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Published in:
"*Sustainability*" (an international, scientific, peer-reviewed journal published by MDPI)
08/12/2020

Reducing by up to 50% Enteric Gaseous Emissions of Methane and Carbon Dioxide from dairy cows

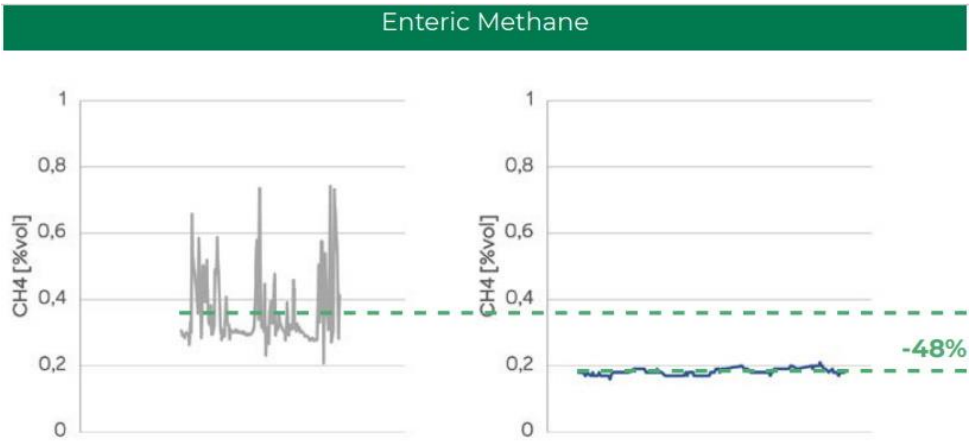
F. Mitloehner[1], M. E. Chiodini[2,3]
[1]University of California, Davis, USA; [2]Università degli Studi di Milano, Italy; [3]SOP Srl., Busto Arsizio, Italy

Background

Animal-sourced foods have come under increased scrutiny due to public awareness and concern over their environmental impacts. Animal-sourced foods can also improve national agricultural alignment to several of the UN Sustainable Development Goals by providing nutritious food to the population and provide stable livelihoods for rural communities [1], where the lack of arable land makes it possible only for ruminants to convert non-edible plants into food. Nevertheless, the agricultural livestock sector has been identified for its contributions to greenhouse gas (GHG) production. In the United States, the livestock sector is estimated to contribute 35% of the anthropogenic methane (CH_4), 72% of which originates from enteric fermentation and 28% from manure management [2]. At the EU level, 53% of anthropogenic methane emissions come from agriculture of which 80.7% originate from enteric fermentation of ruminant species and 17.4 % from manure management [3].
Recently, a new model to calculate the relative contribution of different substances to Global Warming has been developed, which takes into account the short life of Methane in the atmosphere. The GWP* model attributes greater warming potential to CH_4 in the short term, making variations (increases or decreases) in the emission rates of this gas more significant regarding climate. The model calculates that constant emission rates do not contribute to global warming. In addition to this, it shows that reductions of methane emissions of over 10% with respect to current levels would be equivalent to removing CO_2 from the atmosphere, with a potential consequent cooling action.
Several strategies, from changes in feed composition to breeding low methane producing cows, have been investigated. Feed additives are seen as one of the most promising strategies, although some of them have manifested issues, including toxicity to the animals or the environment, short-term effects, or are not yet available to the market due to regulatory constraints.

The SOP Solution

SOP continuously strives to validate the efficacy of its solutions via a combination of constant internal laboratory research processes, in field validation with numerous clients as well as peer review efforts with the leading agricultural universities of the world. SOP's in field research has demonstrated the ability of Star Cow to reduce enteric emissions of Methane and Carbon Dioxide by up to 50%.



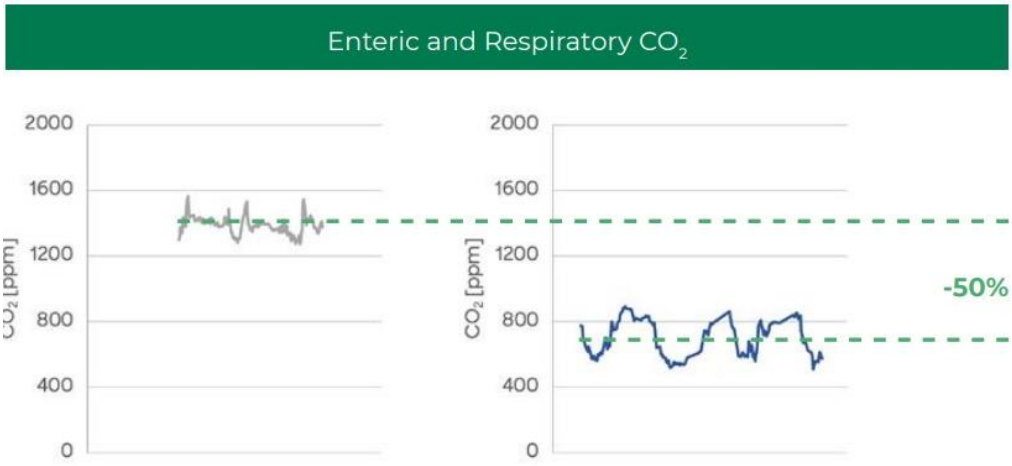


Figure 1: Reduction of enteric Methane and Carbon Dioxide emissions in dairy farms. Benchmark measurements, left, in gray, and measurements from animals using Star Cow, right in blue.

These measurements have been made utilizing carefully calibrated monitoring units that are installed in barns, typically placed in the area(s) where high-level production cows are housed. The units are able to continuously sample the air and provide data corresponding to a ground surface area of approximately 500 m². The benchmark monitoring is done prior to commencing the deployment of the Star Cow product. The subsequent measurements are taken at least ten weeks later in order to allow for sufficient adaptation of the cows' rumen to the conditioning enabled by the use of Star Cow. These in-field research data points represent a further update of previous studies, performed in laboratory conditions, where the measurements were interrupted after only six weeks, resulting in reductions of "only" approximately 20% of the enteric GHG emissions. Those preliminary results were published in the scientific journal "Sustainability" in December 2020[4]. More recent extended monitoring studies commenced in late 2020 and continue to date. These in-depth studies are being conducted in several commercial farms located in northern Italy, utilizing sensors designed to measure the concentrations in the air of Methane, Carbon Dioxide and Ammonia as well as more common environmental parameters, such as temperature and humidity. The results captured continue to support actual reductions of these two critical GHG's by up to 50%

Conclusions

The combination of university studies and empirical in-field analysis confirm the efficacy of Star Cow in mitigating enteric emissions by up to 50% regarding both Methane and Carbon dioxide from dairy cattle. The products very low application rate, its proven safety and numerous other benefits for dairy cows and farmers make it a highly scalable, actionable and economic tool for dairy farmers to reduce their carbon footprint, improve their livelihood while also providing significate benefits to our collective, global fight to mitigate against and adapt to the dramatic effects of climate change

