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BACVIR FI

Natural control of fever and hyperthermia

January 2022

www.bacviranimalsafety.com

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1.-Brochure

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2.-Introduction

Pyrexia o fever

It is a **natural response** of the organism to an inflammatory stimulus, often consequence of a microbial infection (virus, bacteria, toxins, etc.) that consists of an **increase** in **body temperature** above the physiological range.

- It is a double-edged sword:
  - on the one hand it helps the organism to fight the infection
  - on the other hand, it leads to a decrease in welfare, intake, feed conversion and productivity.
- It is very common at certain times in the production cycle of farm animals, especially in times of stress when defenses are compromised and there is a high incidence of pathologies.

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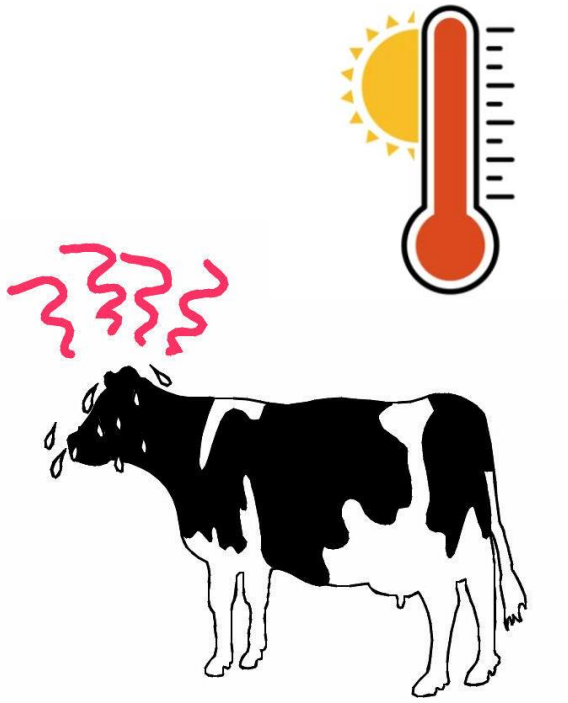
2.-Introducción

Hyperthermia:

An **increase** in **body temperature** above the physiological range due to an **inability** of the body to dissipate the heat produced by the body effectively and usually occurs as a **consequence** of **high ambient temperatures** and **humidity**.

- In farm animals the negative effects that occur because of increased temperature are known as **heat stress.**
  - It is a problem of **increasing importance** in all species due to rising ambient temperatures caused by **climate change**.
  - It **compromises** the **health**, **welfare** and **performance** of production animals, resulting in economic losses.



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3.- Composición

- **BACVIR FI** contains a **complex botanical extract** from the *Apiaciae* family with a wide range of active ingredients:
  - Essential oils
  - Polysaccharides
  - Flavonoids
  - Fatty acids
  - Sterols
  - Saponins

Its **components** are **widely used** in **traditional medicine** for the **treatment** of **fever**, **inflammation** and **infectious diseases** such as influenza, infectious bovine rhinotracheitis (IBR) and proventriculitis. (Poult. Sci. 2021)

- BACVIR FI is an additive available in liquid and solid form to be added to water, milk replacer or feed

✓ Marked **antipyretic**, **anti-inflammatory** and **analgesic** effect.

✓ Indicated for the **control** of **fever** and mitigation of **heat stress** in livestock

