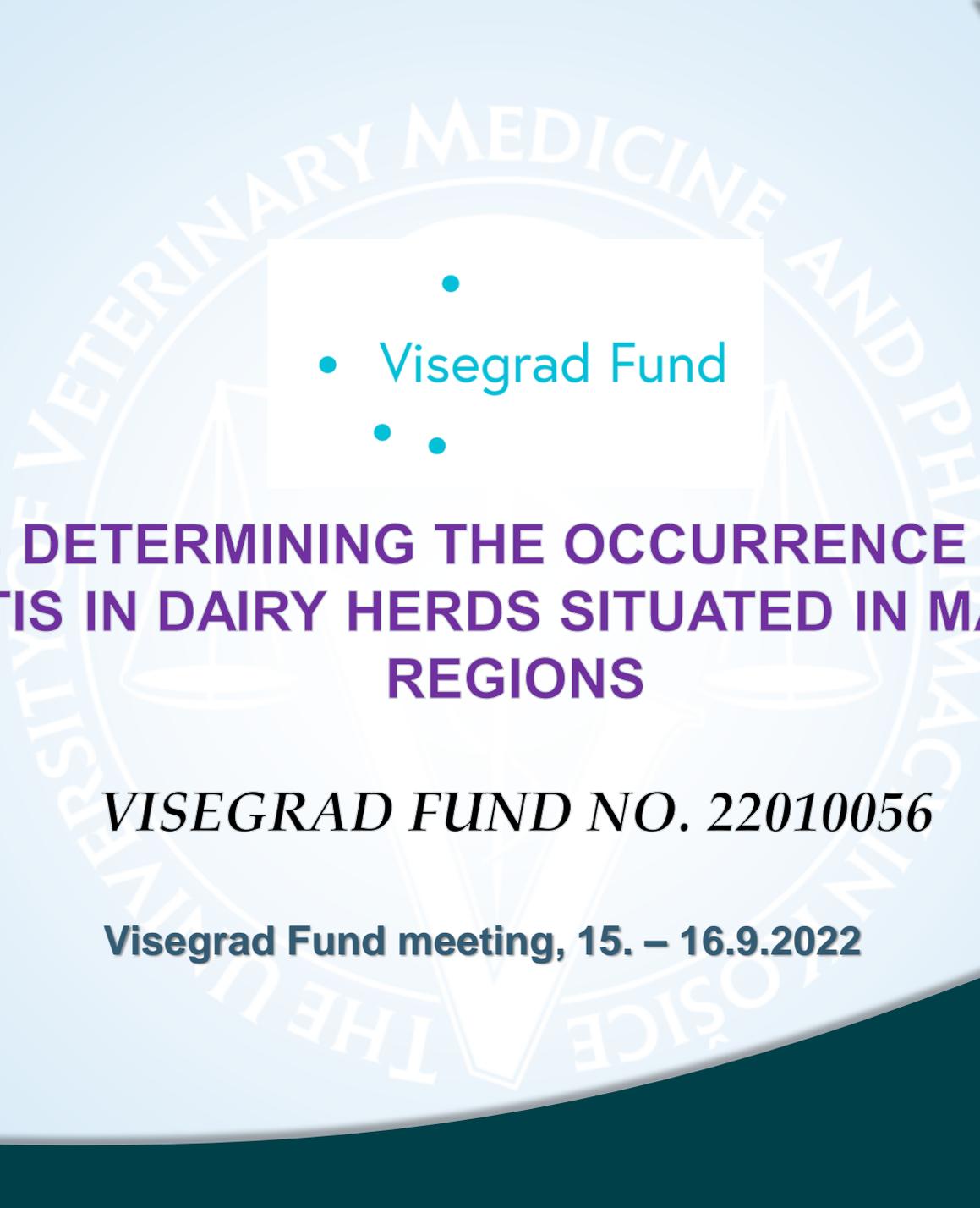


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- - Visegrad Fund
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FACTORS DETERMINING THE OCCURRENCE OF BOVINE MASTITIS IN DAIRY HERDS SITUATED IN MARGINAL REGIONS

VISEGRAD FUND NO. 22010056

Visegrad Fund meeting, 15. – 16.9.2022

Implementation and participating countries

Start of project: 01/2020

Finisf of project: 09/2022

The general mission of Visegradfund is to advance ideas for sustainable regional cooperation in Central Europe.