[1] *Adesogan et al., Animal source foods: Sustainability problem or malnutrition and sustainability solution? Perspective matters. Glob. Food Secur. 2020.*
[2] *USEPA. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2015. 2017.*
[3] *European Commission (2020). Communication from the commission to the European parliament, the council, the European economic and social committee and the committee of the regions on an EU strategy to reduce methane emissions.*
[4] *https://www.mdpi.com/2071-1050/12/24/10250*

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"*Sustainability*" (an international, scientific, peer-reviewed journal published by MDPI)
13/02/2020

Mitigation strategies for Ammonia, GHG and odorous emissions from stored liquid manure: a microbial approach

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About this Report

This report originates from a scientific paper published in the journal "*Sustainability*" (https://www.mdpi.com/2071-1050/12/4/1393) in February 2020 by a globally recognized climate emissions team at the University of California, Davis, led by prof. Frank Mitloehner. The purpose of the study was to evaluate the real world efficacy of "SOP LAGOON," a commercial manure additive developed to improve the sustainability parameters for dairy operations worldwide and to mitigate the Greenhouse Gases (GHG), ammonia and unpleasant odor emissions by conditioning microbial activities in manure management.

The Background

Ammonia (NH_3), methane (CH_4), nitrous oxide (N_2O), and carbon dioxide (CO_2) emissions from livestock farms contribute to negative environmental impacts, such as soil and water acidification and climate change. Ammonia emissions (over 80% of which come from manure handling) are a known criteria pollutant that affects human health, and has been recognized by the scientific community as an essential precursor to PM2.5 formation. According to the IPCC, agriculture worldwide contributes 10% to 12% of anthropogenic CO_2, 40% of CH_4, and 60% of N_2O emissions. Some of the manure management practices that seek to reduce these kinds of emissions require significant capital investment and high maintenance costs. Therefore, alternative approaches are often sought, such as the use of additives in slurry storage. A previous study of Borgonovo et al, published in Sustainability in September 2019 (https://www.mdpi.com/2071-1050/11/18/4998), demonstrated that SOP LAGOON is effective in mitigating GHG and ammonia emissions from fresh slurry.

The Study

The study was performed on separated liquid manure, sourced from a commercial dairy farm (900 head, Solano County, CA) which is representative of typical dairy operations. Ammonia (NH_3), Greenhouse gases (GHG), and odorous emissions were measured over time to assess the potential impact of SOP LAGOON for emissions mitigation at source in manure management. The measurements were made continuously over a one-week period to evaluate the fluctuations of the emissions streams along with daily moisture and temperature.

The Results upon Gaseous & Odorous Emissions

The liquid manure treated with the SOP LAGOON additive showed significantly lower emission levels across the entire measured period:

- **Ammonia** (NH_3) **reduced by 45.9%**
- **Methane** (CH_4) **reduced by 22.7%**
- **Nitrous Oxide** (N_2O) **reduced by 45.4%**
- **Carbon Dioxide** (CO_2) **reduced by 14.7%**

The use of SOP LAGOON also significantly reduces odor intensity.

SOP LAGOON & the UN Sustainable Development Goals (SDGs)

Due to the gaseous emissions reductions and the life cycle assessment (as in Borgonovo et al.), the integration of SOP LAGOON into the UN SDG framework for a more sustainable world is recognized and encouraged, especially for SDG3 (Health and Well-being), SDG6 (Water quality) and SDG13 (Climate action). The ability of SOP LAGOON to reduce odorous emissions also allows the farms to mitigate their impact on potential conflicts with the surrounding communities, improving their compliance with SDG11 (Sustainable communities) and SDG17 (Partnership for the goals).

The UC Davis Research Team

Prof. Dr. Frank Mitloehner, PhD, is Professor and Air Quality Extension Specialist, Department of Animal Science at University of California - Davis. He served as Chairman at FAO for the Partnership Project for the Benchmarking of Environmental Impacts of the Global Livestock Supply Chains, LEAP. His team's research areas include measurements and mitigation of greenhouse gases, ammonia, and the study of their effects on human- and animal health and welfare, investigating the nexus of agricultural productivity and environmental sustainability.

The SOP Product

SOP LAGOON is a commercial additive for liquid manure, on the market for over 15 years in the EU and North America, based on Calcium Sulfate dihydrate, and processed with a proprietary technology. The SOP technical process is designed to work positively with the microbial communities present in liquid manure to achieve better environmental outcomes for farmers, their communities, and the planet. The primary commercial goals of SOP LAGOON are to reduce energy consumption on farm by maintaining manure fluidity, to reduce strong odors, and to mitigate gaseous emissions, such as ammonia, for improved farm productivity on a lower cost basis.

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12/09/2019

Mitigation strategies for Ammonia and GHG emissions from stored liquid manure: a microbial approach

M. Guarino, F. Borgonovo, C. Conti
Department of Environmental Science & Policy, Università degli Studi di Milano, Italy

About this Report

This report originates from a scientific paper published in the journal "Sustainability" (https://www.mdpi.com/2071-1050/11/18/4998) in September 2019 by a leading environmental and climate emissions team at the University of Milan. The purpose of the study was to evaluate the real world efficacy of "SOP LAGOON," a commercial manure additive developed to improve the sustainability parameters for dairy operations worldwide by conditioning microbial activities in manure management.

The Background

Ammonia (NH_3), methane (CH_4), nitrous oxide (N_2O), and carbon dioxide (CO_2) emissions from livestock farms contribute to negative environmental impacts, such as soil and water acidification and climate change. Ammonia emissions are a known criteria pollutant that affects human health, and has been recognized by the scientific community as an essential precursor to PM2.5 formation. According to the IPCC, agriculture worldwide contributes 10% to 12% of anthropogenic CO_2, 40% of CH_4, and 60% of N_2O emissions. Some of the manure management practices that seek to reduce these kinds of emissions require significant capital investment and high maintenance costs. Therefore, alternative approaches are often sought, such as the use of additives in slurry storage. SOP LAGOON was also tested by prof. Mitloehner and his team at UC Davis, showing significant results in mitigating the ammonia, GHG and odor emissions from separated liquid manure (Petersen et al., Sustainability, February 2020, https://www.mdpi.com/2071-1050/12/4/1393).

The Study

The study was performed on fresh liquid manure, sourced from a commercial dairy farm, which is representative of typical dairy operations. Ammonia (NH_3) emissions and Greenhouse gases (GHG), as well as the chemical characteristics of the liquid manure, were measured over time to assess the potential impact of SOP LAGOON for emissions mitigation at source in manure management. A Life Cycle Assessment (LCA) of SOP treated liquid manure was also performed in order to evaluate the results within a whole system approach, including the impact of using liquid manure as crop fertilizer.

