



POLITÉCNICA



UNIVERSIDAD
COMPLUTENSE
MADRID



Pre-slaughter fasting on stress response and meat quality in rainbow trout (*Oncorhynchus mykiss*)

De la Llave Propín, Álvaro; Martínez Villalba, Andrea; González Garoz, Roberto; De la Fuente, Jesús; Pérez, Concepción; González de Chávarri, Elisabeth; Díaz, María Teresa; Cabezas, Almudena; Villarroel, Morris and Bermejo-Poza, Rubén



BIANDOCARNE

Álvaro De la Llave Propín

Research engineer (Fac. Vet. – UCM)

Facultad de Veterinaria (Universidad Complutense de Madrid)

PhD student (ETSIAAB – UPM)

Escuela Técnica Superior de Ingeniería Agronómica, Alimentaria y de Biosistemas (Universidad Politécnica de Madrid)

Animal Production and Aquaculture

e-mail: alvade03@ucm.es

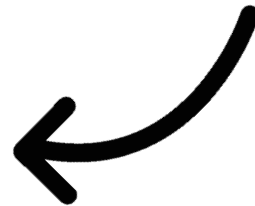
INTRODUCTION



**AQUACULTURE**

ANIMAL WELFARE 

**QUALITY**



PRE-SLAUGHTER FASTING

**PREVENTS
CONTAMINATION**

- **↓ Economic losses**

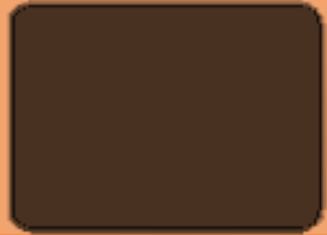
**↓ AMMONIA
PRODUCTION**

- **Hygienic conditions**

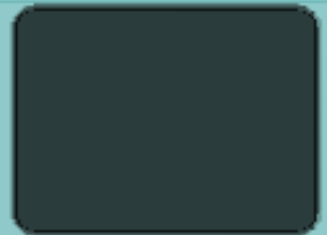
**AVOIDS MUSCLE-ENZYME
CONTACT**

- **Slows down muscle degradation**

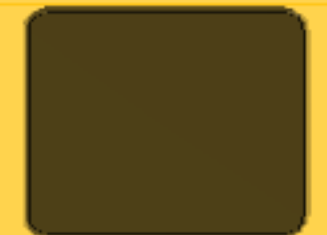
CONSIDERATIONS



Adaptation to the environment + Reduction to the optimum



Size-dependent effect

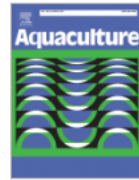


Use of DEGREE DAYS vs. Days (24-72 h)



Aquaculture

Volume 473, 20 April 2017, Pages 272-277



Determination of optimal degree days of fasting before slaughter in rainbow trout (*Oncorhynchus mykiss*)

Rubén Bermejo-Poza ^a  , Jesús De la Fuente ^a, Concepción Pérez ^b,
Elisabet González de Chavarri ^a, María Teresa Díaz ^c, Fernando Torrent ^d,
Morris Villarroel ^e