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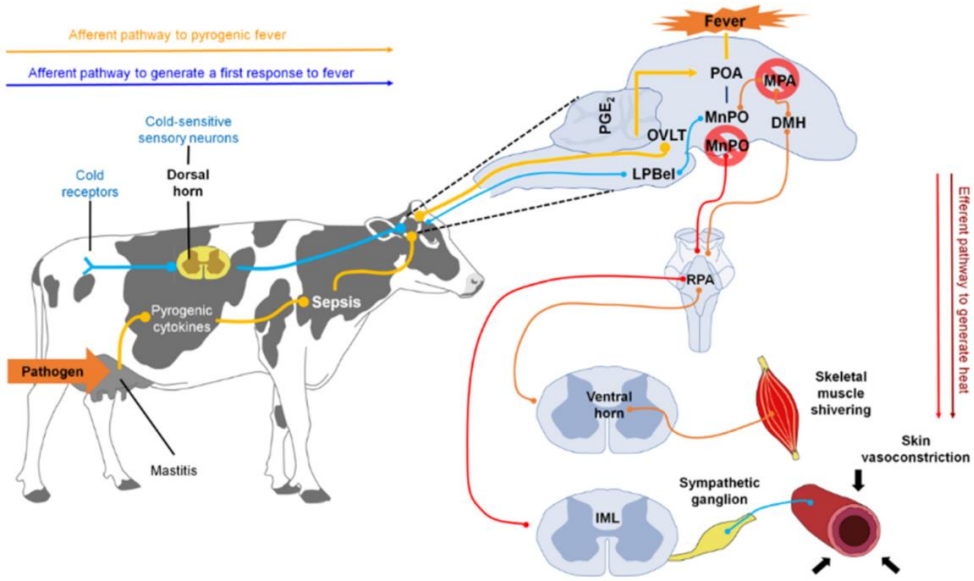
4.- Mode of action

- The **antipyretic**, **anti-inflammatory** and **analgesic** action of BACVIR FI is produced by several mechanisms:

1. **Inhibition** of plasma production and release of **proinflammatory** and **pyrogenic cytokines** (IL-6, IL-1b, IL-8, TNFa) and **prostaglandin E2** (PGE2).
2. **Regulation** of the **synthesis** and **secretion** in the **hypothalamus** of:
    - **AVP** (Arginine Vasopressin): a hormone that regulates blood vessel dilatation
    - **cAMP** (cyclic adenosine monophosphate)



Mota-Rojas et al. 2021

3. **Inhibition** of **serotonin**, **norepinephrine** and **dopamine reuptake** at CNS level (contributes to analgesic effect).

5.- Propiedades-beneficio

1. Marked **antipyretic**, **anti-inflammatory** and **analgesic** activity.
2. **Alternative to antipyretic drugs** for the treatments involving fever (infections, inflammations, etc.)
3. **Adjuvant** in the treatment of **infectious diseases** of the **respiratory tract (IBR, influenza, etc.)**
4. Do **not** cause **gastrointestinal side effects**, common after the use of anti-inflammatory medications (gastric ulcers and other digestive pathologies)
5. Indicated for mitigating the negative effects of **heat stress**
6. **Rapid onset** of **action:** peak plasma levels are reached 30 minutes after administration.
7. **High palatability**
8. **No veterinary prescription**
9. **No withdrawal period**