The Results upon Gaseous Emissions

The manure treated with the SOP LAGOON additive showed significantly lower emission levels starting from day 4 after the first application in the manure:

- **Ammonia** (NH_3) **reduced by 100%**
- **Methane** (CH_4) **reduced by 21.5%**
- **Nitrous Oxide** (N_2O) **reduced by 100%**
- **Carbon Dioxide** (CO_2) **reduced by 22.9%**.

The Results from the Life Cycle Assessment

Two life cycle scenarios were compared, one with and one without the addition of SOP LAGOON. The Alternative Scenario, i.e. the scenario with the addition of the product, proved to be the most effective with the greatest results in the Climate Change Mitigation, Particulate Matter Formation, and Terrestrial Impact categories, as the product reduces

gaseous emissions without accumulating nitrates in the slurry, thus making it a valid and valuable substitute for synthetic fertilizers.
Due to the emissions reductions and the life cycle assessment, the desire to integrate SOP LAGOON into the UN SDG framework for a more sustainable world is recognized and encouraged, especially for SDG6 and SDG13.

The University of Milan Research Team

Prof. Dr. Marcella Guarino, PhD, is Associate professor at University of Milan, in the Department of Environmental Science and Policy. She is Chairperson at the European Association of Precision Livestock Farming. Her team's research areas include monitoring air emissions from farms and the identification of techniques and strategies to reduce the impact of livestock operations on the environment. Dr. Marcello Chiodini, PhD researcher at the University of Milan and SOP collaborator supplied the technical details regarding the product.

The SOP Product

SOP LAGOON is a commercial additive for liquid manure, on the market for over 15 years in the EU and North America, based on Calcium Sulfate dehydrate, and processed with a proprietary technology. The SOP technical process is designed to work positively with the microbial communities present in liquid manure to achieve better environmental outcomes for farmers, their communities, and the planet. The primary commercial goals of SOP LAGOON are to reduce energy consumption on farm by maintaining manure fluidity, to reduce strong odors, and to mitigate gaseous emissions, such as ammonia, for improved farm productivity on a lower cost basis.

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Presented at:
Mastitis Research Workers NMC Meeting
(Phoenix, Arizona, USA – 2016)

Case Report: Clinical Mastitis Monitoring on a Commercial Arizona Dairy Farm

P. Luparia[1], N. Rota[2], M. Poggianella[1], C. Cannizzaro[1], S. Smalley[3], V. Bronzo[2]
[1]SOP Srl, Busto Arsizio (VA), Italy; [2]Department of Health, Animal Science and Food Safety, Università degli Studi di Milano, Italy; [3]Dairy Decisions LLC, Phoenix (AZ) USA

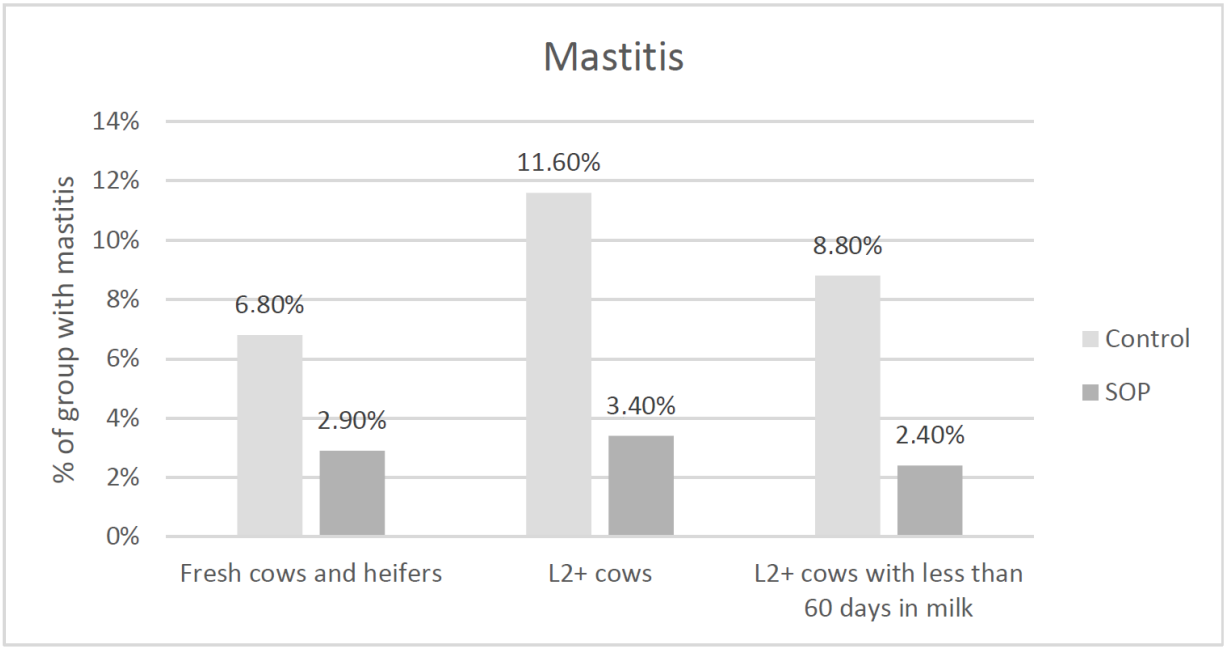
Objectives

The aim of this case study was to assess the efficacy of a commercial product (SOP) on the clinical mastitis rate on a commercial dairy farm located in Arizona (U.S.A.).

Materials & Methods

Formula	SOP SQC 233 + SQE 034
No. animals	3,000 dairy cows, of which 1,275 were fresh (399 primiparous and 876 pluriparous)
Materials & Methods	Comparison between two groups from the same farm (1 SOP, 1 control) Fresh cows and heifers: 516 control vs 759 with SOP L2+ cows: 224 control vs 652 with SOP L2+ cows with less than 60 days in milk: 351 control vs 917 with SOP. The cows were monitored from 15/07/14 to 15/10/14.
Evaluated parameters	Mastitis incidence per month
Statistical significance	P<0.01%

Results & Graphs



Conclusions

SOP can be an effective method in controlling the mastitis rate in commercial dairy farms.