Aquaculture

Volume 462, 1 September 2016, Pages 109-114

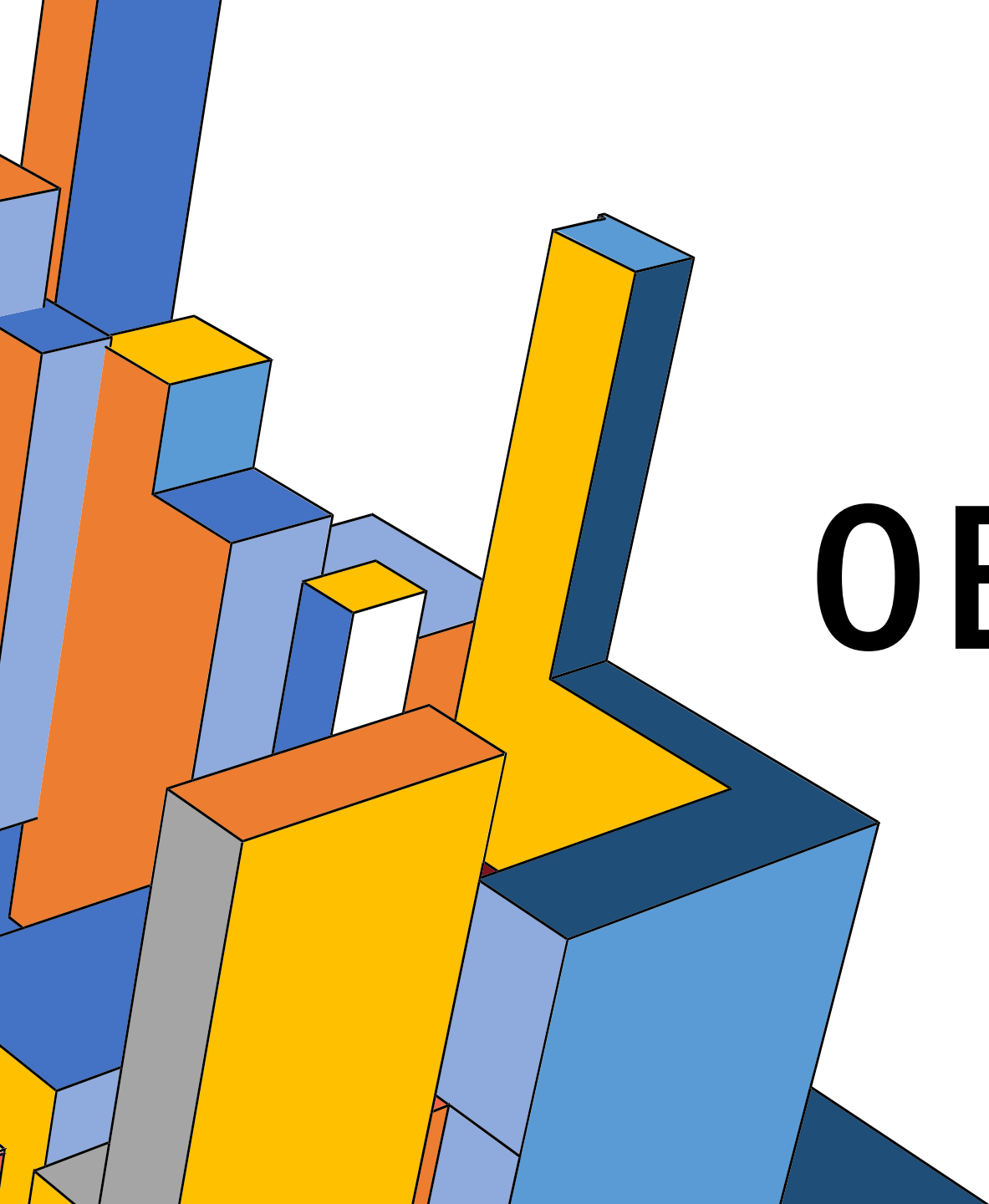


Effect of degree-days of fasting stress on rainbow trout, *Oncorhynchus mykiss*

Javier López-Luna ^a  , Ruben Bermejo-Poza ^c , Fernando Torrent Bravo ^d ,
Morris Villarroel ^b 

Effects of Fasting on Intermediary Metabolism Enzymes in the Liver and Muscle of Rainbow Trout

by  Montserrat Fernández-Muela ^{1,†} , Rubén Bermejo-Poza ^{1,*†}  ,  Almudena Cabezas ¹,
 Concepción Pérez ²,  Elisabet González de Chavarri ¹ ,  María Teresa Díaz ¹ ,
 Fernando Torrent ³,  Morris Villarroel ⁴  and  Jesús De la Fuente ¹ 