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6.- *In vivo* test results

1. Antipyretic effect of BACVIR FI in rats (2016)

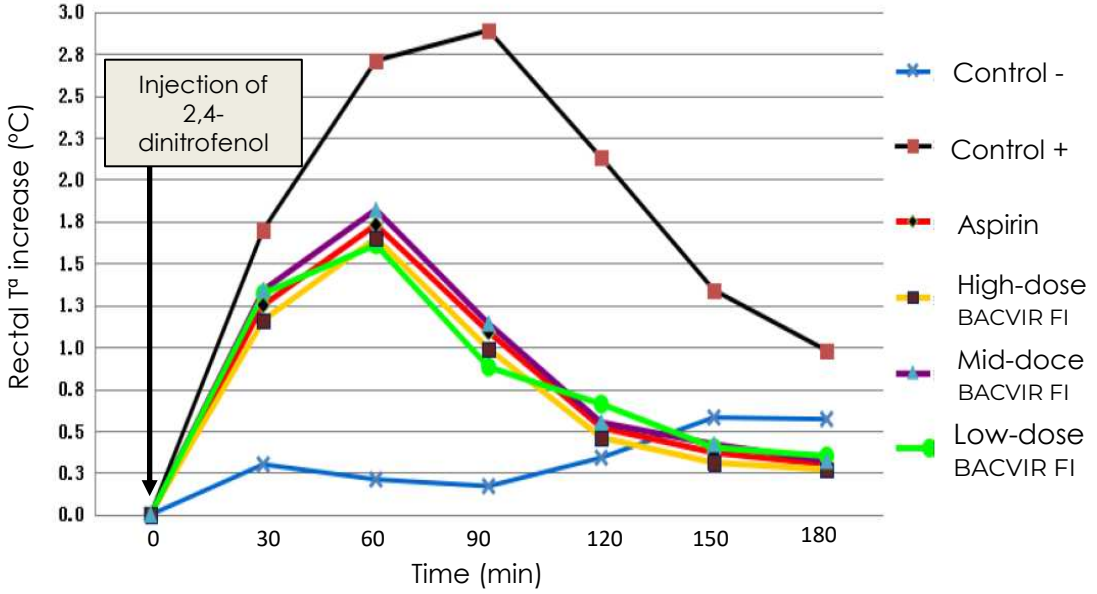
OBJETIVO

To determine the **antipyretic effect** of BACVIR FI in rats

DISEÑO EXPERIMENTAL

- **60 male** Wistar rats, 180-220g BW, divided into 6 groups (oral administration every 24h for 3 days)
  1. **Control –** : no fever induced, no treatment
  2. **Control +:** fever induction, no treatment
  3. **Aspirin**: fever induction, administration of aspirin
  4. **Low-dose BACVIR FI** fever induction and low-dose Piroterm administration
  5. **Mid-dose BACVIR FI**: fever induction and mid-dose Piroterm administration
  6. **High-dose BACVIR FI** fever induction and low-dose Piroterm administration

RESULTS



- One hour after the last dose, **fever** was **induced** by subcutaneous injection of 15 mg/kg of **2,4-dinitrofenol** (metabolic enhancer that increases the systemic temperature)
- **Rectal temperature** was measured **every 30 minutes for 3 h**

CONCLUSIÓN

BACVIR FI showed a **remarkable antipyretic effect** in rats at all the doses used in this study and was **equivalent** to **acetylsalicylic acid** (aspirin).