Presented at:
ESVCN Congress
(Toulouse, France - 2015)

Preliminary results of in-field monitoring of a feed additive for rumen functionality on 7 Italian commercial dairy farms

P. Luparia[1], N. Rota[2], M. Poggianella[1], V. Bronzo[2]
[1]SOP srl, Busto Arsizio, Italy; [2]Department of Health, Animal Science and Food Safety, Università degli Studi di Milano, Italy

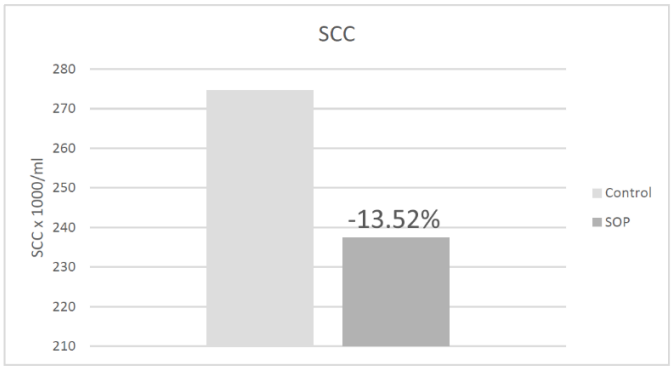
Objectives

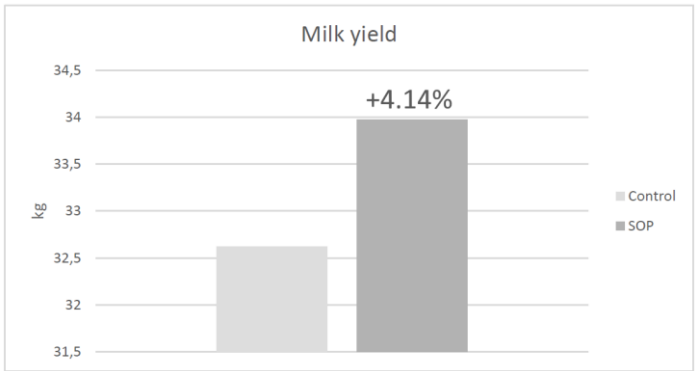
The aim of this study was to assess the efficacy of a commercial additive (SOP) on dairy cow rumen wellbeing and on milk yield and quality.

Materials & Methods

Formula	SOP SQC 233 + SQE 034 + SQC 005A
No. of animals	1,357 (7 commercial Italian dairy farms were involved in this trial with 75 to 330 lactating cows each)
Materials & Methods	A period of 1 year before treatment was compared to a period of 1 year after use of the feed additive. All the farms were located in the same area, used corn silage and fodder produced on site, with commercially available concentrates, and used comparable herd management and milking routines. No changes were made during the whole trial period in any aspect of the dairy herd management.
Evaluated parameters	SCC; Milk yield
Statistical significance	P<0.05 (SCC); P<0.01 (production)

Results & Graphs





Conclusions

Due to the action of the SOP technology on the gut microbiota, the quality and the quantity of the milk yield can be increased.

Presented at:
ADSA-AMPA-ASAS-CSAS-WSASAS
Joint Annual Meeting
(Phoenix, Arizona, USA - 2012)

Investigation of a bio-hygienizing additive for oral use in dairy cows: effect on the somatic cell count in milk

P. Luparia[1], M. Poggianella[1], V. Bronzo[2]
[1]SOP Srl, Busto Arsizio (VA), Italy; [2]Department of Health, Animal Science and Food Safety, Università degli Studi di Milano, Italy

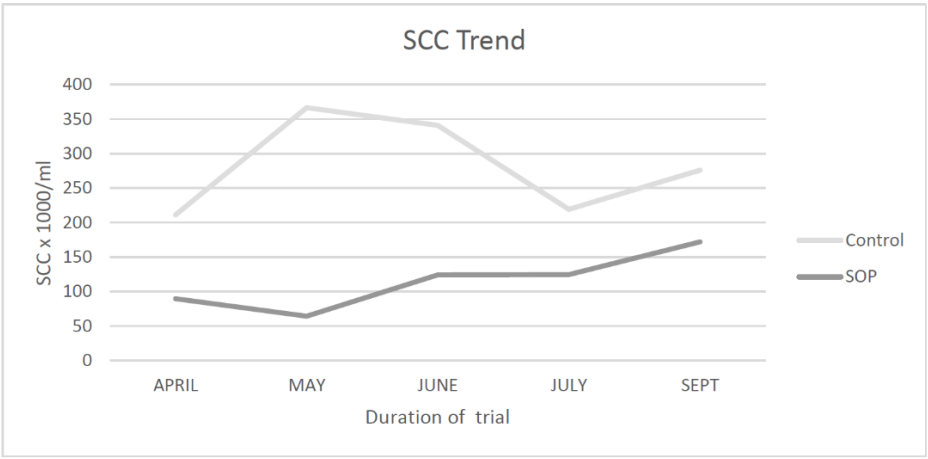
Objectives

The aim of this study was to evaluate the efficacy of a technological feed additive (SOP) to be added to the feed in the mixing wagon, on the somatic cell count in milk on a commercial dairy farm situated in Northern Italy.

Materials & Methods

Formula	SOP SQC 233 + SQE 034
No. of animals	140 lactating cows
Materials & Methods	The cows were monitored from April 2011 until September 2011, a period chosen for its critical somatic cell levels due to the seasonal increase in temperature. The data was elaborated using the statistical software SPSS 19.0 (IBM, SPSS, New York, U.S.A.) and the average SCC values were compared to the Linear Score (LS) via analyses of the variance in the generalized linear model.
Evaluated parameters	SCC
Statistical significance	P<0.01

Results & Graphs



Comments after publication: The graph represents the SCC trend measured during the study. The SCC data of April is the first data recorded after beginning treatment.

Conclusions

SOP helps control the SCC especially in the most susceptible animals of the herd, such as the primiparous cows.

Presented at:
NMC 50th Annual Meeting
(Arlington, Virginia, USA - 2011)

SOP treatment of separated manure solids to reduce Klebsiella bacteria counts

H. Lynn Sharkey[1], A. Zanierato[2], P. Luparia[2], M. Poggianella[2], P. Moroni[1], Y. H. Schukken[1]

[1]Quality Milk Production Services, Cornell University, Ithaca, New York, USA; [2]SOP Srl, Busto Arsizio (VA), Italy

