

Context & Objectives

- ▶ Exposure to **high temperatures could affect meat quality**, through alterations in muscle membrane permeability and metabolism.
- ▶ Anhydrous betaine is especially interesting under summer conditions, related to osmoprotective properties, but its **hygroscopicity makes it difficult to manipulate** in feed plants.
- ▶ This study aims at validating the impact on broiler performance and muscle integrity of a **non hygroscopic fat coated form of anhydrous betaine** over a non coated form.

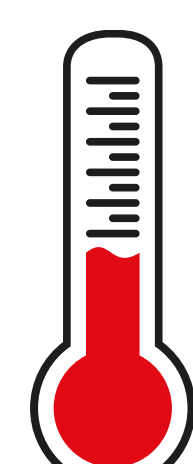
Materials & Methods

- ▶ In Vivo Trial at MiXscience Research Center (<http://www.mixscience.eu/rid/mixscience-research-center/>)



Experimental plan:

- Day old male Ross PM3 chicks allocated in 40 cages, with 4 birds per cage and 6 to 7 replicates per group.



6 pm – 8 am	24°C
8 am – 11 am	28°C
11 am – 3 pm	30°C
3 pm – 6 pm	28°C

< High temperatures >



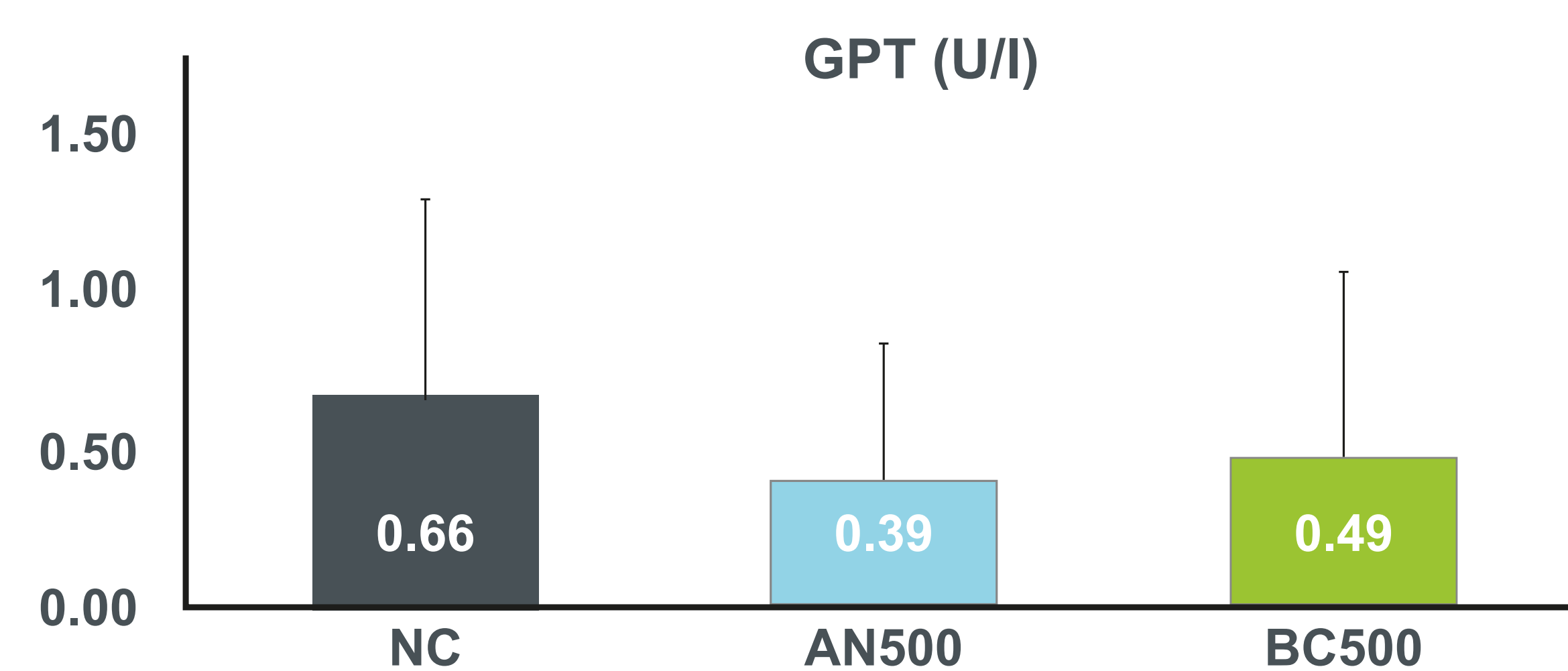
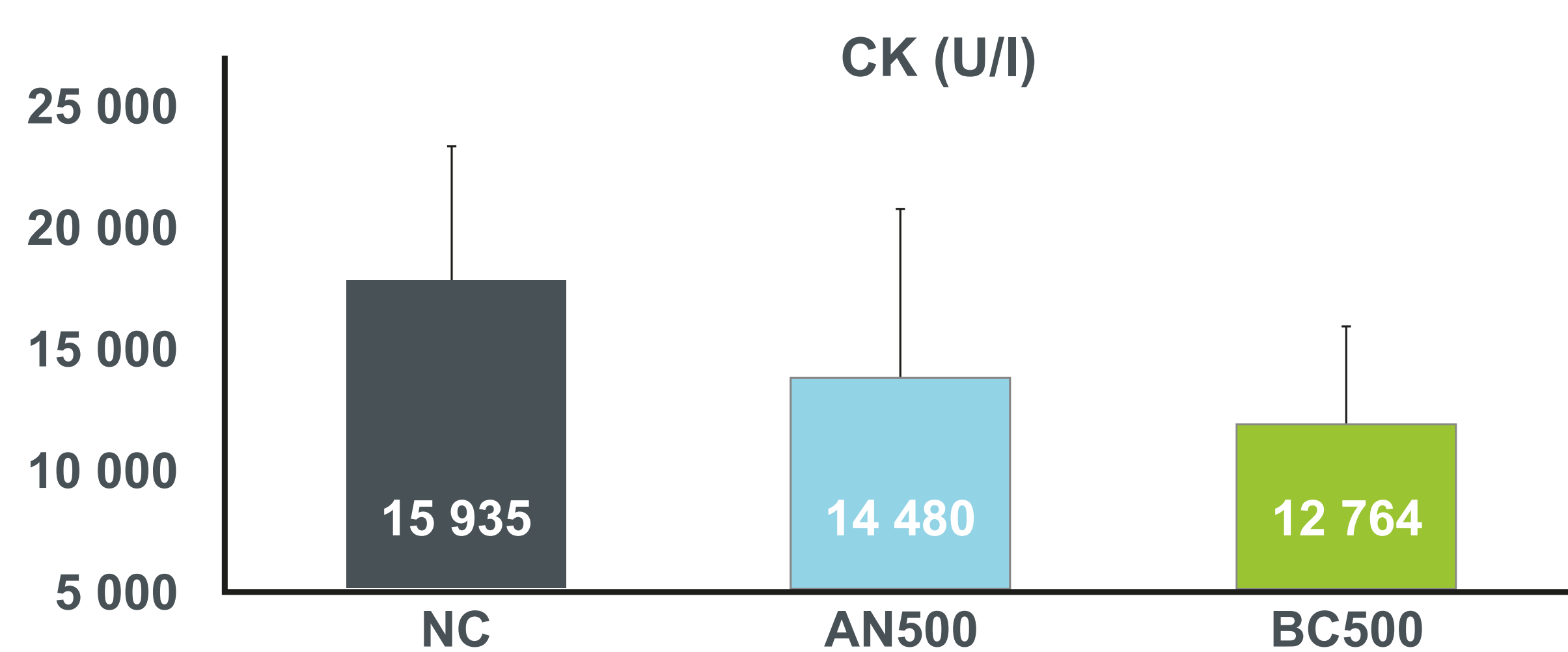
Measurements:

- Zootechnical performances for all groups
- Analysis on jugular vein blood at 34 days for groups NC, AN500 and BC500: (n=16 per group)
 - Creatine kinase (CK)
 - Glutamic-pyruvic transaminase (GPT)
 - Glutathion peroxydase (GPx)

Group	NC	AN250	AN500	AN1000	BC250	BC500
Betaine form	∅	Free anhydrous betaine			Coated anhydrous betaine	
Added betaine in the diet from 0 to 34d (g/T)	0	250	500	1000	250	500

