has by far the largest share of the environmental impact of the entire production
- Decrease of environmental impact due to introduction of larvae:

Decrease in		Larvae fed
environmental impact	Larvae fed	on fruit
achieved by	on	and
introduction of HI larvae	Gainesville	vegetable
into the diet of:	diet	waste
Laying hens	5%	5.50%
Broilers	3.30%	3.80%



#### CONCLUSIONS

#### ACKNOWLEDGEMENTS



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# Thank you for your attention!

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