Slovakia

Czech Republic

Hungary

Poland

Organizations

Main applicant: University of Veterinary Medicine and Pharmacy in Košice, Slovakia

- Coordinator of the project: František Zigo, Assoc. prof., DVM, PhD.
- co-researcher: Silvia Ondrašovičová, DVM, PhD.

Partner 1: University of Veterinary and Pharmaceutical Sciences Brno, Czech Republic

- co-researcher: Šárka Bursová, Assoc. prof., DVM, PhD.

Partner 2: University of Veterinary Medicine Budapest, Hungary

- co-researcher: David Sandor Kiss, Assoc. prof., Dr. PhD.

Partner 3: Wroclaw University of Environmental and Life Sciences, Poland

- co-researcher: Ewa Pecka-Kielb, Dr. inž., PhD.

Budget overview

valid for the entire duration of the project

- Accommodation and board: 4720.0 EUR
- Office supplies/consumption material: 205.0 EUR
- Printing/publishing costs: 1450.0 EUR
- Transportation and postage: 1615.0 EUR
- Project overhead costs/ per diems 1303.0 EUR
- Operating costs / energy 1000.0 EUR
- **Total:** **10 293.0 EUR**

Objectives of the project

- The main objective of the project is international cooperation of university research teams from V4 countries with the focus on the **detection and prevention of mastitis in dairy cattle farms located in marginal regions.**
- In addition to the diagnostics of mastitis in dairy cows, the investigators are deal with the quality and safety of the raw milk and dairy products produced on the farms.



Marginal regions or less flavoured areas

- The relatively large parts of V4 territory with agricultural production are peripheral or the so-called “**marginal regions**” or “**less flavoured areas**” where, with the optimum use of all factors of production (labor, land, capital), animal commodities can be effectively produced only occasionally.
- Geographic, social and economic stability of these regions is strongly influenced by breeding of ruminants with market milk production. Dairy cattle farming accounts for up to 75% of the animal production of these areas and milk production has an irreplaceable role, especially in nutrition of consumers as several dairy specialties can be classified as functional food.
- The dairy farms in marginal regions have difficulties to comply with all the requirements for dairy production and animal health care.

Monitored dairy farms

- We selected dairy farms from each country
- Must be located in marginal areas
- Min. 100 pcs and max. 300 pcs of dairy cows in one farm
- Traditional breeds consist from Simental cattle
- Cows in lactation cycle (14 -100 after calving)
- Min. one complet investigation of all cows
- Sampling of milk, CMT and clinical investigation.
- Detection of udder pathogens and their virulence factors



Events during project resolution

1st meeting of project research teams (online), Kosice, SK

- In 16.06.2021 Slovakia, UVMP Košice

1st Research Phase - Data Collection

- From 27/10/2022 to 29/10/2021 Czechia, Brno

Participation in a Conference

- From 06/04/2022 to 08/04/2022 Slovakia, Piešťany

Participation in a Conference

- From 27/04/2022 to 29/04/2022 Hungary, Hódmezővásárhely

Events during project resolution

2nd research phase - data collection from milk yield and transport of samples

- From 18/07/2022 to 20/07/2022 Hungary, Budapest

3rd research phase - data collection from milk yield and transport and analysis of samples

- From 29/08/2022 to 31/08/2022 Slovakia, Košice

2nd meeting of project research team

- From 15/09/2022 to 16/09/2022 Slovakia, Košice

Outputs

- **1x Scientific book**
- **1x Research article (IF>1)**
- **1x Research article (IF<1)**
- **2x Conference**

Outputs - Scientific book

- Zigo, F.; Ondrasovicova, S; Pecka-Kielb, E; Sandor Kiss, D.:
OCCURRENCE AND PREVENTION OF MASTITIS IN DAIRY FARMS SITUATED IN MARGINAL REGIONS. 2022,
1st edit., Eliva Press, 107 p.

