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Updates

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EDI

Sustainable Food Systems Transformation in the face of Environmental Change and Water Shortage

Co-organized by BG8/HS13

Convener: Marta Tuninetti[ECS]

Co-conveners: Alvar Escriva-Bou, Irene Blanco-Gutiérrez, Carole Dalin, Matti Kummu

- Orals | Thu, 18 Apr, 14:00–18:00 (CEST) Room 0.96/97
- Posters on site | Attendance Fri, 19 Apr, 16:15–18:00 (CEST) | Display Fri, 19 Apr, 14:00–18:00 Hall X4
- Posters virtual | Attendance Fri, 19 Apr, 14:00–15:45 (CEST) | Display Fri, 19 Apr, 08:30–18:00 vHall X4

Session description

Orals: Thu, 18 Apr | Room 0.96/97

Chairpersons: Irene Blanco-Gutiérrez, Alvar Escriva-Bou

14:00–14:05
5-minute convener introduction

Sustainable water management

14:05–14:15 | EGU24-21484 | On-site presentation
Sustainable and digitalized water management in rural environments in the SUDOE area (GestEAUr project)
Jose Luis Molina, Victor Monsalvo, Angel Encinas, and Engracia Lacasa

14:15–14:25 | EGU24-7458 | ECS | Highlight | On-site presentation
Leveraging renewable energy solutions for distributed urban water management: The case of sewer mining
Athanasios Zisos, Klio Monokrousou, Konstantinos Tsimnadis, Ioannis Dafnos, Katerina Dimitrou, Andreas Efstratiadis, and Christos Makropoulos

14:25–14:35 | EGU24-3941 | ECS | Highlight | On-site presentation
Do non-conventional water resources lead to a better performance of irrigation communities? A comparative analysis between the regions of Murcia (Spain) and Apulia (Italy)
Mario Ballesteros-Olza, Sarah Stempfle, Irene Blanco-Gutiérrez, Almudena Gómez-Ramos, Giacomo Giannoccaro, and Bernardo De Gennaro

14:35–14:45 | EGU24-1342 | ECS | Highlight | On-site presentation
Increasing water footprints of flex crops
Oleksandr Mialyk, Markus Berger, and Martijn J. Booij

14:45–14:55 | EGU24-11369 | ECS | On-site presentation
Expert-based global database of sand dams dimensions and distribution across drylands
Jessica Eisma, **Luigi Piemontese**, Giulio Castelli, Ruth Quinn, Bongani Mpofu, Doug Graber Neufeld, Cate Ryan, Hannah Ritchie, Lorenzo Villani, and Elena Bresci

14:55–15:05 | EGU24-15345 | ECS | On-site presentation
Atrazine Removal in Constructed Wetlands: Efficacy of Monocultures versus Polycultures
Sai Kiran Pilla, Mahak Jain, Partha Sarathi Ghosal, and Ashok Kumar Gupta

15:05–15:15 | EGU24-18001 | ECS | Virtual presentation
Adsorptive removal of humic acid from water by magnesium oxide
Rupal Sinha and Partha Sarathi Ghosal

15:15–15:25 | EGU24-7380 | ECS | Virtual presentation
Removal of favipiravir and oseltamivir in domestic wastewater effluents using ozonation and catalytic ozonation
Nasim Chavoshi, Serdar Dogruel, Nilay Bilgin-Saritas, Zeynep Karaoglu, Irem Ozturk-Ufuk, Ramazan Keyikoglu, Alireza Khataee, Emel Topuz, and Elif Pehlivanoglu-Mantas

15:25–15:35 | EGU24-13972 | ECS | On-site presentation
Balancing groundwater access and sustainability through energy pricing in India
Sudatta Ray

15:35–15:40
Discussion

Sustainable food solutions (water, climate, biodiversity, health)

15:40–15:45
Convener introduction

Coffee break

Chairpersons: Marta Tuninetti, Carole Dalin, Matti Kummu

16:15–16:25 | EGU24-7331 | **ECS** | On-site presentation
Agricultural pollution in Indian Interstate Trade Network
Shekhar Goyal, Raviraj Dave, Udit Bhatia, and Rohini Kumar