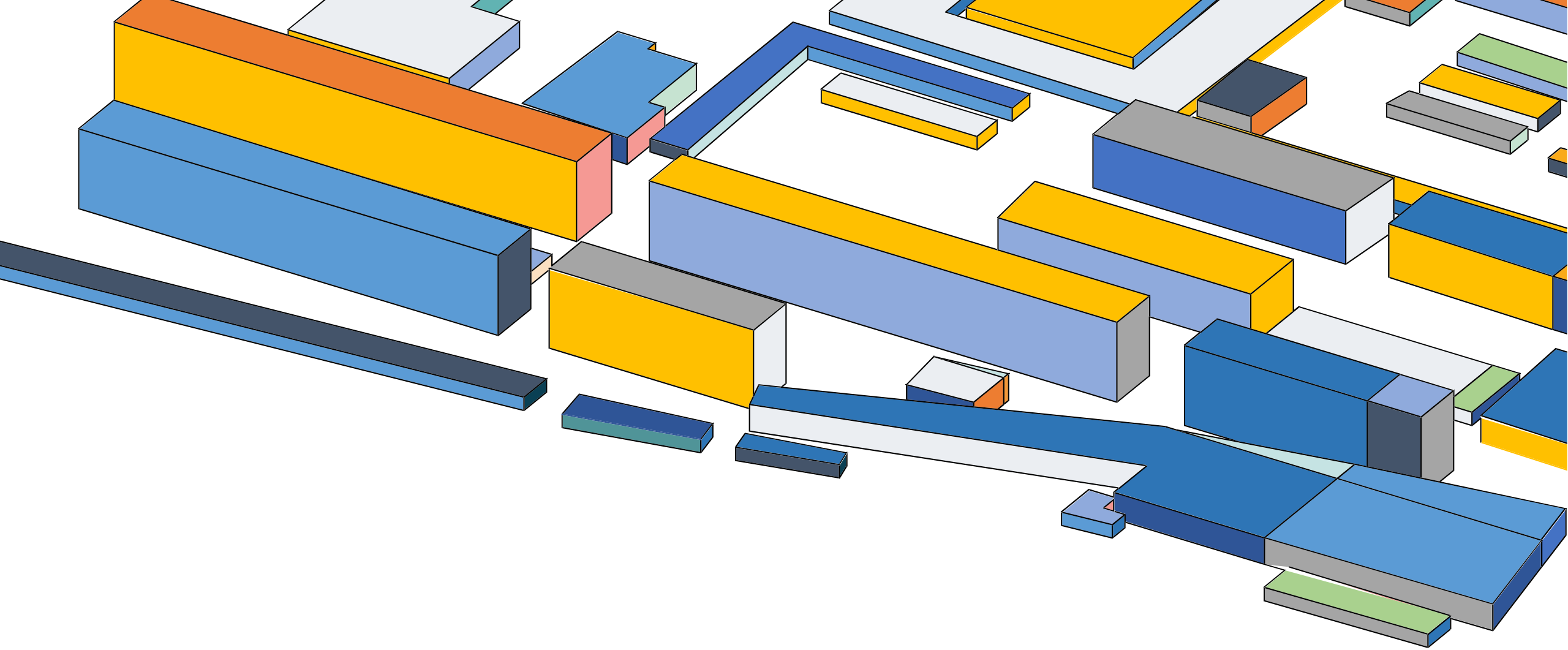


OBJECTIVE

EFFECT OF



STRESS REPONSE & FLESH QUALITY



MATERIALS & METHODS



30 x
tank

RAINBOW TROUTS

**TANKS
(1x1x1 m)**

9



AVERAGE WATER °C



17 kg

INITIAL BIOMASS

22 °C



TREATMENTS

0D

- NO FASTING

50D

- 3-DAYS FASTING

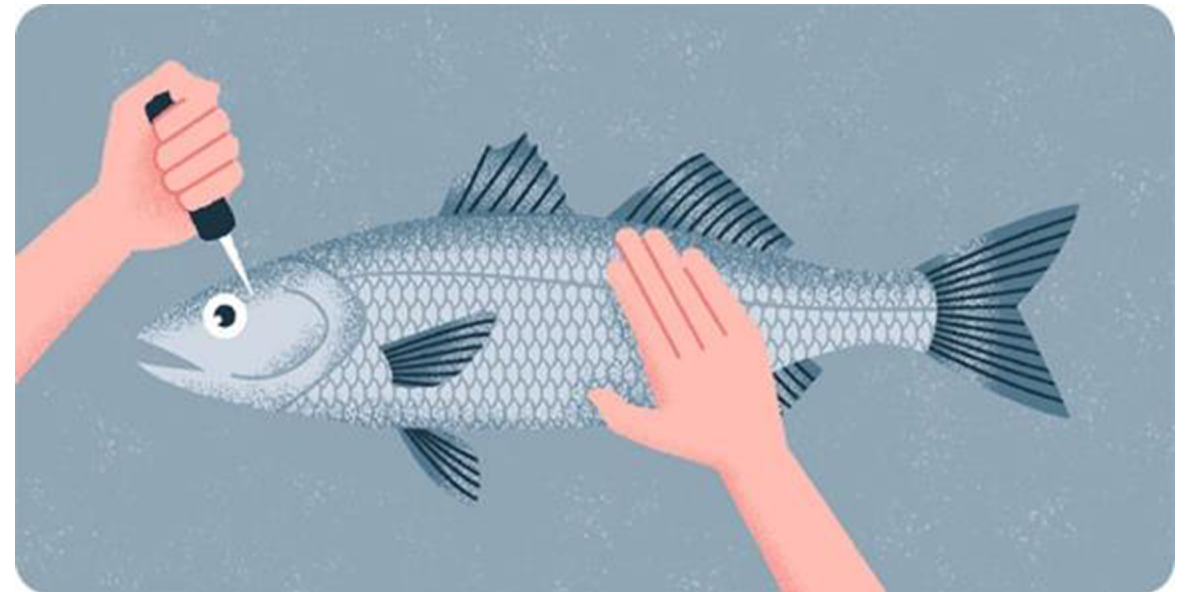
- 65.5°C d

100D

- 6-DAYS FASTING

- 131.3°C d

MATERIALS AND METHODS



BIOMETRIC PARAMETERS (15 fish from each tank):

- Slaughter weight
- Standard length
- Body condition

(BC = slaughter weight/standard length³)

RIGOR MORTIS (5 out of 15 fish from each tank) :

- 0 hours *post mortem*
- 24 hours *post mortem*



POST-EVISCERATION SAMPLES (10 out of 15 fish from each tank):

- Muscle pH
- Muscle colour (CIELAB)
- Liver colour (CIELAB)
- Liver weight → Hepatosomatic