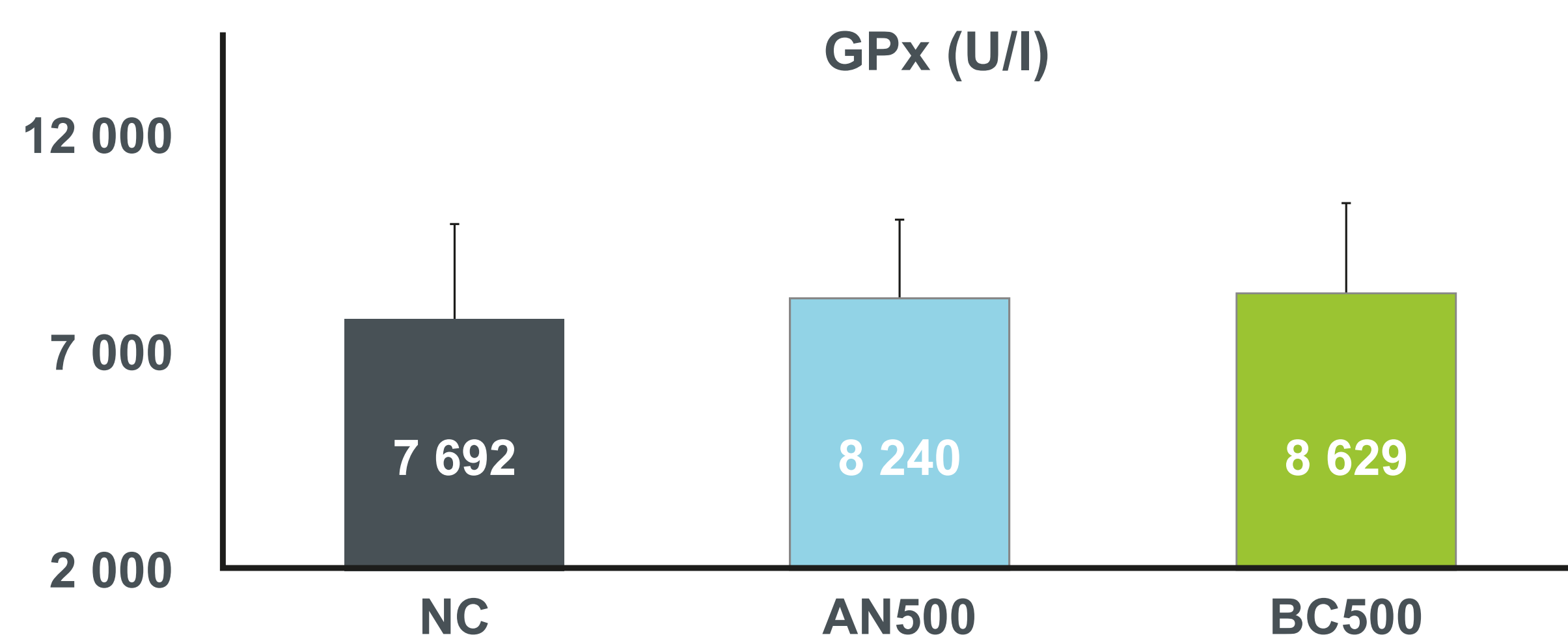
Results

- ✓ Performances tend to be improved for all groups compared to NC, with the best result for BC500 (2.6kg corrected FCR between 0 and 34 days: 1.48 for BC500 vs.1.53 for NC).



- ✓ Tendency to reduce the skeletal muscle-derived isoenzyme CK with both betaine forms, especially with the coated one (-9.1% and -19.9% for non coated and coated forms, respectively), which may indicate a reduction of heat stress related damage to muscle membrane.

- ✓ Numerical decrease of plasmatic glutamic-pyruvic transaminase (GPT) (-41% and -26% for non coated and coated forms, respectively), which may indicate lower cellular injury related to hyperthermia.



- ✓ Tendency to increase glutathione peroxidase (GPx) (+7.1% and +12.2% for non coated and coated forms, respectively), an enzyme protecting the organism from oxydative damage.

Conclusion

- ▶ The specific fat-coated form of betaine produced by MiXscience is of particular interest under summer conditions and can be used in feed plants due to his low hygroscopic effect.
- ▶ This study confirms the in vivo efficacy of coated betaine in broiler chickens, with a tendency to improve performance and meat quality compared to negative control and free non-coated betaine.