Occurrence and prevention of mastitis in dairy farms situated in marginal regions

- Description of marginal regions
- Geographic, social and economic stability of these regions is strongly influenced by breeding of ruminants with market milk production. Dairy cattle farming accounts for up to 75% of the animal production of these areas and milk production has an irreplaceable role, especially in nutrition of consumers as several dairy specialties can be classified as functional food.
- The dairy farms in marginal regions have difficulties to comply with all the requirements for dairy production and animal health care.
- Detection of mastitis and pathogens
- Detection of virulence factors
- Prevention of mastitis

Occurrence and prevention of mastitis in dairy farms situated in marginal regions

Detection and etiology of mastitis

- The **first part of the scientific publication** consists of a set of two studies focused on the aetiology and methods of detection of intramammary infection - mastitis in cows including identification of forms and causative agents of mastitis, as well as evaluation of the impact of pathogenic bacteria on qualitative changes in the produced milk.

Prevention and control of mastitis

- The **second part** of the scientific publication presents a set of four studies dealing with the causes of the occurrence, control and prevention of dairy mastitis.

Outputs - Research Article

Zigo F, Farkašová Z, Výrostková J, Regecová I, Ondrašovičová S, Vargová M, Sasáková N, Pecka-Kielb E, Bursová Š, Kiss DS. **DAIRY COWS' UDDER PATHOGENS AND OCCURRENCE OF VIRULENCE FACTORS IN STAPHYLOCOCCI.** Animals (Basel). 2022 Feb 14;12(4):470. doi: 10.3390/ani12040470.

DAIRY COWS' UDDER PATHOGENS AND OCCURRENCE OF VIRULENCE FACTORS IN STAPHYLOCOCCI

- This study investigated 960 Slovak and Czech spotted cattle from four different dairy herds located in Eastern Slovakia and Czechia
- Positive CMT score (1–3) for one or more quarters were detected in 271 (28.2%) of the examined animals.
- Out of 230 infected milk samples, representing 24.0% of all dairy cows, staphylococci (59.1% of positive findings) were the most commonly isolated organisms, followed by *E. coli* (11.3%), streptococci *Str. uberis* (9.1%) and *Str. agalactiae* (3.4%), and enterococci (6.1%).
- Generally, the isolated staphylococci showed 77.2% resistance to one or more antimicrobials.
- The presence of the *mecA* gene was also confirmed in two isolates of *S. aureus* and two species of NAS.

Outputs – Research article

- Vasil' M, Zigo F, Farkašová Z, Pecka-Kielb E, Bujok J, Illek J. **COMPARISON OF EFFECT OF PARENTERAL AND ORAL SUPPLEMENTATION OF SELENIUM AND VITAMIN E ON SELECTED ANTIOXIDANT PARAMETERS AND UDDER HEALTH OF DAIRY COWS.** Pol J Vet Sci. 2022 Mar; 25(1):155-164.

Comparison of effect of parenteral and oral supplementation of Selenium and vitamin E on selected antioxidant parameters and udder health of dairy cows.

- The aim of this study was to compare the effect of parenteral and oral supplementation of Selenium (Se) and vitamin E (VTE) on selected antioxidant parameters in blood and colostrum as well as their effect on the incidence of mastitis in dairy cows during the final phase of gravidity (6 weeks) and first two weeks after calving.
- In order to prevent oxidative stress and moderate inflammatory response in dairy cows it is very important to optimally balance their nutritive needs with an appropriate ratio of Se and VTE supplements.
- Therefore we still recommend supplementation of the cows' postpartum diet with 0.5 mg of Se/kg dry matter (DM) and 102 mg of dl- α -tocopherol acetate/kg DM to stabilize their optimal blood levels, stimulate the activity of glutathione peroxidase and reduce the incidence of mastitis.

