

Final report

Energy agency's title of the project - Swedish

Green2Feed – Hållbar djurfoder och biogas från gröna blad

Energy agency's title of the project - English

Green2 Feed – Sustainable animal feed and biogas from green leaves

Organisation

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Preface

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Sammanfattning

Green2Feed-projektet visar hur grön biomassa kan bidra både till förnybar energiproduktion och en mer hållbar proteinförsörjning genom ett integrerat bioraffinaderikoncept. Genom att kombinera extraktion av grönt protein för livsmedel och foder med biogasproduktion från restströmmar adresseras två centrala utmaningar: behovet av fossilfri energi och minskat importberoende av proteinfoder, särskilt soja.

Biogasanvändningen i Sverige har ökat kraftigt och väntas fortsätta växa, samtidigt som cirka 25 % av det råprotein som används i EU:s animalieproduktion importeras. Projektet har undersökt hur fraktionering av bladbiomassa kan integreras i biogassystem för att öka resurseffektiviteten. Fokus har legat på underutnyttjade resurser som vall, mellangrödor och betblast, vilket även bidrar till förbättrad växtföljd, kolinlagring och effektiv markanvändning.

En systembaserad översikt visade att integration med biogas är avgörande för att förbättra miljömässig och ekonomisk hållbarhet i växtproteinbaserade värdekedjor. En pilotskalestudie av kvävet fördelning visade att upp till 87 % av kvävet i fraktionerna utgjordes av aminosyror, vilket bekräftar effektiv proteinkoncentration. Samtidigt identifierades proteinnedbrytning och begränsad selektivitet, vilket pekar på behov av processoptimering. Aminosyraprofilerna visade att vissa fraktioner lämpar sig väl som foder till idisslare och grisar. Analyser av metanpotential understryker vikten av att nyttiggöra restströmmar.

Resultaten visar att integration av biogas i växtproteinbaserade bioraffinaderier ökar resurseffektiviteten och stärker näringscirkulationen. Projektet har bidragit med ny kunskap om kvävet fördelning i pilotskala och om de systemmässiga fördelarna med att koppla samman livsmedels-, foder- och energiproduktion.

Nästa steg är att förbättra proteinutbytet och stabiliteten i processen, hantera antinutritionella ämnen, optimera biogasutbytet samt utveckla växtförädling anpassad för integrerade livsmedels- och energisystem.

Summary

The Green2Feed project demonstrates how green biomass can simultaneously strengthen renewable energy production and sustainable protein supply through an integrated biorefinery concept. By combining green protein extraction for food and feed with biogas production from residual streams, the project addresses two urgent challenges: the growing demand for fossil-free energy and Europe's dependency on imported protein feed, particularly soy.

Swedish biogas use has increased rapidly and is expected to continue growing, while around 25% of crude protein used in EU animal production is imported. Green2Feed investigated how protein fractionation of leafy biomass can be integrated into biogas systems to improve overall resource efficiency. The project focused on underutilized resources such as ley crops, cover crops, and sugar beet tops, supporting carbon sequestration, improved crop rotations, and efficient land use.

The work included a systems-level review of plant proteins for human consumption, highlighting biogas integration as a key factor for improving environmental and economic performance. A pilot-scale study of nitrogen fate showed that up to 87% of nitrogen in the fractions originated from amino acids, confirming effective protein concentration. However, protein degradation and limited selectivity were observed, indicating the need for process optimization. Amino acid profiles demonstrated that specific fractions are suitable as feed for ruminants and pigs. Analyses of biomethane potential further confirmed the importance of valorising residual streams.

Overall, the results show that integrating biogas into plant protein biorefineries significantly improves resource efficiency and nutrient circularity. Residual fractions retain substantial energy potential, and digestate recycling contributes to improved nitrogen and carbon management. The project provides new knowledge on nitrogen partitioning at pilot scale and on the systemic benefits of linking food, feed, and energy production.

Next steps include improving protein recovery and stability, addressing antinutritional components, optimizing biogas yields, and advancing plant breeding tailored to integrated food–energy systems.