16:25–16:35 | EGU24-7880 | **ECS** | On-site presentation
Crop switching in the Indo-Gangetic Plain of India can improve water and food sustainability with increased farmers' profit
Ruparati Chakraborti, Kyle Frankel Davis, Ruth DeFries, Narasimha D. Rao, Jisha Joseph, and Subimal Ghosh

16:35–16:45 | EGU24-4850 | **ECS** | On-site presentation
Global coupling coordination and interactions between diet, environment, and human health (withdrawn)
Meng Li, La Zhuo, and Pute Wu

16:45–16:55 | EGU24-15307 | **ECS** | On-site presentation
Tracking real-time impacts of climate variability and trade disruptions on water and food security
Marijn Gülpen, Christian Siderius, Ype van der Velde, Jon Cranko Page, Jan Biermann, Ronald Hutjes, Lisanne Nauta, Samuel Sutanto, and Hester Biemans

16:55–17:05 | EGU24-14983 | **ECS** | **Highlight** | On-site presentation
Reducing climate change impacts and inequality of the global food system through diet shifts
Yanxian Li, Pan He, Yuli Shan, Yu Li, Ye Hang, Shuai Shao, Franco Ruzzenenti, and Klaus Hubacek

17:05–17:15 | EGU24-5637 | **ECS** | On-site presentation
Balancing food system greenhouse gas emissions reduction and food security in China
Hao Zhao, Haotian Zhang, Petr Havlik, and Jinfeng Chang

17:15–17:25 | EGU24-11353 | **ECS** | On-site presentation
Agroforestry management practices as nature-based solutions for climate change adaptation in the Galapagos Islands
Ilia Alomia, Yessenia Montes, Rose Paque, Jean Dixon, Armando Molina, and **Veerle Vanacker**

17:25–17:35 | EGU24-22485 | **Highlight** | On-site presentation
Future food systems compatible with agricultural boundaries for biodiversity (withdrawn)
Remi Prudhomme, Patrice Dumas, Pierre-Marie Aubert, and Diego Garci-Vega

17:35–17:45 | EGU24-4136 | **ECS** | **Highlight** | On-site presentation
The economic and environmental impacts of UK meat imports post-Brexit
Kaixuan Wang, Lirong Liu, Jonathan Chenoweth, and Stephen Morse

17:45–17:55 | EGU24-1491 | **ECS** | On-site presentation
Modelling Agrivoltaics in a climate perspective for water-energy-food nexus analysis
Lia Rapella, Philippe Drobinski, and Davide Faranda

17:55–18:00
Discussion

Posters on site: Fri, 19 Apr, 16:15–18:00 | Hall X4

> **Display time**: Fri, 19 Apr, 14:00–Fri, 19 Apr, 18:00

Chairpersons: Marta Tuninetti, Carole Dalin

X4.87 | EGU24-9881 | **ECS**
Comparison of different interpolation techniques for sub-basins located in Madrid.
Blanca Cuevas, Elena Pascual, Carlota Bernal, and Sergio Zubelzu

X4.88 | EGU24-1481 | **ECS**
Overcoming Barriers to Sustainable Rice Production: A Remote Sensing-Enabled Approach
Nick Kupfer, Carsten Montzka, and Tuan Quoc Vo

X4.89 | EGU24-16795 | **ECS** | **Highlight**
Food loss & waste of staple crop products: mapping environmental impacts within the Nexus paradigm
Francesco Semeria, Giacomo Falchetta, Adriano Vinca, Francesco Laio, Luca Ridolfi, and Marta Tuninetti

X4.90 | EGU24-21831 | **ECS**
Multi-sensor analysis of variability in rice transplanting dates in smallholder rice production systems in South Asia (withdrawn after no-show)
Pauline Kimani, Timothy Foster, Ben Parkes, Shu Kee Lam, and Alexis Pang

X4.91 | EGU24-14721

Silage production from olive mil wastes
Ioannis Manariotis, Styliani Biliani, Maria Varvara Manarioti, and Nikolaos Athanassolpoulos

