

# Projektpresentation

Green Valleys er et 3-årigt EU-projekt, hvis formål er at etablere en udviklingsplatform for bioraffinering. Projektet skal via demonstrationsanlæg ved Töreboda i Västra Götaland og ved Foulum i Midtjylland demonstrere, hvordan raffinering af biomassen fra græsmarker kan levere bæredygtigt producerede energiprodukter og proteiner.

Gennem et svensk-dansk forskningssamarbejde kommer vi også til at påvise hvordan cirkulær grøn bioøkonomi kan udgøre et hidtil uudnyttet potentiale for landbruget. Vi undersøger klima og miljøfordele ved regionalt dyrkede græsafgrøder, hvor græsset forarbejdes til bæredygtig energi og foder af høj kvalitet.

# Projektpresentation

Green Valleys är ett treårigt EU-projekt med mål att etablera en utvecklingsplattform för bioraffinering. Med en anläggning i Töreboda, Västra Götaland och en i Foulum, Midtjylland kommer vi demonstrera hur bioraffinering kan utnyttja gräsmarker till att leverera hållbart producerade energiprodukter och proteinfoder.

Genom ett svensk-danskt forskningssamarbete kommer vi kunna visa på hur cirkulär grön bioekonomi kan utnyttja lantbrukets potential. Vi undersöker klimat- och miljönyttan i regionalt odlade vallgrödor där gräset förädlas till hållbar energi och högvärdigt foder.

## Task 4.2 Optimisation of harvest- and storage systems of herbage for efficient use of energy and protein of the biorefined products

- Responsible: SLU in close collaboration with Västra Götaland Region Naturbruksförvaltning and AU Foulum
- Data for system calculations by Chalmers
- Hushållningssällskapet Sjuhärad and SEGES will disseminate the results.
- Skive municipality will share with us their experiences from their biorefinery utilising grass.

# Grass-clover forage for wilting and ensiling

- First cut June 4-5 2019 of a sward of timothy, meadow fescue, perennial ryegrass and red and white clover

## Wilting treatments

- Direct cut 15% DM ensiled June 4
- Wilted to 26% DM ensiled June 4
- Wilted to 49% DM ensiled June 5



# Experimental Design

- First cut June 4-5, 2019 of a sward of timothy, meadow fescue, perennial ryegrass and red and white clover

*For each of the wilting treatments:*

## Additive treatments

- Control wo additive
- Inoculant of homofermentative LAB
- Salt-based additive
- Acid
- 4 replications (silos) per treatment
- A total of 48 silos



# Experimental Design

- Second cut July 18, 2019 of a sward of timothy, meadow fescue, perennial ryegrass and red and white clover

***Wilted to 37% DM:***

## Additive treatments

- Control wo additive
- Inoculant of homofermentative LAB
- Salt-based additive
- Acid
- 4 replications (silos) per treatment
- A total of 16 silos

## Aerobic stability test of the silage



*Silage samples for analysis of*

- pH after 3 days of fermentation
- DM
- Fermentation characteristics and proteolysis
- Protein quality as CP fractions differing in solubility and degradability

# Protein quality assessment of forage and silage

## Cornell Net Carbohydrate and Protein System (CNCPS)

Crude protein			
True Protein (TP)			Non-protein N (NPN; A)
Buffer insoluble Protein (BIP)		Buffer-soluble protein (BSP; B1)	
ND-insoluble Protein (NDIP)		ND-soluble protein (NDSP; B2)	
AD-insoluble protein (ADIP; C)	AD-soluble protein (ADSP; B3)		
<b>Analysed</b>		Rumen undegradable protein (RUP) at a specific rumen passage rate can be calculated based on these CP fractions and fibre contents (Kirchhof et al., 2010).	
<b>Calculated</b>			

## Expected results

- Wilting will improve the protein quality of the herbage and decrease the protein breakdown during ensiling.
- Use of additives will decrease the protein breakdown during ensiling
- We will find the best management at harvest and ensiling for efficient utilisation of the biorefined products, both in regards to energy and protein

## Task 4.5 Trials for optimal utilisation of the biorefined products for feeding of farm animals

- Responsible: SLU in close collaboration with Västra Götaland Region Naturbruksförvaltning, AU Foulum and Hushållningssällskapet Sjuhärad
- Data for system calculations by Chalmers
- Hushållningssällskapet Sjuhärad, Aarhus University and Skive municipality will disseminate the results
- Feed values of herbage, silage and biorefined fibre fraction will be produced with wethers (sheep) as model animals.
- Dairy cows at Sötåsen will be fed silage or biorefined fibre fraction in their diets to compare milk yield and milk composition by the cows fed the different diets.

# Feed evaluation trial with wethers at SLU Götala Beef and Lamb Research, Skara



## ***Treatments***

- Fresh grass-clover forage harvested 2020
- Biorefined fibre fraction from fresh grass-clover forage harvested 2020
- Ensiled grass-clover forage harvested 2020
- Biorefined ensiled grass-clover forage harvested 2020

Fed to 8 wethers (2 wethers/feed)

Change-over, each period 1 month

All animals get all feeds

## Intake

Total collection of faeces and urine

Digestibility of feeds

Protein utilisation by ruminants

# Dairy cow trial at Sötåsen, Töreboda

## **Treatments**

- Grass-clover silage from 2020
- Biorefined fibre fraction from the same silage 2020

Indoor period 2000/2001

Half of the cows get the silage

Half of the cows get the fibre fraction

Milk yield

Milk composition



## Task 4.5 Trials for optimal utilisation of the biorefined products for feeding of farm animals

**Anna Wallenbeck, researcher, SLU**

- The biorefined liquid fraction will be evaluated in comparison to an organic commercial standard feed in a production trial with growing pigs at Sötåsen

**Hushållningssällskapet Sjuhärad**

- Test of different storage possibilities of the liquid fraction for stable storage.

**Troels Kristensen, Aarhus University**

- Upscaling of the results from the trials to farm level, bringing in previous experiments from Denmark and from the literature.