Introduction

Driven by concerns over climate change and an increasing awareness of the condition of our environment, society, governments and companies are focussing on sustainable production of all products, including energy. The project Green2Feed had the aim to address multiple driving forces and needs in our shift to a biobased society. Biogas from green biomass has been a successful addition to the fossil-free energy mix, but there are opportunities to improve the efficient use of this green resource. The need for biogas is demonstrated by a recent doubling in Swedish biogas use between 2015 and 2020 (Klackenberg, 2025) and a possible 5 fold growth in Swedish biogas by 2030 (energigas.se). There are societal forces calling for more sustainable solutions for animal feeding where the EU currently imports 25% of the crude protein consumed by animals (FEFAC, 2025) where approx. 75% of the protein meal is imported, currently dominated by imported soy feeds.

The Green2Feed project has investigated a biorefinery process integrating green protein production for animal feed in the biogas production chain, simultaneously addressing the need for biogas and sustainable feed proteins. Green biomass was processed in Green2Feed to produce non-ruminant animal feed and the potential of the side-streams from the Green2Feed protein production process were investigated for use in biogas production. The main idea was to use underutilized resources but also dedicated crops to meet this demand for biogas while meeting land use regulations and maintaining existing agricultural production by its innovative feedstock strategy, supporting cover and legume crops improving carbon sequestration and storage. Furthermore, the Green2Feed process was investigated as a driver to recover otherwise unused agricultural biomass resources such as sugar beet tops and intermediate crops. Green biomass is among the most abundant resources on Earth (Bar-On & Milo, 2019). It contains substantial amounts of valuable components that could be sustainably used in food, feed and industrial products within the circular bioeconomy (Andersen & Kiel, 2000; Berndtsson et al., 2020; Muneer et al., 2021). Recent and ongoing studies show that fractionation of green biomass can produce protein feed and feed products that could contribute to reducing the amount of imported protein, a known source of strong land use change and subsequent climate impact (Heusala et al., 2020). Residual streams from such fractionation processes are interesting from an energy perspective, where anaerobic digestion is the key technology for closing nutrient and carbon loops, to provide renewable energy with a low climate impact and increase overall resource use efficiency while providing biofertilizer to bring nutrients back to the soil. Valorising all main and side streams from such

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fractionation supports economic sustainability of the overall process and potentially gives additional positive climate effects via replacement of products with a greenhouse gas intensive production such as feed, fertilizers, food additives and fuels.

Material and methods

This project consisted of 5 studies aimed at developing the biorefinery process of feed protein production from green biomass and to form a knowledge base for the estimation of biogas potential from residual streams from this biorefinery.

- 1) **Plant proteins for human consumption**
- 2) **Nitrogen fate in fractionation**
- 3) Pre-treatment for improved protein yield
- 4) Extractable dietary fiber and free sugars
- 5) Biomethane and digestate potential

Results from the first two studies have been published as scientific peer-reviewed articles. Publication of the other three studies as scientific peer-reviewed articles is pending. Therefore, these will be added as an attachment.

List of acronyms

BJ	brown juice
BM	unfractionated biomass
GJ	green juice
GP	green protein
LCA	life cycle assessment
P	fiber pulp
WJ	white juice
WP	white protein
VS	volatile solids

1. Plant proteins for human consumption

This work is based on a multidisciplinary review and systems-level synthesis of scientific literature addressing plant proteins for human consumption, with a particular emphasis on biorefinery approaches and the integration of biogas production. Rather than applying experimental methods, the study compiles and analyses existing peer-reviewed research, international reports, and statistical databases to evaluate opportunities and constraints along the entire plant protein value chain.

The review encompasses crop cultivation, plant breeding, protein processing, environmental and economic assessment, and consumer perspectives. Special attention is given to biomass flows and side-stream utilization, which are central to a biorefinery concept. Crop categories considered include grain legumes, cereals, pseudocereals, oil crops, potatoes, and green biomass (e.g. ley, cover crops, and forage crops). Production statistics at Swedish, European, and global scales were compiled mainly from FAOSTAT and Eurostat, and average protein concentrations were used to estimate potential protein yields.