X4.92 | EGU24-18099 | **ECS** |
Application of Life Cycle Assessment in Vegetarian Lunch Box: Environmental Impact Hotspot Analysis of Whole Grain and Vegetable Production
Chih-Kang Chen and Ching-Pin Tung

X4.93 | EGU24-20605 | **ECS**
Exploring the potential of cowpea inoculation in Namibia for improved resource use and human nutrition
Jihye Jeong, Kerstin Jantke, and Uwe. A Schneider

Posters virtual: Fri, 19 Apr, 14:00–15:45 | vHall X4

Display time: Fri, 19 Apr, 08:30–Fri, 19 Apr, 18:00

Chairpersons: Irene Blanco-Gutiérrez, Alvar Escriva-Bou

vX4.33 | EGU24-605 | **ECS**
Disentangling social perspectives on the use of reclaimed water in agriculture using Q methodology
Cintya Villacorta Ranera, Irene Blanco Gutiérrez, and Paula Novo Nunez

vX4.34 | EGU24-3533 | **Highlight**
Challenges and opportunities of using reclaimed water for agricultural irrigation in Spain: A hydro-economic analysis.
Paloma Esteve, Irene Blanco-Gutiérrez, Marina RL Mautner, Samaneh Seifollahi-Aghmiuni, and Marisa Escobar

vX4.35 | EGU24-2856 | **ECS** | **Highlight**
Sustainable Management Strategies for Non-Conventional Water Resources: Enhancing Food and Water Security in Arid and Semi-Arid Regions
Ayat-Allah Bouramdane

Silages creation with olive miles in different urea and molasses rates

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Abstract:

Each year, the food and agriculture sectors generate enormous amounts of garbage and byproducts, which are dumped into nearby open fields, damaging the ecology and endangering the health of people and animals. Food scraps are suggested for use as animal feed in circular economy methods. Using less common animal feeds made from culinary leftovers and roughage sources could offer farmers a range of environmentally beneficial feeding choices. When ruminants are fed food by-products instead of traditional animal feeds, the amount of green plants is decreased, animal milk production is increased, and feed costs are decreased. A promising by-product that can be added to the manufactured sausages is olive mills.

Silage is a type of animal feed made from green foliage crops that have undergone acidification through fermentation to preserve them. It is typically produced by grass crops, such as sorghum, maize, or other cereals.Not just the grain, but the whole green plant. Silage can be produced from a variety of crops, albeit it varies depending on the animal being fed (cattle, sheep, and other similar ruminants). The production of high-quality animal feed is ensured by the suggested modification of silage using olive mills.In this study, examined silages with different molasses and urea rates 0, 1, 2 and 4% and 0, 0.5 and 1% per olive mill dry matter, respectively. The existence of urea and absence of molasses turned to be an inconvenient factor for the creation of silages. Generally, the highest molasses rates the highest efficiency for silages production.

Acknowledgements: This work was created as part of the project

Keywords: Silage, olive miles, molasses , urea

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Silage production from olive mill wastes

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Introduction

Food and Agricultural industries annually produce large quantities of waste and by-products, which are disposed into neighboring open fields polluting the ecosystem and causing serious problems to human and animal health. Circular economy practices propose food wastes as animals' feeds. Olive mills is a promising by-product that can be used as supplement in the produced silages. The purpose of this research was to investigate the best conditions for producing silage for animal feed utilizing olive oil waste from a diphasic olive mill facility. Straw and olive mill waste made up 53 to 55% and 45 to 47% (dry weight basis) of the silage composition, respectively. Various mass ratios of urea (0–1%) and molasse (0–4%) were applied per dry weight of the olive mill. It was discovered that the silage process was inhibited by the presence of urea and the lack of molasses. The silage production efficiency with the highest molasses rating is the highest.

Experimental procedure

In the present study, silage composition using olive fruit, molasses, straw, urea and inoculum was examined. The silages cases was divided into individual air-tight bags. The bags are opened at regular intervals in the first days more often while over time the sampling is diluted The steps of the procedure followed are illustrated in **Figure 1**.