Conference – Piešťany, Slovakia

- *František Zigo, Silvia Ondrašovičová, Milan Vasil', Zuzana Farkašová, Ewa Pecka-Kielb, Šimon Halás:*

OCCURRENCE AND REDUCTION OF INTRAMAMMARY INFECTIONS IN DAIRY COW HERD DURING THE YEAR-LONG APPLICATION OF ANTIMASTITIS MEASURES.

Food safety and quality. Proceedings of scientific works, Piešťany, Slovakia, 2022, p. 193 - 197, ISBN 978-80-8266-007-7.

OCCURRENCE AND REDUCTION OF INTRAMAMMARY INFECTIONS IN DAIRY COW HERD DURING THE YEAR-LONG APPLICATION OF ANTIMASTITIS MEASURES

- The aim of this study was to reduce the prevalence of mastitis by introduction of effective anti-mastitis measures in a herd of 125 dairy cows. The effectiveness of the relevant measures was monitored by six examinations conducted in two-month intervals. During the monitored period, a reduction in the prevalence of mastitis was recorded from 53.6% to 22.9%, i.e. by 26.0%. The prevalence of *Staphylococcus* spp. in the examined samples gradually reduced from 33.4% to 18.4%, 14.1%, 10.0%, 7.6%, and 8.1%. In contrast to the dynamics of mastitis, the monthly fluctuations in the values of somatic cell count (SCC) and total bacterial count (TBC) in bulk tank milk samples were irregular. However, a declining dynamics of SCC and TBC was evident during the last three samplings which reflected a reduction in the counts of *Staphylococcus* spp. after the treatment and introduction of mastitis suppression procedures.

Conference – Hódmezővásárhely, Hungary

- Zigo František, Farkašová Zuzana, Ondrašovičová Silvia, Pecka-Kielb Ewa, Bursová Šárka, Kiss Sandor David: **THE EFFECT OF IMPROVED COMPOSITION OF BEDDING USED IN DAIRY FARM CONDITIONS ON LEVEL OF INDICATOR MICROORGANISMS.** 19th WELLMANN INTERNATIONAL SCIENTIFIC CONFERENCE, Book of abstracts, 28th April 2022 Hódmezővásárhely, p. 99, ISBN 2978-963-306-860-1.

THE EFFECT OF IMPROVED COMPOSITION OF BEDDING USED IN DAIRY FARM CONDITIONS ON LEVEL OF INDICATOR MICROORGANISMS

- The aim of the study was to compare improved bedding composition with conventional straw bedding under farm conditions, regarding its effects on the indicator microorganisms influencing hygiene levels.
- Improved bedding composition
- Comparing classical straw bedding with the improved recipe bedding
- Evaluation of hygienic conditions

Improved bedding composition

- Improved bedding composition consisting of recycled manure solids (RMS; 15 kg), ground limestone (100 kg), water (80 l) and straw (25 kg).



THE EFFECT OF IMPROVED COMPOSITION OF BEDDING USED IN DAIRY FARM CONDITIONS ON LEVEL OF INDICATOR MICROORGANISMS

- Comparing classical straw bedding with the improved recipe bedding, the total viable count (TVC) and coliforms (CB) in freshly-laid bedding as well as a month after laying were found to be reduced.
- In addition to TVC and CB, decreased numbers of faecal coliforms (FC) and faecal streptococci (FS) were observed in the freshly-laid bedding as well as in the first, second and third months after laying.

Planned article

AN EFFECT OF UDDER PATHOGENS ON COMPOSITION AND PHYSICO-CHEMICAL CHANGES OF COWS' MILK

- Investigation 3 dairy farms from Czechia, Slovakia and Hungary
- Detection of subclinical and clinical mastitis
- Milk sampling

Laboratory analysis:

- udder pathogens
- milk MDA
- changes of fatty acids composition

THANK YOU FOR YOUR ATTENTION