Environmental performance was assessed through synthesis of life cycle assessment (LCA) studies, focusing on greenhouse gas emissions, nitrogen use, land efficiency, and energy inputs. Within this context, biogas systems were evaluated as an integrated component of plant protein production, particularly for the utilization of residues from crop cultivation and protein extraction (e.g. pulp, brown juice). The role of anaerobic digestion in recycling nutrients and producing renewable energy was analysed qualitatively based on existing feasibility studies.

Economic feasibility was discussed using published assessments of protein extraction technologies and bioenergy systems, considering investment needs, processing efficiency, and market values. The review also integrated consumer research addressing acceptance of plant-based foods and sustainability-related attributes, including perceptions of circular and climate-smart food systems.

Plant breeding and processing technologies were reviewed with a focus on their compatibility with biorefinery concepts. This includes breeding for traits that improve both protein extractability and suitability of residual biomass for biogas production. By integrating these diverse perspectives, the study applies a systems approach to identify synergies between food protein production and renewable energy generation, using Sweden as a case study within a broader European and global context.

Contributors to this study were Eva Johansson, Georg Carlsson, Åsa Grimberg, William R. Newson, Thomas Prade, Sara Spendrup, and Sven-Erik Svensson.

2. Nitrogen fate in fractionation

To determine the fate of nitrogenous compounds in the protein extraction process, the different fractions obtained from a demo-scale biorefinery process were analysed. For this study, fractions from eight different biomass sources (red clover, lucerne, beetroot tops, sugar beet tops, immature oat, white clover, pea residues, and hemp) were included, all of them processed during 2020. The contents of N, nitrate, nitrite, amino acids, and protein, especially RuBisCO, were assessed on dry matter basis. The relative contribution of each compound to the total amount of N was calculated. Amino acid scores of the fractions were further compared to needs of human, pigs, chicken, and lactating dairy. For details of the methods used, see (Nynäs et al., 2024).

Contributors to this study were Anna-Lovisa Nynäs, Emilia Berndtsson, William Newsson, Helena Persson Hovmalm, and Eva Johansson.

Results

1. Plant proteins for human consumption

The review highlights that biorefinery approaches, including biogas production, significantly enhance the sustainability potential of plant-based protein systems. Across crop categories, large quantities of residual biomass are generated during cultivation and protein processing. These side-streams, often underutilized, represent a major opportunity for anaerobic digestion and renewable energy generation.

Cultivation remains the dominant contributor to environmental impact in plant protein value chains, mainly due to fertilizer use, fuel consumption, and yield variability. Integrating biogas systems can mitigate these impacts by converting crop residues, green biomass, and protein extraction by-products into renewable energy, thereby reducing reliance on fossil fuels. Digestate from biogas production can be recycled as fertilizer, improving nutrient use efficiency and closing nitrogen and carbon cycles.

Green biomass-based systems show particularly strong synergies with biogas production. While current protein extraction efficiencies from green biomass are low, the remaining pulp retains substantial energy content. The review shows that combining leaf protein extraction for human consumption with biogas production from residual biomass substantially improves overall resource efficiency and economic viability. This integrated approach increases protein output per hectare while simultaneously generating energy.

For grain legumes, cereals, oil crops, and potatoes, processing residues such as press cakes, fiber fractions, and processing water can also be valorised in biogas systems. This reduces waste management costs and offsets energy demands of protein fractionation processes, particularly for wet extraction methods that are otherwise energy intensive.

Plant breeding emerges as a critical enabling factor in biorefinery systems. Traits such as high protein extractability, favourable biomass composition, and reduced antinutritional factors not only improve food protein quality but also enhance the suitability of residual biomass for anaerobic digestion. Similarly, processing technologies influence both protein quality and the quantity and characteristics of biogas substrates.

Overall, the results demonstrate that integrating biogas production into plant protein value chains improves environmental performance, strengthens economic feasibility, and supports circular bioeconomy

principles. However, system optimization is required to balance protein recovery, energy yield, and processing costs.