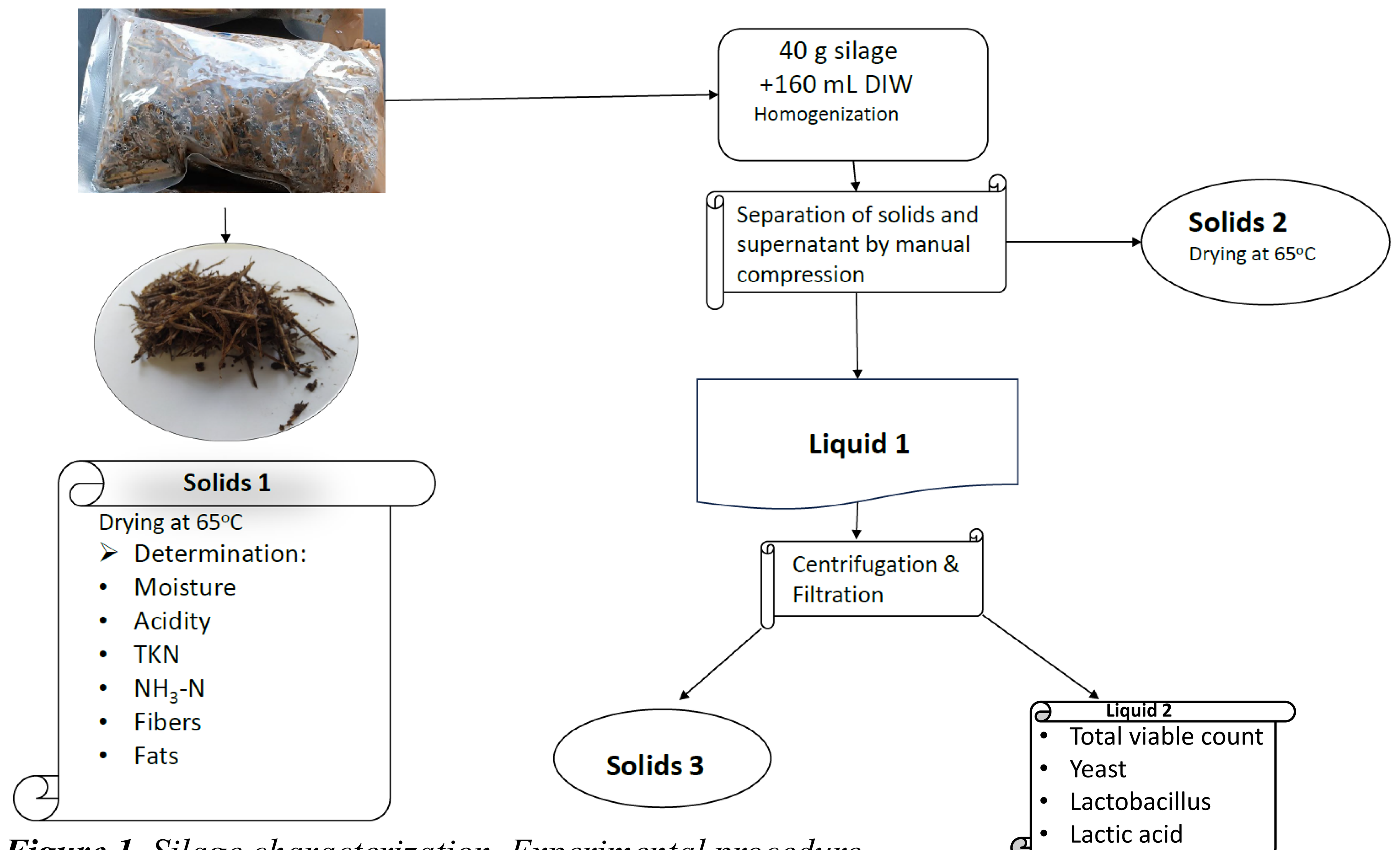

Figure 1. Silage characterization. Experimental procedure.