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6.- *In vivo* test results

2. Analgesic effect of BACVIR FI in laboratory mice (2010)

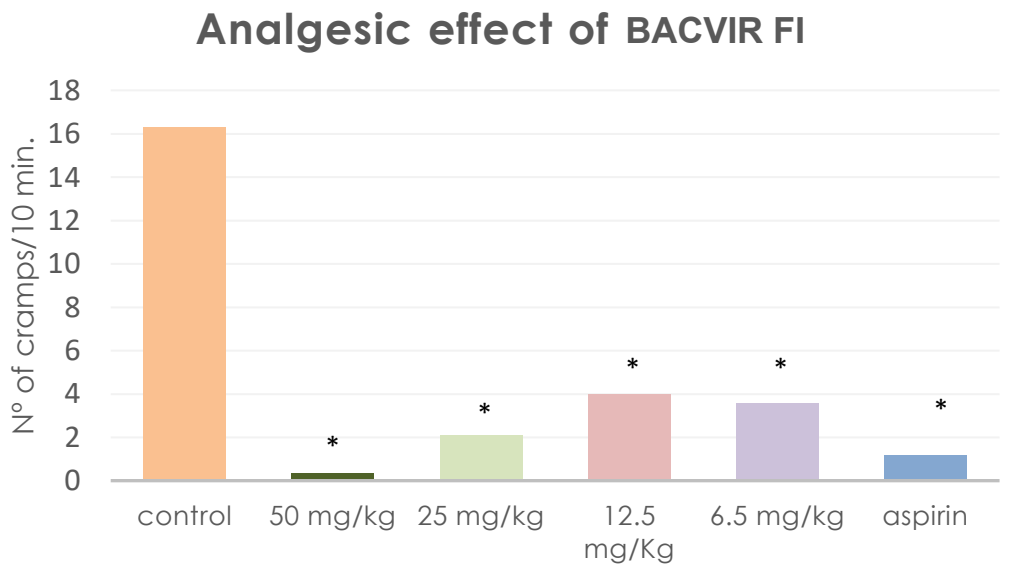
OBJETIVE

To **analyse** the **analgesic effect** of **BACVIR FI** in laboratory mice

EXPERIMENTAL DESIGN

- 6 treatments (6 groups of 5 mice), oral administration
  1. **Control** (saline)
  2. **BACVIR FI 6,5 mg/kg**
  3. **BACVIR FI 12,5 mg/kg**
  4. **BACVIR FI 25 mg/kg**
  5. **BACVIR FI 50 mg/kg**
  6. **Acetylsalicylic acid** (aspirin) 150 mg/kg
- 1 h after treatment, **pain** was **induced** by IP injection of acetic acid (Koster et al. 1959)
- **To assess** the perception of **pain**, the **number** of **painful abdominal contractions (cramps)** in 10 minutes was monitored

RESULTS



*P<0,001 vs control

CONCLUSION

BACVIR FI exhibits **marked analgesic activity** in laboratory animals **equivalent** to **common use analgesic drugs**

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6.- *In vivo* test results

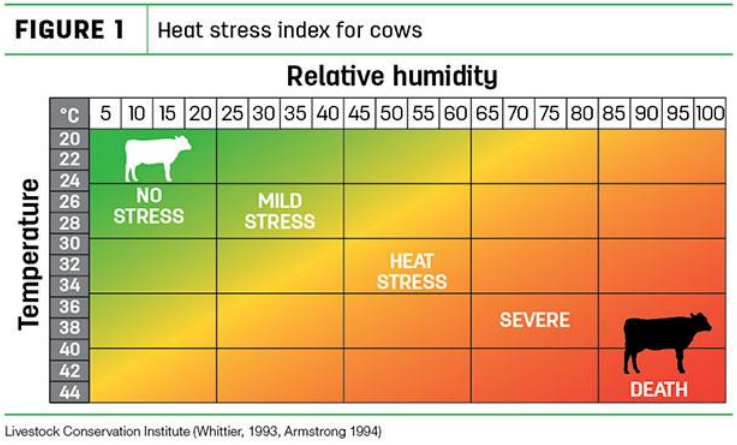
HEAT STRESS IN DAIRY COWS

- Heat stress has negative consequences on animal productivity, welfare and health status (Wrinkle et al., 2012).
- The impact on the performance of dairy cows ids due to (Wheelock et al. 2010):

  1) **Decreased intake** (up to 50%)
  2) **Decrease in milk production** (up to10%)