2. Nitrogen fate in fractionation

The N in the different fractions was up to 87% explained by amino acids, thus, the N mainly originates from protein (Figure 1). From the protein analyses, it was however evident that the protein was largely degraded or otherwise insoluble. Similar patterns in how the protein types and amino acids travelled through the process was seen, and no significant separation of RuBisCO as compared to other proteins was seen. No clear difference in essential and non-essential amino acids could be seen among the fractions. Liquid fractions, such as GJ, WJ and BJ were enriched in water-soluble nitrogenous compounds, while the fractions consisting of precipitated protein (heat precipitated protein in GP and acid precipitated protein in WP) had the highest share of insoluble compounds.

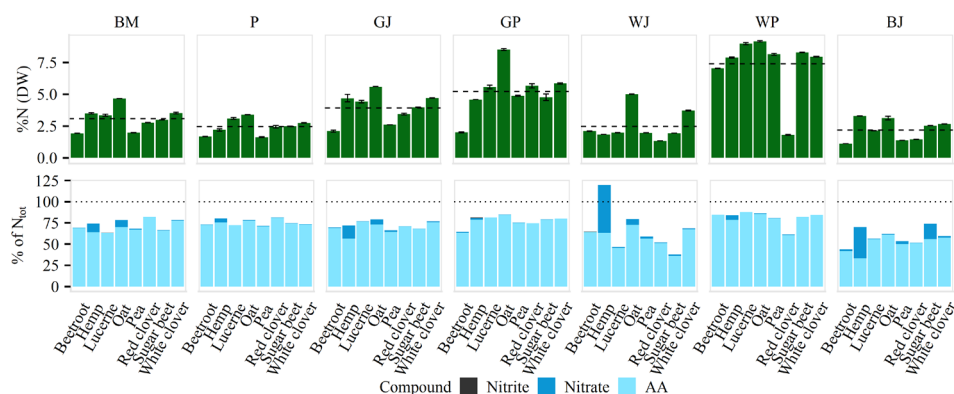


Figure 1. Top: Total N content (% dry weight (DW), mean of duplicate measurements) in fractions (unfractionated biomass (BM), pulp (P), green juice (GJ), green protein (GP), white juice (WJ), white protein (WP), brown juice (BJ) from the different biomass sources. Dashed lines represent the mean of all biomass sources. Bottom: Content of N from the nitrogenous compounds (amino acids (AA), nitrate and nitrite; one measurement per sample) compared to N_{total} . Dotted lines indicate 100% of the N. Based on Figure 1 in (Nynäs et al. 2024).

Based on the AA scores, it was clear the P and GJ were suitability as feed for ruminants and pigs, respectively. Detailed results from this study are available in the publication by Nynäs et al. (2024).

Discussion

1. Plant proteins for human consumption

The integration of biogas production into plant protein biorefineries substantially strengthens the sustainability case for plant-based proteins as alternatives to animal-derived products. A central insight from this review is that many environmental and economic bottlenecks associated with protein extraction can be mitigated when biomass is utilized in a circular, multi-output system rather than in linear value chains. Cultivation has consistently been identified as the dominant contributor to greenhouse gas emissions in plant protein systems, largely due to fertilizer use, energy inputs, and yield variability (e.g. Lamb et al. (2021), Lötjönen and Ollikainen (2017)).

Biorefinery concepts that integrate protein extraction with anaerobic digestion address these challenges by valorising residual biomass streams. Processing side-streams such as pulp, press cakes, and liquid residues retain substantial energy potential and can be converted into renewable energy through biogas production. This reduces dependence on fossil fuels for processing and offsets emissions associated with wet protein fractionation technologies (Muneer et al., 2021; Prade, Björnsson, et al., 2017). In addition, digestate recycling contributes to improved nutrient use efficiency and supports nitrogen and carbon cycling within agricultural systems (Johansson, Muneer, et al., 2023; Mosleth et al., 2020).