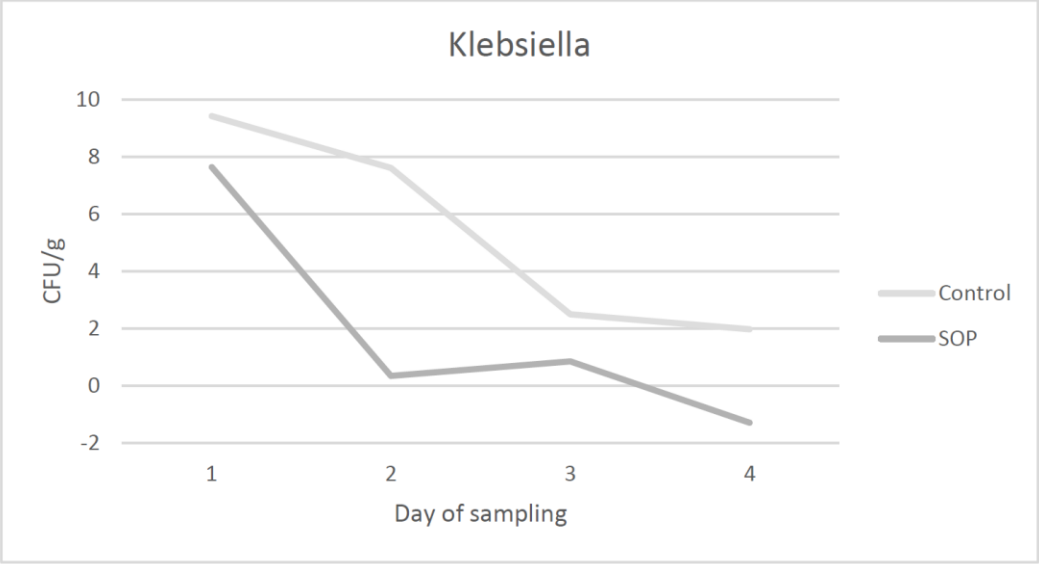
Objectives

The aim of this study was to evaluate the effects of a Bio-hygienization treatment (SOP) on the bacterial populations (Streptococci and Klebsiella) and compare the bacteria counts in two separated manure solid heaps in a Bauer-Fan Bedding Recovery Unit.

Materials & Methods

Formula	SOP SQC 233
Amount of manure	two heaps of approximately 3 m^3
Materials & Methods	Sampling consisted of aseptically taking samples every day from day 0 just before treatment (SOP), then on day 1, 2 and 3 and then, once, on day 7. 5 samples were taken every day from a depth of 20-30 cm, 5 samples from 40 to 60 cm and another 5 samples from a depth of 60-100 cm.
Evaluated parameters	Klebsiella
Statistical significance	P<0.01

Results & Graphs



Comments after publication: the graph above shows an average reduction of more than 90% of the Klebsiella CFU, with a value of 99.9% on the 2nd day of treatment.

Conclusions

The SOP products can affect very specific bacteria and help reduce them.

Presented at:
NMC 50th Annual Meeting
(Arlington, Virginia, USA - 2011)

Annual monitoring of the SCC on a commercial Italian farm treated with SOP

A. Zanierato[1], M. Casalone[2], P. Luparia[1], V. Bronzo[3], P. Moroni[3,4]

[1]SOP srl, Busto Arsizio, Italy; [2]Freelance veterinary, Turin, Italy; [3]Department of Veterinary Pathology, Hygiene and Public Health, Faculty of Veterinary Medicine, Università degli Studi di Milano, Italy; [4]Dept. of Population Medicine and Diagnostic Sciences, Quality Milk Yield Production Services, Cornell University, Ithaca NY, USA.

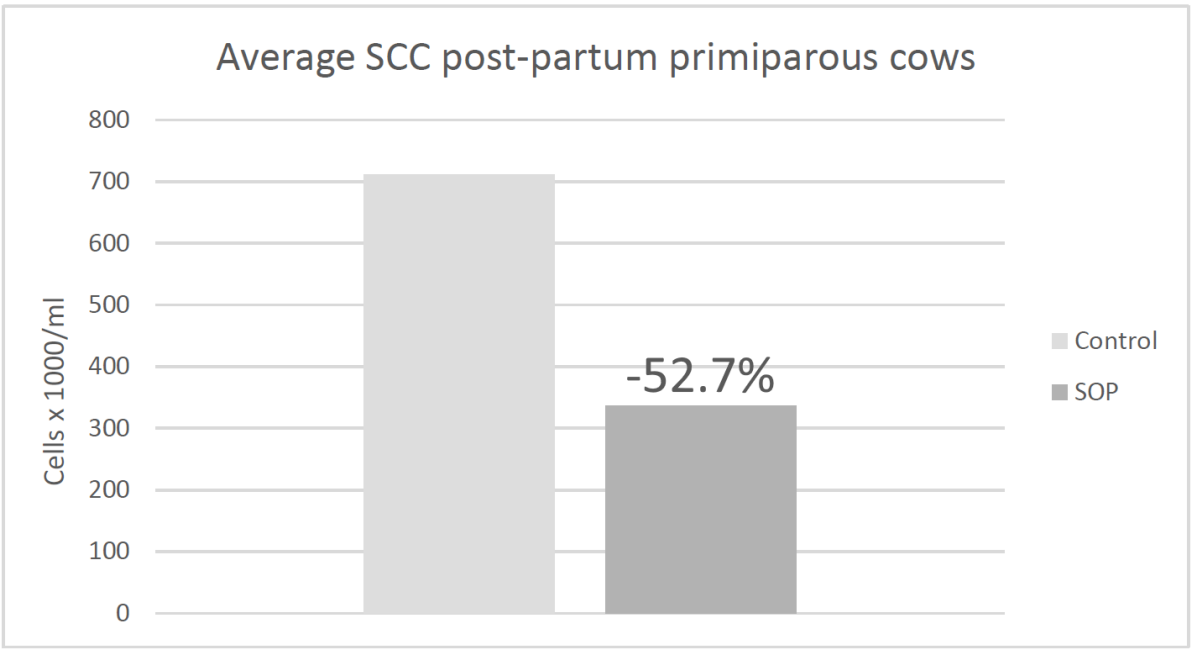
Objectives

The aim of this experiment was to evaluate the influence of a bio-hygienization treatment (SOP) on the dynamics of some pathogenic bacterial species.

Materials & Methods

Formula	SOP SQC 233 + SQE 034
Amount of manure	395
Materials & Methods	The monitoring of the somatic cells in the primiparous animals in the treated area (SOP) were compared to the primiparous control kept in untreated areas (standard), by the collection of data during the first DHI monthly controls after calving, in the period from December 2009 to July 2010.
Evaluated parameters	SCC
Statistical significance	P<0.01

Results & Graphs



Conclusions

The SOP products keep the environmental pathogenic microbial load under control and help reduce the SCC.