  3) **Increased respiratory rate and sweating**
  4) **Increased maintenance requirements to keep homeothermic balance (up to** 30%)
  5) Rumination and nutrient absorption are compromised

- Despite numerous nutritional and husbandry strategies have been implemented to alleviate its consequences, heat stress still remains a very costly problems for dairy farmers.

- Heat stress is consequence of high environmental temperature and humidity.



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6.- *In vivo* test results

3. Effect of BACVIR FI on heat stress in dairy cows (2014)

OBJETIVE

To determine the effect of BACVIR FI on heat stress in dairy cows

EXPERIMENTAL DESIGN

- **40 Holstein cows:**
  - Average of 75 days of lactation, 37,5 kg milk/day in 3 milkings and 1.7 births.
  - Fed on a formulated ration exceeding the NRC 2001 recommendations
    - Distributed in 3 daily intakes
  - Divided into **4 groups:**
    1. **Control**
    2. **0,25 g BACVIR FI/Kg DM**
    3. **0,5 g BACVIR FI/Kg DM**
    4. **1g BACVIR FI/Kg DM**
- **Cows** were subjected to heat **stress conditions**
  - Average THI of 78,2 at 6 am, 79,7 at 2pm and 78.3 at 10 pm (heat stress in cows when THI>72)
- The duration of the experiment was 10 weeks (one week of adaptation to the diet)
- Rectal temperature, respiratory rate, feed intake and milk production was recorded