Green biomass-based systems exemplify the benefits of this integrated approach. Although protein recovery rates for human consumption are currently low, combining leaf protein extraction with biogas production from residual pulp allows near-complete utilization of harvested biomass. This cascading use of biomass improves protein productivity per hectare while maintaining favourable climate performance compared to animal protein systems (Alexander et al., 2016; Prade et al., 2021; Sabaté et al., 2015). Such systems are particularly relevant in regions with established ley cultivation and biogas infrastructure, such as Sweden.

Plant breeding plays a critical enabling role in future biorefineries. Traits that improve protein extractability, reduce antinutritional factors, or modify biomass composition can simultaneously benefit food protein quality and methane yield from digestion. The review highlights that breeding efforts have traditionally prioritized yield and resistance, whereas traits relevant for biorefinery performance remain underexplored (Capstaff & Miller, 2018; Johansson, Kuktaite, et al., 2023). Targeted breeding

strategies could therefore enhance synergies between food and energy production.

Despite these advantages, several challenges remain. Biorefinery systems require significant capital investment, logistical coordination, and cross-sector integration, which may limit short-term adoption (Tidåker et al., 2021). Moreover, consumer awareness of circular production systems is limited, suggesting that sustainability benefits linked to biogas integration are not yet fully translated into market value (Aschemann-Witzel & Peschel, 2019; Spendrup et al., 2021).

In conclusion, biogas should be viewed not as a supplementary technology but as a core component of sustainable plant protein biorefineries. Its integration enhances environmental performance, improves economic resilience, and aligns plant-based protein production with circular bioeconomy and climate mitigation goals (Johansson, Muneer, et al., 2023; Prade, Kätterer, et al., 2017).

2. Nitrogen fate in fractionation

This study provides valuable pilot-scale evidence on how nitrogen and protein fractions behave during green biomass fractionation, addressing a critical gap between laboratory-scale experiments and industrial feasibility. By tracking nitrogen forms and amino acid composition across multiple fractions derived from diverse leafy biomass sources, the authors demonstrate both the promise and the current limitations of green biorefinery concepts for food and feed applications.

A key finding is that amino acids account for most of the nitrogen in all fractions, confirming that leaf protein fractionation effectively concentrates nutritionally relevant nitrogen rather than undesirable inorganic forms. However, the study also reveals that protein degradation and reduced solubility occur during pilot-scale processing, particularly in the green protein (GP) and white protein (WP) fractions. This highlights a major challenge for industrial upscaling: maintaining protein integrity under conditions of heat, residence time, and mechanical stress. Similar degradation issues have been reported in other leaf protein extraction studies, suggesting that improved temperature control, oxygen exclusion, or alternative separation techniques are required to preserve functional proteins.

Importantly, the fractionation process did not selectively enrich RuBisCO or essential amino acids, as all protein types and amino acids followed similar partitioning patterns. While this limits targeted protein purification,

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it also implies that complex separation steps may be unnecessary when the goal is bulk protein production. From a nutritional standpoint, both GP and WP generally met essential amino acid requirements for humans, pigs, and poultry, although methionine and cysteine were occasionally limiting. This reinforces the idea that green biomass proteins are best used in combination with complementary protein sources, such as cereals, to achieve balanced amino acid profiles.

The study further emphasizes the importance of side-stream valorisation. Juice fractions, especially brown juice, accumulated water-soluble nitrogenous and potentially antinutritional compounds such as nitrate. While this limits their direct use as feed, these fractions represent opportunities for extracting bioactive compounds, fermentation substrates, or biostimulants, consistent with circular bioeconomy principles. Without such valorization pathways, the economic and environmental viability of green biomass fractionation would be significantly reduced.

In the process used in this project for fractionating green biomass into protein and other products, the proteins are enriched in the protein fractions (green and white protein) in a similar way for most green biomass sources. Additionally, the relative levels of essential and non-essential amino acids of those fractions were within the same ranges. And from previous studies (Nynäs et al., 2021) no significant differences in functional properties, such as foaming and solubility, were seen between biomass sources. This indicates that the process is applicable to a wide range of crops, which increases the amount of suitable and available raw material, and it also prolongs the season of when the process can be active.