Presented at:
Buiatrics World Congress
(Santiago, Chile - 2010)

Monitoring the effects of a Bio-hygienization treatment on the growth performance of calves for replacement heifers

A. Zanierato[1], I. Accorinti[1], P. Luparia[1], V. Bronzo[3], E. Tetone[2], K. Leslie[2]
[1]SOP s.r.l. Busto Arsizio (VA), Italy; [2]Department of Population Medicine, Ontario Veterinary College, University of Guelph, Ontario, Canada; [3]Department of Veterinary Pathology, Hygiene and Public Health, Faculty of Veterinary Medicine, Università degli Studi di Milano, Italy

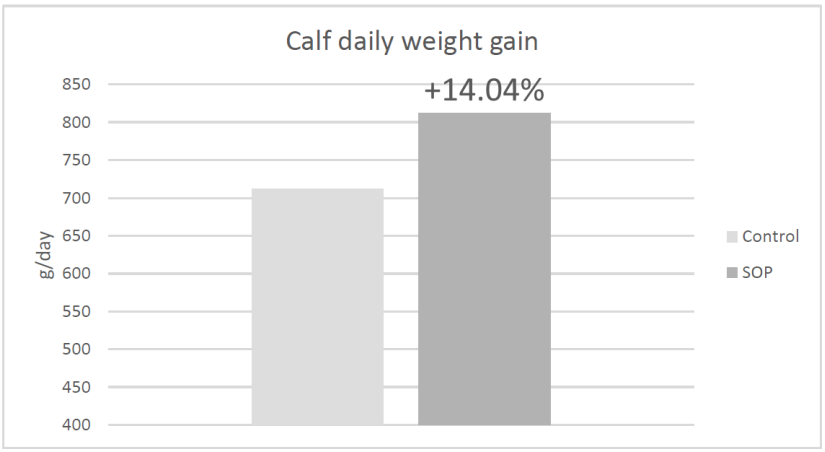
Objectives

The aim of this research was to evaluate the effects of a Bio-hygienization treatment (SOP) on maternity and calf pen bedding, regarding environmental factors and the health and growth performance of commercial replacement heifer calves.

Materials & Methods

Formula	SOP SQC 234
No. of animals	19 heifer calves
Materials & Methods	The investigation involved 19 heifer calves on a commercial dairy farm in Ontario, Canada. Maternity pens were randomly assigned to either bio-hygienized (SOP) bedding or no treatment (standard). Individual calf pens and communal weaned calf pens were likewise assigned. The trial lasted 120 days (May 14th 2009 – Sept. 14th 2009).
Evaluated parameters	Health and growth performance of commercial replacement heifer calves
Statistical significance	$P<0.05$

Results & Graphs



Conclusions

The SOP products reduce the causes of stress in farm animals, allowing them to be more productive.

Presented at:
NMC 49th Annual Meeting
(Albuquerque, New Mexico, USA - 2010)

Monitoring of the efficacy of a Bio-hygienization treatment on the reduction of the microbial load in cubicles with mats of an Italian dairy herd

M. Favretti[1], P. Moroni[2], V. Bronzo[2], S. Cavalli[3], A. Zanierato[3]
[1]Istituto Zooprofilattico Sperimentale delle Venezie, San Donà di Piave (VE), Italy; [2]Department of Veterinary Pathology, Hygiene and Public Health, Faculty of Veterinary Medicine, Università degli Studi di Milano, Italy; [3]SOP srl, Busto Arsizio, Italy

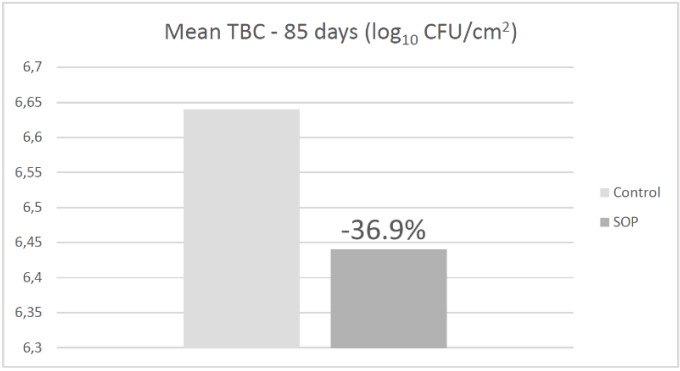
Objectives

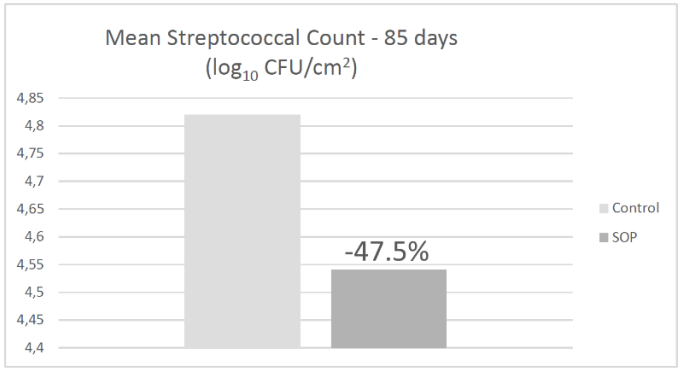
The aim of this study was to investigate the influence of a bio-hygienization treatment (SOP) on cubicles/stalls with synthetic rubber mats, evaluating its influence on the dynamics of the microbial populations during the spring/summer period.

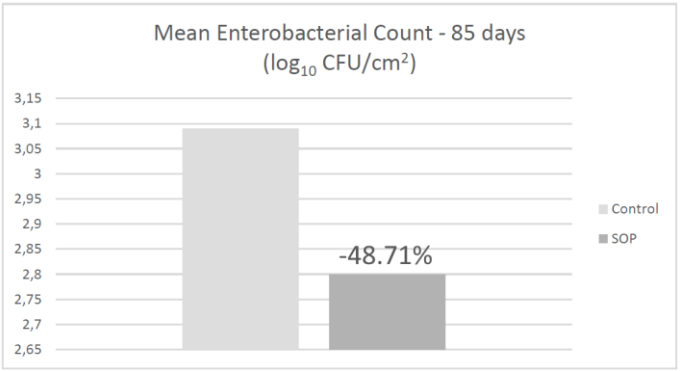
Materials & Methods

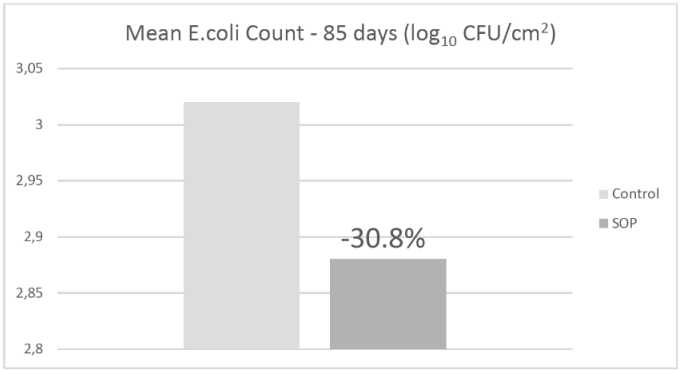
Formula	SOP SQC 233 + SQE 034
No. of animals	40
Materials & Methods	The cows on a commercial dairy farm were divided into two groups of 20 cattle each, all at a similar stage of lactation: Group 1 (Control) and Group 2 (SOP). In each group, 5 cubicles/stalls were identified, evenly spaced within the barn, from which microbiological samples were taken every 15 days during the period from February to June 2009.
Evaluated parameters	TBC; Streptococcal Count; Total Coliforms Count; E. Coli
Statistical significance	P<0.05

Results & Graphs









Conclusions

SOP also helps decrease the mastitis-causing microbial load on rubber mats.