Heat stress in considered when:

- THI (temperature-humidity index)>72 (Bohmanova et al, 2007)
- Environmental temperature> 25 °C (Berman et al, 1985)
- Rectal temperature > 39,2 °C and respiratory rate > 60 resp/min (Staples y Thatcher, 2011)

THI=0.81×T+ (0.99×T-14.3) ×R+46.3,

T = temperature y R = relative humidity

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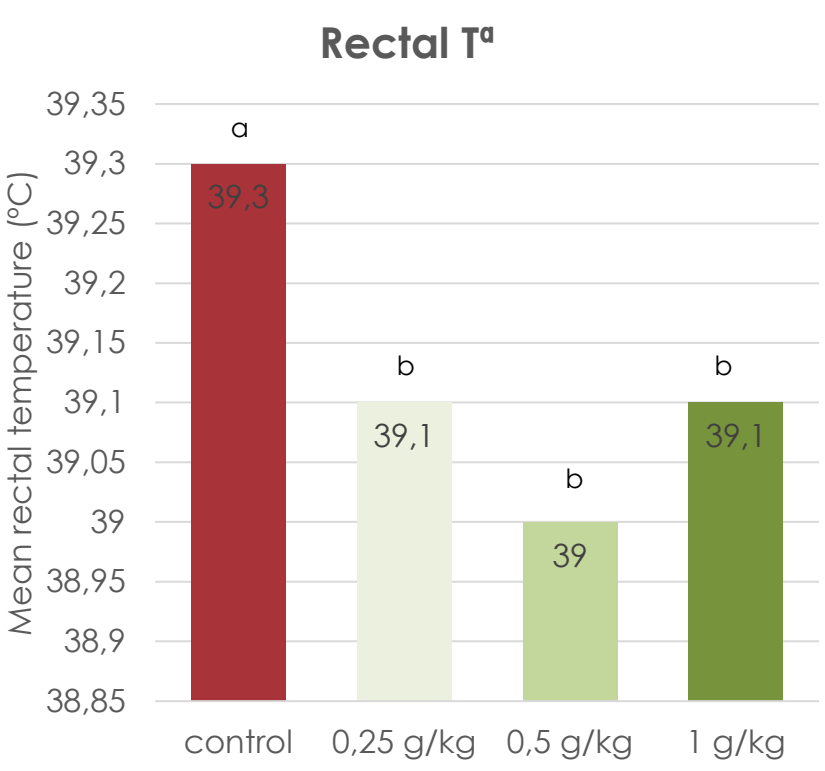
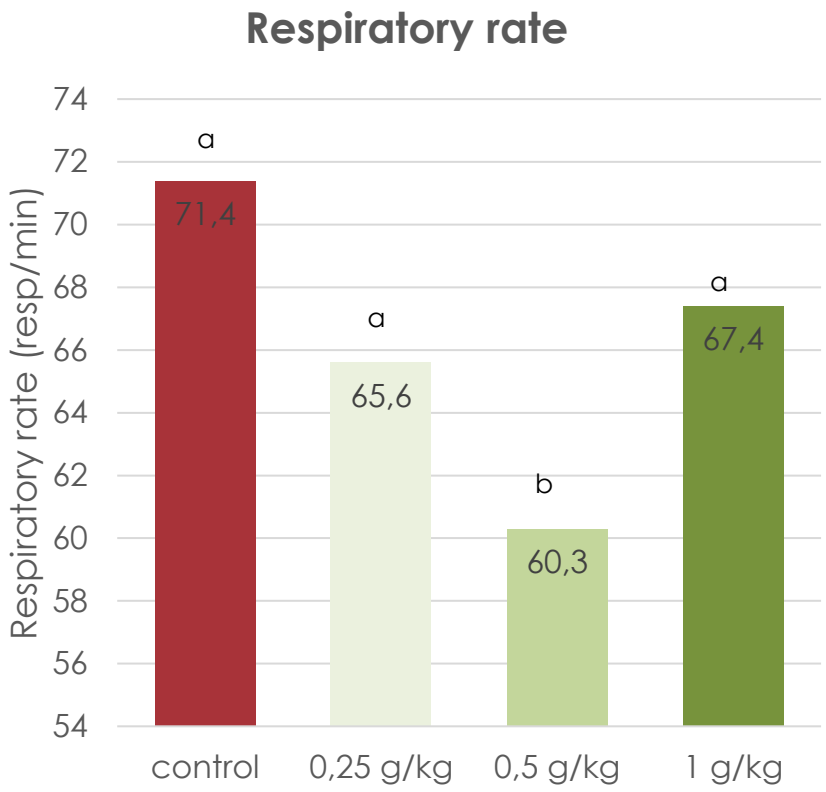
3. Effect of Piroterm on heat stress in dairy cows (2014)