Composition of silages examined

Component (% per DM of olive mill)	Case No. 1	2	3	4	5	6	7	8	9	10	11	12
Straw	88	87	86	84	88	87	86	84	87	86	85	83
Molasses	0	1	2	4	0	1	2	4	0	1	2	4
Urea	0	0	0	0	0.5	0.5	0.5	0.5	1	1	1	1

Note: The water content of all cases was 68%

Solids 1

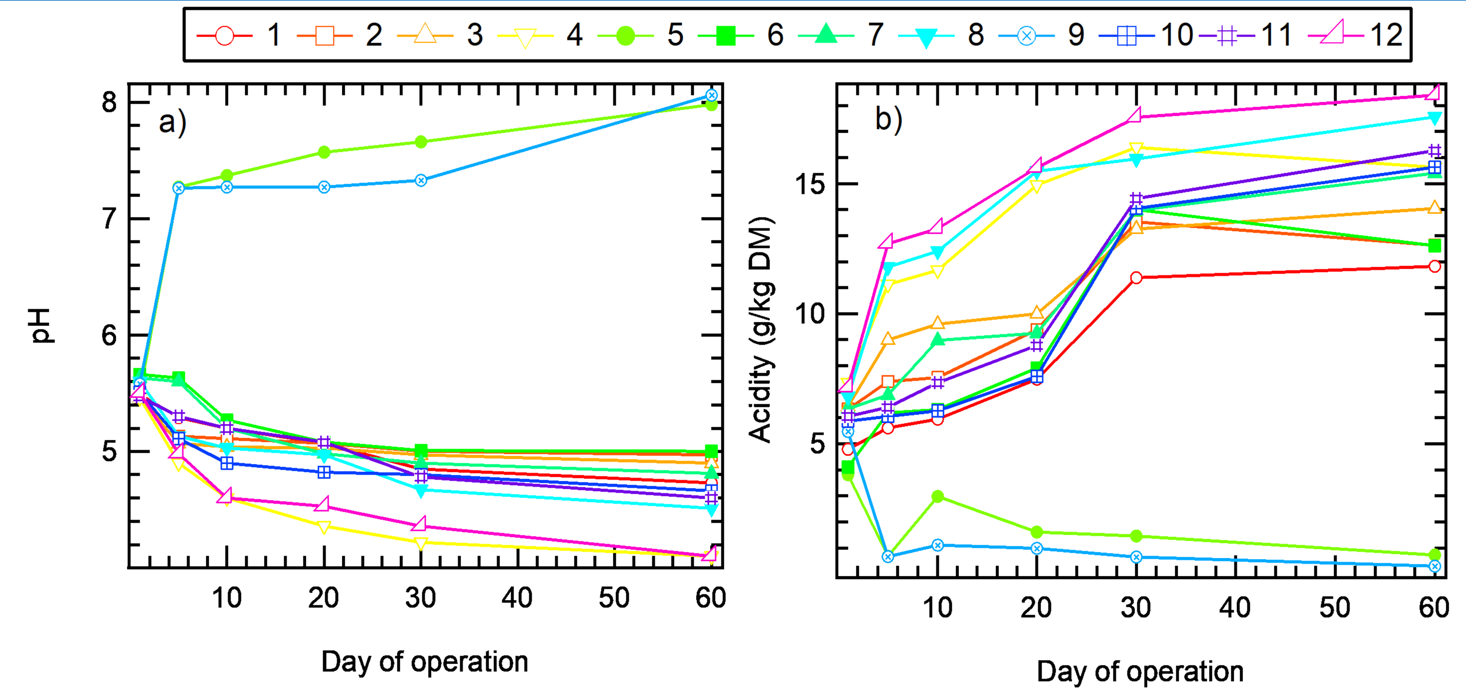

Figure 2. Variation of a)pH and b)acidity of silage cases during the experiment.

- The pH decrease by molasses increase.
- In cases 5 and 9 after day 5 the pH rises.
- The increase of molasses decreases the straw rate from 1.2 to 2.6 times.