Presented at:
NMC 48th Annual Meeting
(Charlotte, North Carolina, USA - 2009)

Monitoring of the efficacy of a Bio-hygienization treatment on the reduction of the microbial load in cubicles of an Italian herd

V. Bronzo[1], A. Zanierato[2], R. Varano[3], P. Moroni[1]
[1]Department of Veterinary Pathology, Hygiene and Public Health, Faculty of Veterinary Medicine, Università degli Studi di Milano, Italy; [2]SOP srl, Busto Arsizio, Italy; [3]Animal Production Practitioners, Italy

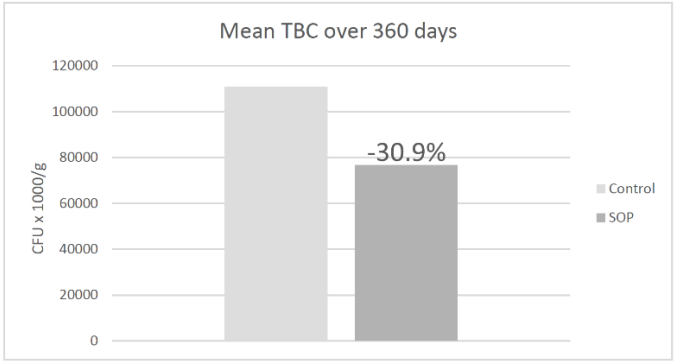
Objectives

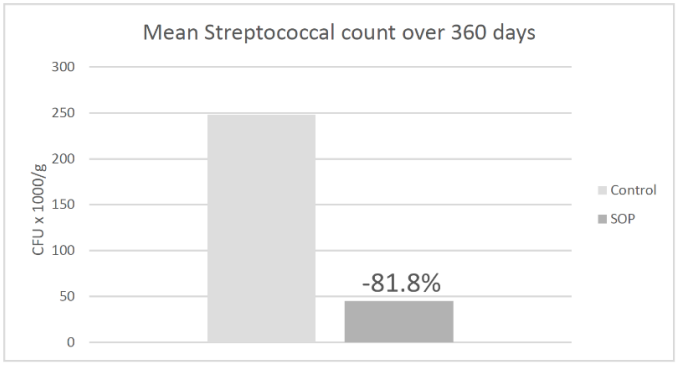
The aim of this study was to evaluate the influence of a Bio-hygienization treatment (SOP) on the dynamics of some pathogenic bacterial species.

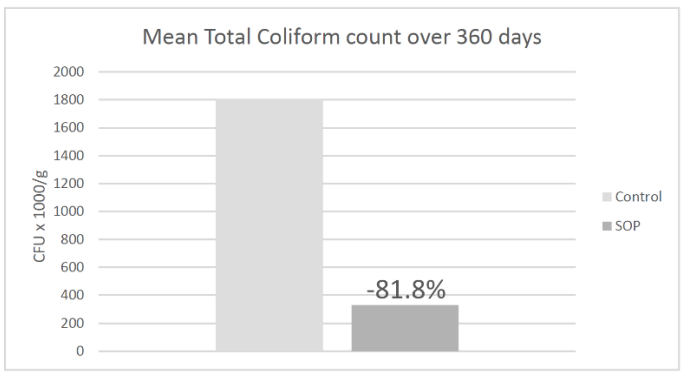
Materials & Methods

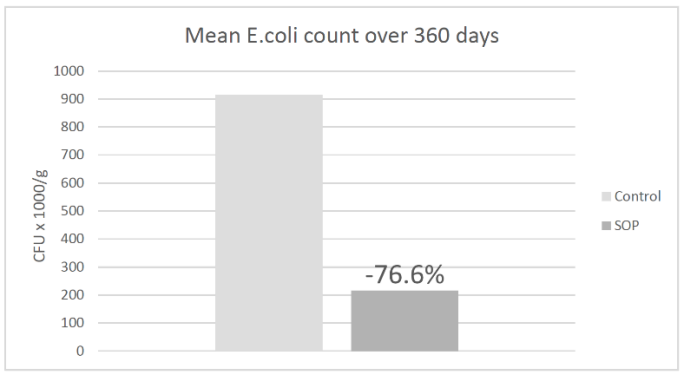
Formula	SOP SQC 233 + SQE 034
No. of animals	140
Materials & Methods	The cows on a commercial dairy farm, in cubicles and on a base of separated manure solids covered with chopped wheat straw, renewed weekly, were divided into two groups of 70 animals each: Group 1 (SOP) and Group 2 (Control). These were monitored over a period of 360 days from the beginning of treatment (July 2007-July 2008) taking samples every 20 days.
Evaluated parameters	TBC; Streptococcal Count; Total Coliforms Count; E. coli
Statistical significance	P<0.05

Results & Graphs









Conclusions

SOP reduces the TBC and thus decreases the risk of udder contamination with mastitis-causing bacteria.

Presented at:
NMC 47th Annual Meeting
(New Orleans, Louisiana, USA - 2008)

Efficacy of a Bio-hygienization additive in controlling the yeast-like microalga Prototheca zopfii

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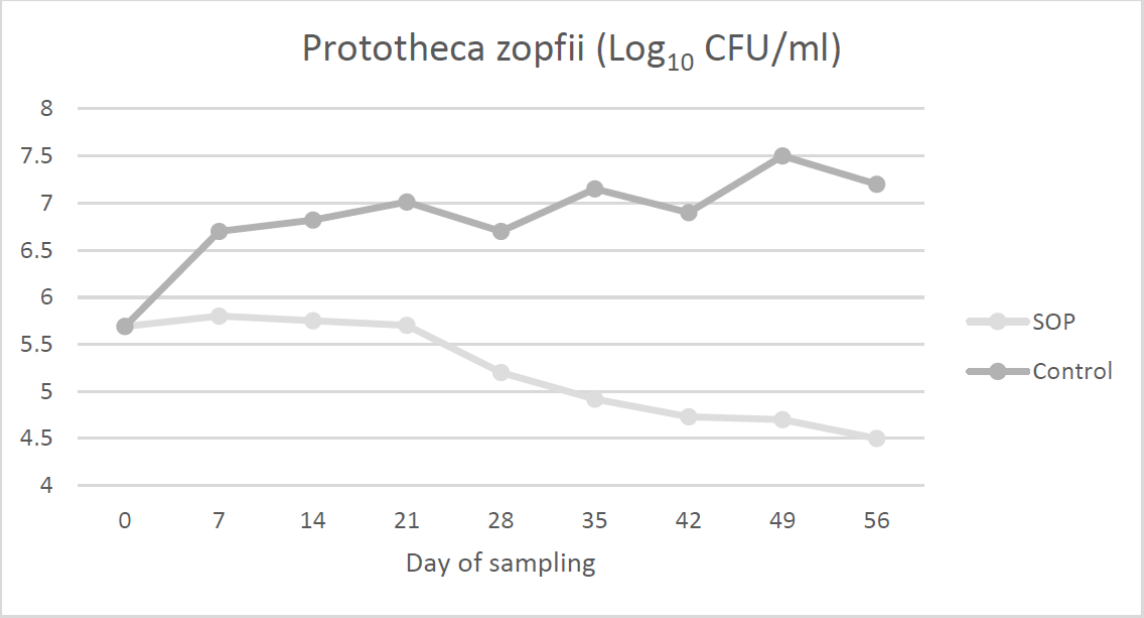
Objectives