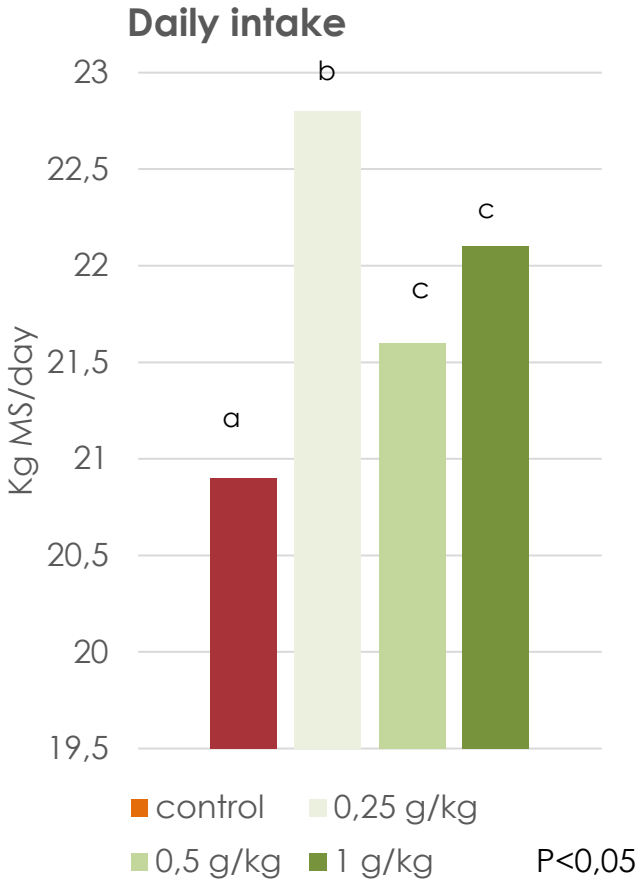
P<0,05

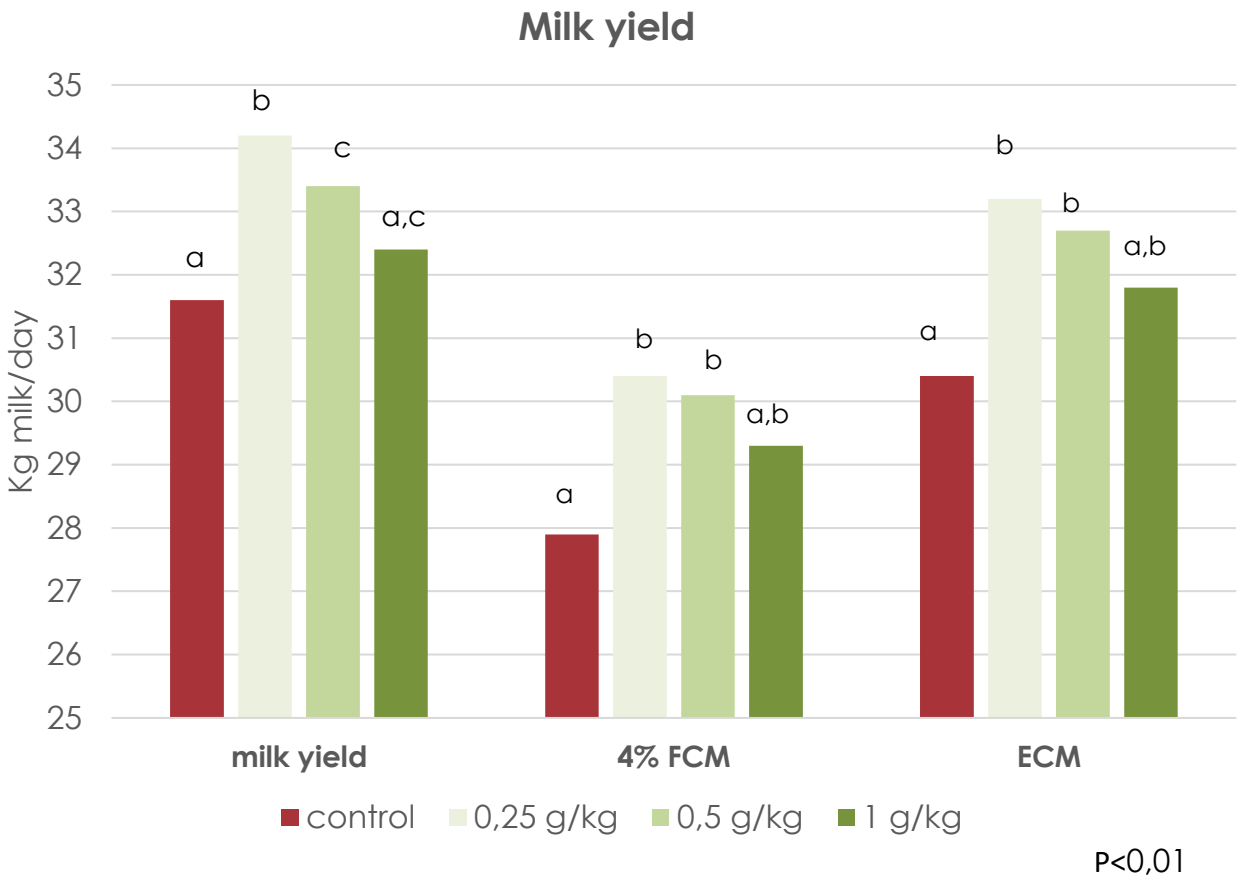


P<0,05

Supplementing the ration with BACVIR FI was **effective** in **lowering rectal temperature** and **respiratory rate** in dairy cows under heat stress.

3. Effect of BACVIR FI on heat stress in dairy cows (2014)





Ration supplementation with BACVIR FI improved comfort of heat-stressed dairy cows, resulting in **higher dry matter intake** and **milk yield.**