Overall, this work strengthens the case for green leafy biomass as a sustainable protein source but also underscores that technological optimization is essential before large-scale deployment. Future research should focus on improving protein recovery from pulp, minimizing degradation during processing, and systematically assessing antinutritional components across biomass types. Addressing these challenges will be critical for integrating green biorefineries into resilient, low-impact food and feed systems.

Publication list

Peer-review articles

- 1) Johansson, E., G. Carlsson, Å. Grimberg, W. R. Newson, T. Prade, S. Spendrup and S.-E. Svensson (2025). Plant proteins for human consumption – from local to global opportunities and challenges in a full value chain context. *Cleaner and Responsible Consumption*: 100319. <https://doi.org/10.1016/j.clrc.2025.100319>

Environmental concerns together with a growing global population and health benefits call for an increased use of plant proteins in the human diet. This review paper summarizes opportunities and challenges of such an increased use and reveals the way forward for plant proteins for human consumption. The results clearly emphasize the increased consumer interest, especially in certain consumer segments, of the use of plant protein-based food alternatives, the positive environmental impact of the use of such alternatives and the wide array of crops available to be developed into novel protein-rich food choices. Major challenges identified are; i) how to combine different plant sources to receive highly nutritional and tasty food products, ii) how to produce crops with a high and easily extractable protein content, which simultaneously contain low amount of unwanted components such as antinutritional factors, iii) environmental effects of the production of the plant protein to be utilized for the protein-rich food items, and iv) economic feasibility of the plant protein food products. Opportunities exist to develop the processing methods for protein fractionation, although consumer preferences, environmental effects, economic feasibility and impact on protein functionality have to be taken into account in such developments. Plant breeding is summarized as a major way forward to target crops high in easily available protein and low in unwanted components, thereby fitting consumer desires simultaneously as contributing to economic feasibility and reduced environmental impact. Cultivation is the main source of the environmental impact in the plant protein value chain, while protein content, composition and extractability affect consumer preferences and both their economic and environmental impact.

- 2) Nynäs, A.-L., E. Berndtsson, W. R. Newson, H. P. Hovmalm and E. Johansson (2024). Protein fractionation of leafy green biomass at the pilot scale: Partitioning and type of nitrogen in the fractions and their usefulness for food and feed. *ACS Food Science & Technology*. <https://doi.org/10.1021/acsfoodscitech.3c00426>

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Abstract: Fractionation of green biomass often results in fractions with insufficient protein content or quality for food or feed. To understand ways forward, we evaluated the fate of nitrogen (N) and the food or feed suitability of six pilot-scale fractions. The N was present mainly as amino acids (AA) in all fractions (<87%), however, the protein was partly degraded or insoluble in the majority of samples. All protein types and AAs traveled similarly through the fractionation process, giving insignificant separation of RuBisCO versus other proteins, and essential versus nonessential AAs. Water-soluble N compounds were enriched in juice fractions (90–95%), while the protein fractions contained the highest insoluble protein content (13–17%). AA composition in pulp and green juice verified their suitability as feed for ruminants and pigs, respectively. Fractionation of green biomass for food and feed is indeed important, although for sustainable industrial applications, further evaluations are required regarding process feasibility, antinutritional components, and brown juice uses.

This publication also became the cover topic of the journal ACS Food Science & Technology:



Figure 2. Cover page of the ACS Journal on Food Science & Technology.

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- 3) Nynäs, A.-L., W. Mlook, C. Wedgwood, W. R. Newson, T. Prade and E. Johansson Increasing protein recovery from lucerne by a second pressing step: Opportunities and challenges for process and feasibility. Submitted to Journal of Agriculture and Food Research.

Green leafy biomass is a promising protein source, but low extraction yields limit process sustainability. This study evaluated chemical, enzymatic, and mechanical treatments combined with re-pressing of lucerne pulp to increase soluble protein recovery, alongside environmental and economic assessments. Several treatments enhanced nitrogen transfer from pulp to green juice, particularly those causing cell disruption. The highest protein recovery (~14%) was achieved using ≥ 0.1 M NaOH, representing a five-fold increase compared to water treatment. However, some treatments caused protein degradation or co-extraction of non-protein components, reducing soluble protein recovery. Demo-scale assessment showed that re-pressing pulp increased environmental impacts and costs per unit protein compared to initial pressing, with diminishing returns from additional re-pressing. Results suggest that, at most, one additional re-pressing with 0.1 M NaOH is justified, provided that process heat is recovered.