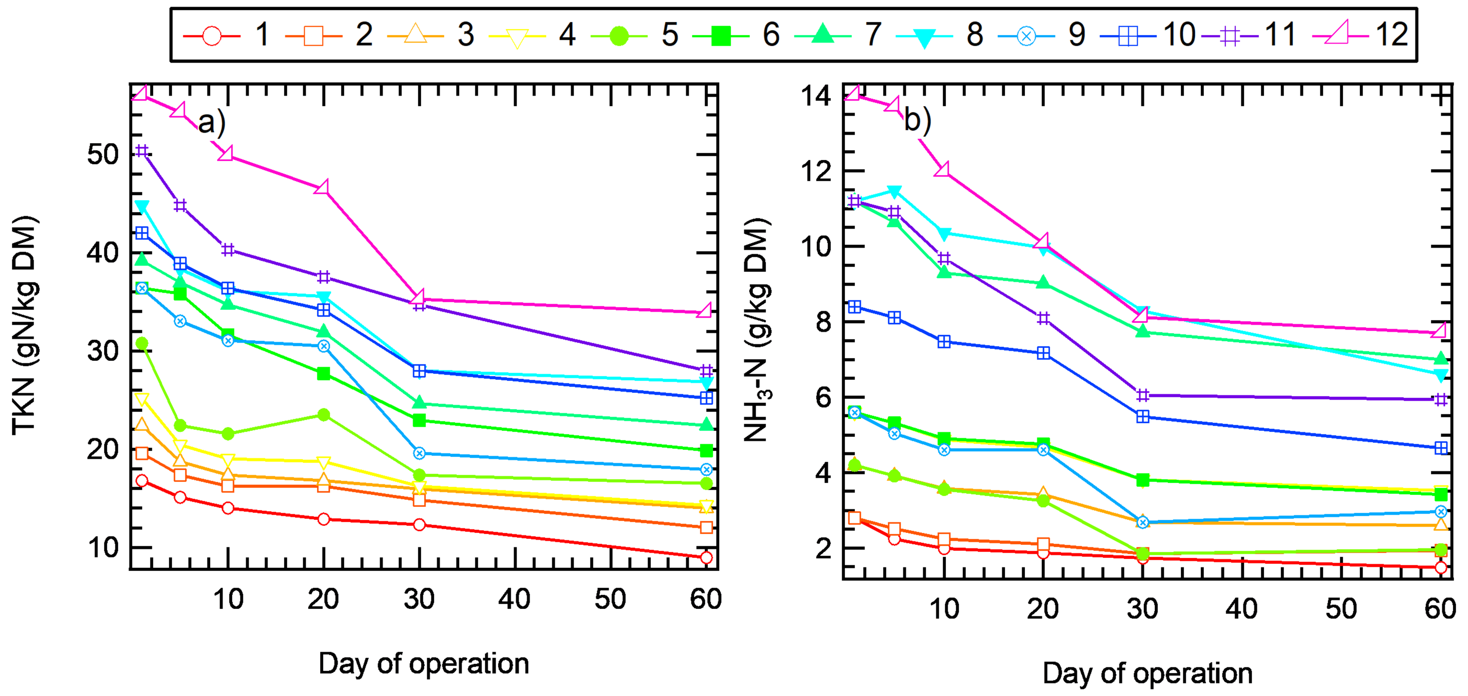

Figure 3. Variation of a)TKN and b)NH3-N of silage cases during the experiment.

- The concentration of N decreases with time in all cases.
- The N content increased by the the concentration of urea and molasses increase.