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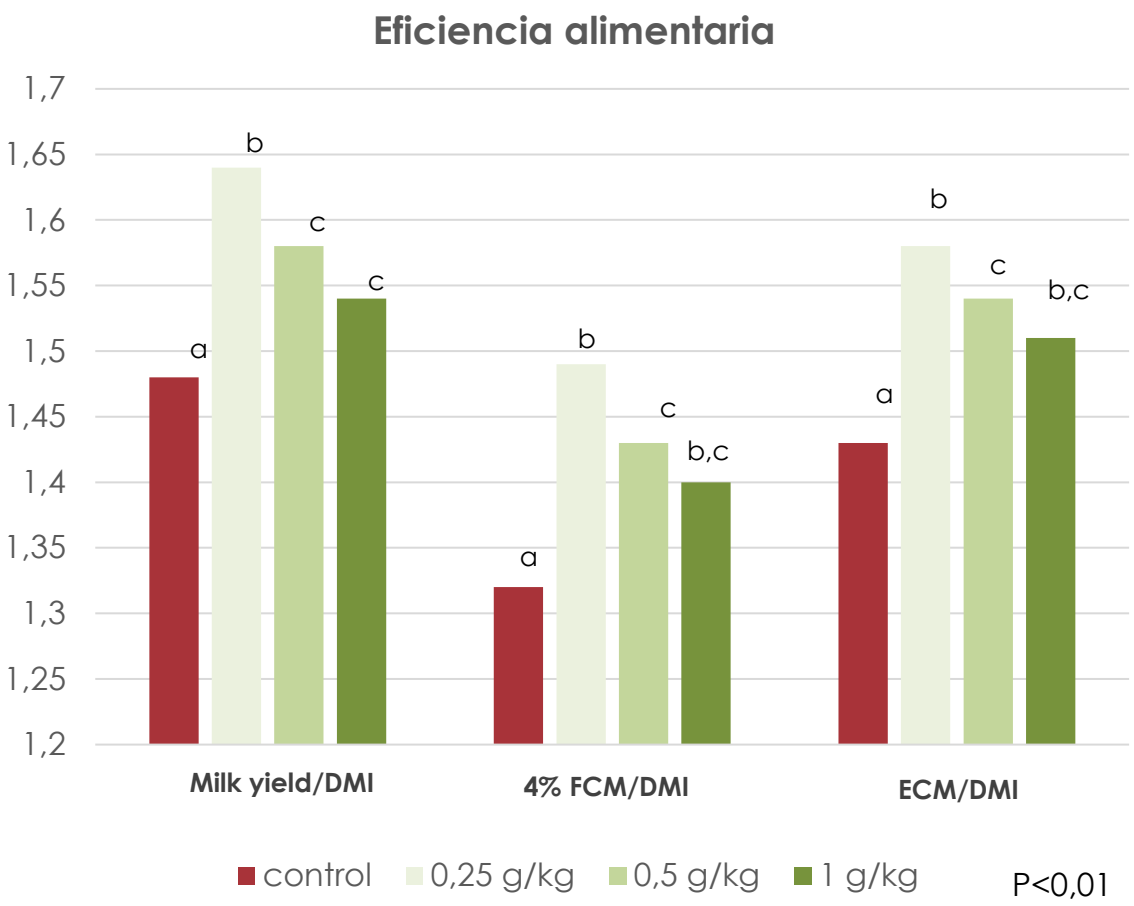
3. Effect of BACVIR FI on heat stress in dairy cows (2014)



Milk components

PARAMETER	Difference	Mean value
Fat, g/kg	NS	33,0
Protein, g/kg	NS	28,3
Lactose, g/kg	NS	49,7
Total solids, g/kg	NS	124
MUN mg/dl	NS	14,1

NS= nosignificant differences

	CONTROL	BACVIR FI	P-value
Somatic cells x10^4/ml	46,6	20,0	0,05-0.10*

* Nearly siggnificant

Diet supplementation with **BACVIR FI:**

- **Improved feed efficiency** of heat-stressed dairy cows **without changing milk composition**
- **Mitigated** the **increase** of **somatic cells** in milk that occurs under heat stress (Hammami et al. 2013)

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7.- Dosage

- BACVIR FI: 1-2L/1000 L drinking water or milk replacer
- BACVIR FI Dry:
  - Cattle/sheep/dairy goats: Add 1-2 kg de Piroterm Dry/Tn dry matter (total ration)
  - Calves/lambs/kids: 2 kg Piroterm dry /Tn feed
  - Pigs: 2 kg Piroterm dry/Tn feed
  - Poultry: 2 kg Piroterm dry/Tn feed

8.- Packaging

- BACVIR FI : Jerrycan of 5L y 25L
- BACVIR FI Dry: Sack of 25kg