- 4) Mlook, W., A.-L. Nynäs, W. Newson, T. Prade, A. Andersson, R. Andersson and E. Johansson. Extractable dietary fiber and free sugars in demo scale fractionation of lucerne and sugar beet. Manuscript.

This study investigated the distribution of dietary fiber and non-structural carbohydrates in demo-scale green biorefinery fractionation of lucerne and sugar beet biomass. Biomass was separated into green juice and pulp streams, which showed clear differences in composition. Pulp fractions contained the highest levels of total dietary fiber, while soluble carbohydrates were mainly concentrated in the green juice supernatant. Fiber composition varied between streams and crops, with glucose and uronic acids as dominant components. These results demonstrate that green biorefinery streams from lucerne and sugar beet can serve as renewable sources of dietary fiber and carbohydrates for food, feed, and biobased applications.

- 5) Mlook, W., C. Wedgwood, A.-L. Nynäs, W. Newson, T. Prade, A. Schnürer and E. Johansson. Biomethane and digestate potential of green biomass and side streams from demo scale green biorefinery Manuscript.

Green biomass and side streams from demo-scale green biorefineries were evaluated for biomethane production and digestate quality. Biomass from

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lucerne, winter wheat, rye, and sugar beet, as well as fractions generated during protein extraction, showed biomethane potentials ranging from 160 to 288 mL CH₄ g⁻¹ VS. Brown juice fractions consistently achieved the highest methane yields, while repressed pulp also showed good potential, particularly for cereal crops. Methane recovery varied by crop and processing pathway. Digestates differed in nutrient composition among fractions, with generally low C:N ratios indicating rapid nitrogen availability. The results highlight the potential of green biorefinery by-products for combined renewable energy production and nutrient recycling, with crop choice and fraction management strongly influencing outcomes.

Conference contributions

Date	Conference, type of contribution	Participants – title of presentation
16 February 2023	Alnarpskonferensen, panel debate	Thomas Prade
7-8 December 2023	BSRC winter conference, Linköping, poster	Waleed Mlook - <i>Biorefinery as sustainable solution to global issues</i>
7-8 December 2023	BSRC winter conference, Linköping, poster	Cristian Wedgwood - <i>LCA & Economics of Lucerne Pulp Treatments for Increased Protein Extraction</i>
12-14 November 2024	38 th European Federation of Food Science and Technology (EFFoST) International Conference 2024, Bruges, Belgium, poster	Waleed Mlook - <i>Demo-scale: Boosting biorefinery protein production from green leafy biomass</i>
28-29 November 2024	BSRC winter conference, Linköping, poster	Waleed Mlook - <i>Demo-scale: Boosting biorefinery protein production from green leafy biomass</i>
12-13 June 2025	BSRC summer conference, Linköping, poster	Md Sani - <i>Solid Digestate to Biochar: Converting Biogas Residue into Circular Carbon</i>
12-13 June 2025	BSRC summer conference, Linköping, poster	Waleed Mlook - <i>Biomethane and digestate potential from green biomass and biorefinery demo scale side streams</i>
12-13 June 2025	BSRC summer conference, Linköping, poster	Cristian Wedgwood - <i>Diverting potential biogas feedstock for food/feed protein extraction</i>
12-13 June 2025	BSRC summer conference, Linköping, poster	Jean Agustin Velasquez Pinas - <i>Systems analysis of biogas and biorefinery production systems: Unlocking the sustainability potential of agricultural residues and value-added processes (BioRES)</i>

Popular Science coverage of the project (selection)

Här blir gräset till livsmedel, news article Linköping University, 8 Oct 2025.

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Attachements

- Report on unpublished parts of the Green2Feed project