The aim of this study was to evaluate the capacity of a product (SOP), in vitro, to reduce the concentration of viable P. zopfii cells.

Materials & Methods

Formula	SOP SQC 233 +SQE 034
No. of animals	In vitro
Materials & Methods	An aliquot of a suspension of growing cells from the strain was inoculated into a sterile manure sample. SOP was then added (SOP sample). Subsequently, every 7 days, SOP was added again. After some time, another sample was incubated without treatment (control). The statistical evaluation of the results was carried out by ANOVA.
Evaluated parameters	Microalga Prototheca zopfii
Statistical significance	P<0.01

Results & Graphs



Conclusions

SOP helps decrease the number of Prototheca cells and, thus, could be useful in keeping the concentrations of viable P. zopfii cells on cattle farms under control.

Presented at:
NMC 46th Annual Meeting
(San Antonio, Texas, USA - 2007)

Efficacy of a Bio-hygienization additive on microbial control in dairy cow bedding

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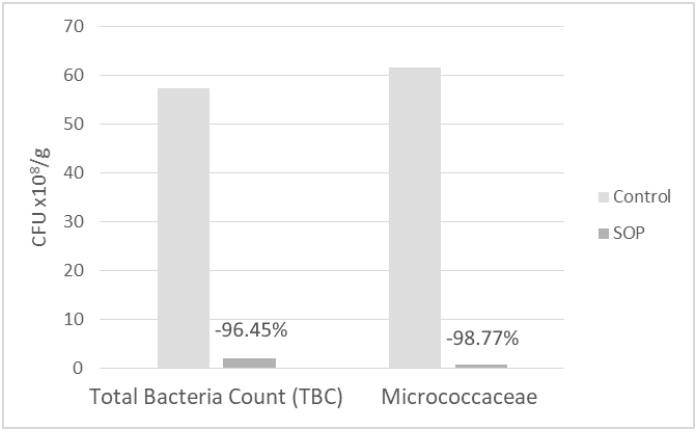
Objectives

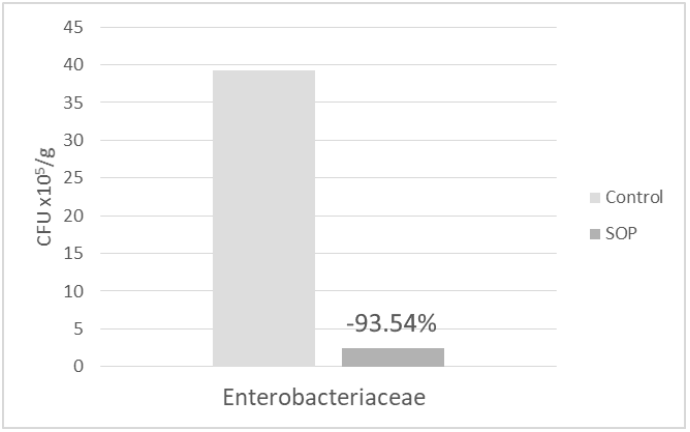
The aim of this field study was to investigate the efficacy of an additive (SOP), as an agent for microbial control in dairy cow bedding and in reducing the somatic cell count in milk.

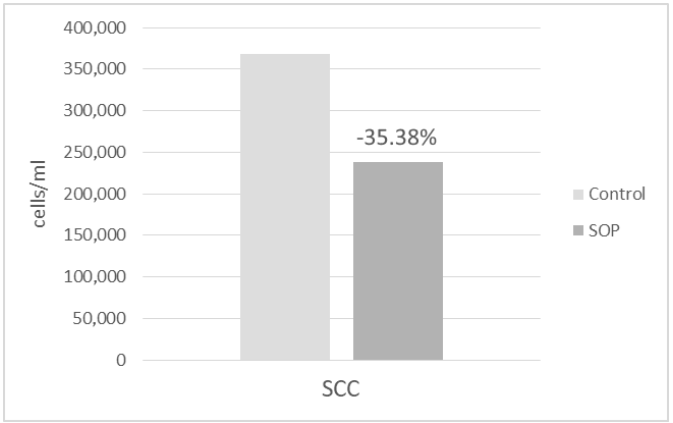
Materials & Methods

Formula	SOP SQC 233 + SQE 034
No. of animals	60 lactating cows, free-stall housed
Materials & Methods	The study was carried out over two years (2004-2005) on a commercial Umbrian Herd (Central Italy) consisting of 60 lactating, free-stall housed cows, on straw bedding. Feed and water were available ad libitum.
Evaluated parameters	Total aerobic bacterial count, Micrococcaceae and Enterobacteriaceae and SCC/ml
Statistical significance	P = 0.004 (TBC); P = 0.0002 (Micrococcaceae); P = 0.01 (Enterobacteriaceae); P = 0.0001 (SCC)

Results & Graphs







Conclusions

SOP not only has an effect on the TBC in bedding, but also helps decrease the SCC in milk.

Presented at:
4th World Italian Beef Cattle Congress
(Gubbio, PG, Italy - 2005)

Evaluation of the efficacy of a litter additive in the control of Staphylococcus spp. and coliform levels: preliminary results of a field trial on organic Chianina beef cattle

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Objectives

This field study was carried out to evaluate the efficacy of an additive (SOP) as an agent in the control of some microorganisms in cattle bedding.

Materials & Methods

Formula	SOP SQC 233
Materials & Methods	2 pens, one control and one SOP.
Evaluated parameters	Staphylococcus spp.; Coliforms
Statistical significance	P = 0.089927 (Staphylococcus spp.) and P = 0.05558 (Coliforms)

Results & Graphs

Conclusions

SOP can decrease the total amount of Coliforms and Staphylococcus in cattle bedding.