Liquid 2

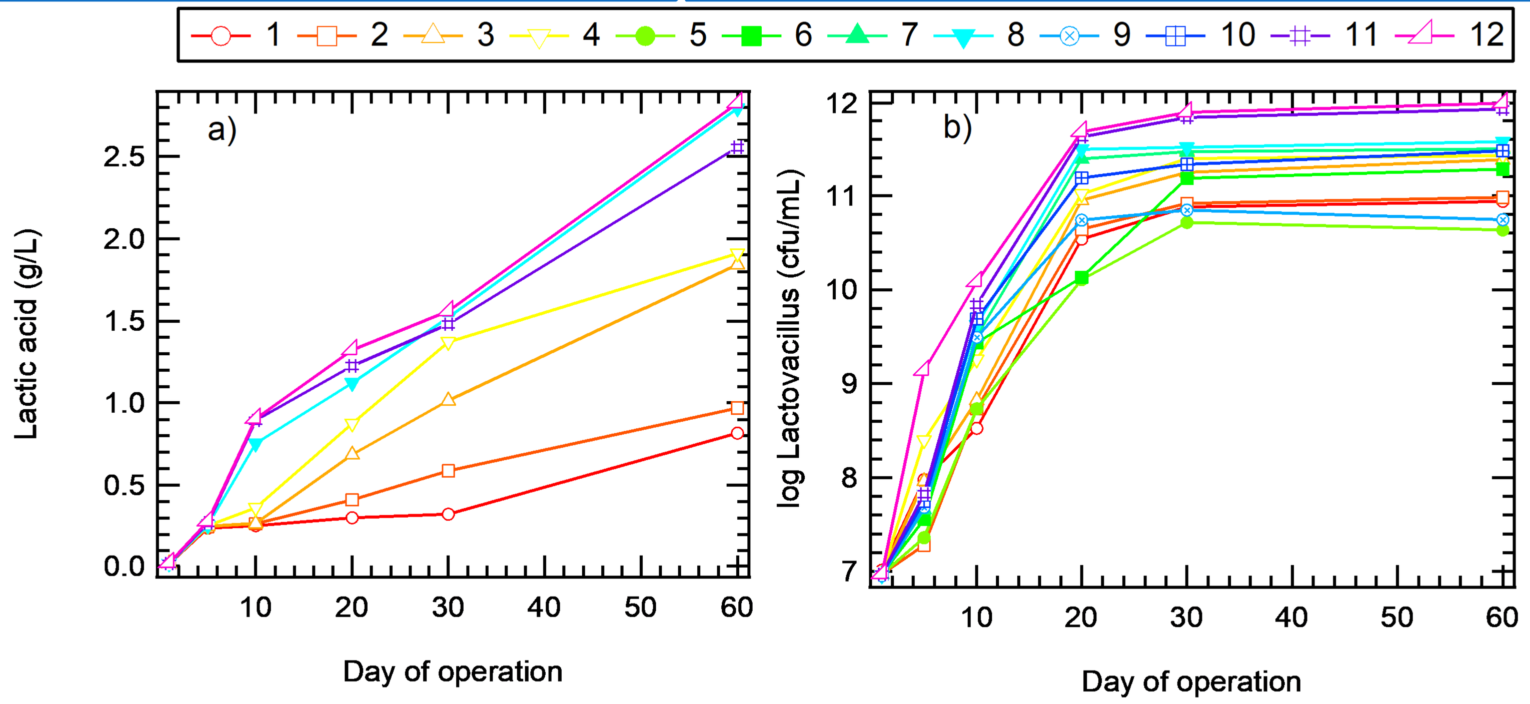

Figure 5. Variation of a)Lactic acid and b) lactobacillus of silage cases during the experiment.

- The population of microorganisms increases over the days.
- In all cases it is observed that the population has a sharp increase after the 20th day of silage.
- Higher increased observed in higher molasses cases.
- With the increase in urea, the concentration of lactic acid also increases.

Conclusions

- ❑ Increasing the concentration of molasses and urea leads to better quality characteristics in acidity, pH and microbial population.
- ❑ Silage cases 4, 8 and 12 have a greater decrease in pH and a higher concentration of nitrogen, microbial load and lactic acid.
- ❑ Silage cases 5 and 9 where no molasses was added, from the 5th day an increase in pH is an indication of stopping the ensiling process.
- ❑ Silage case 12 appears to have the best ensiling performance.
- ❑ Silage cases 8 and 11 appear to have high yield with minor differences from case 12.
- ❑ Case 1 where there is neither urea nor molasses during brewing seems to perform well as well.

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