Index

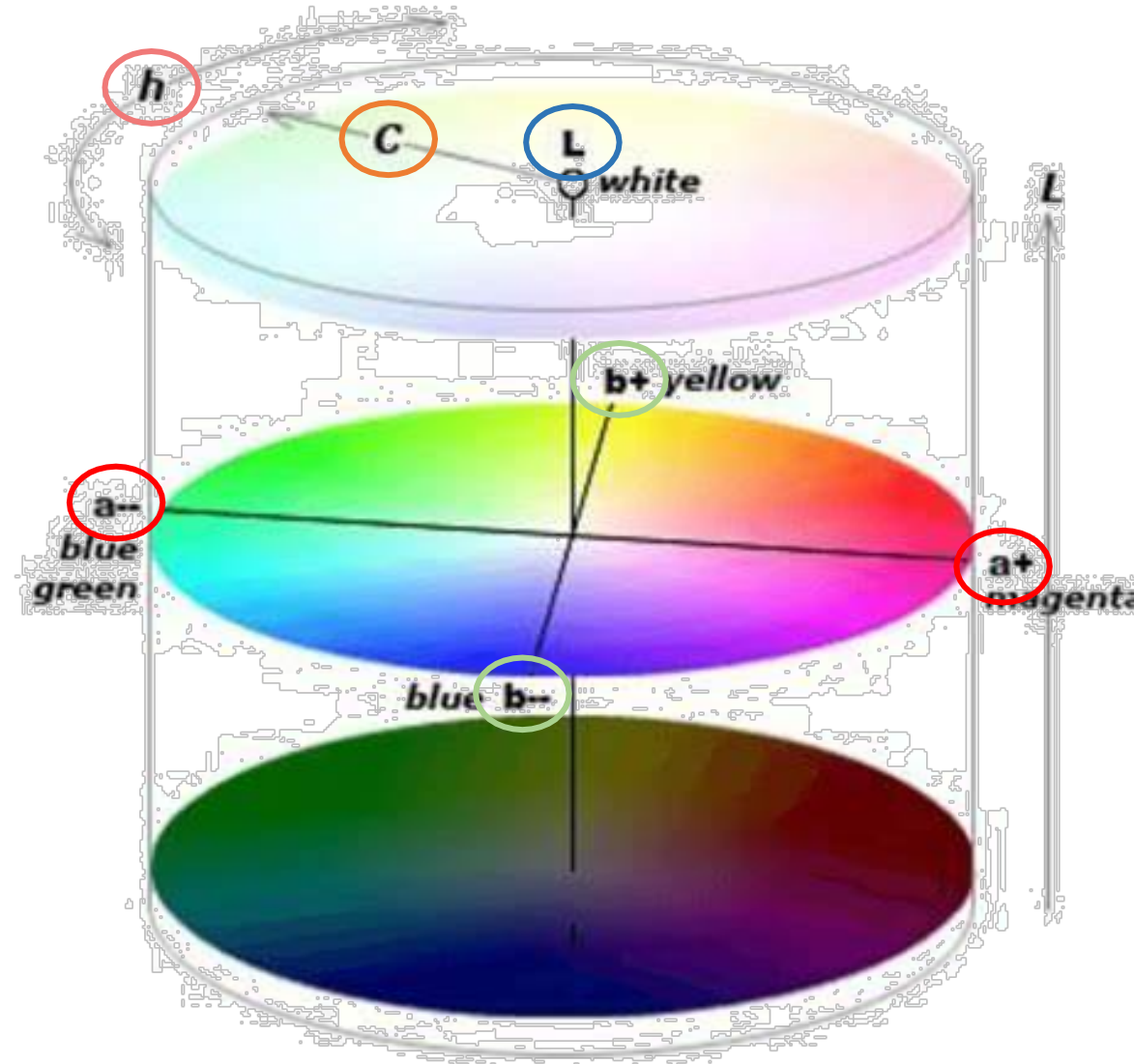
($\text{HSI} = \text{Liver weight} / \text{Slaughter weight} \times 100$)

- Liver glycogen



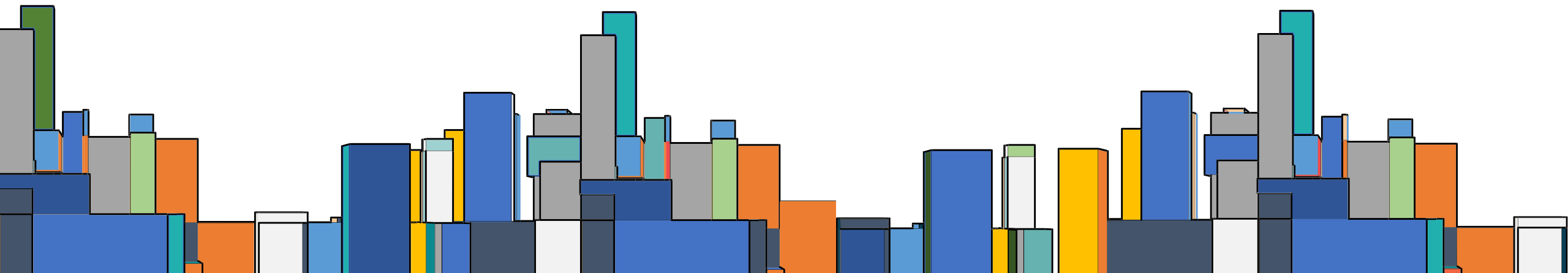
COLOUR (CIELAB)

Space
colour



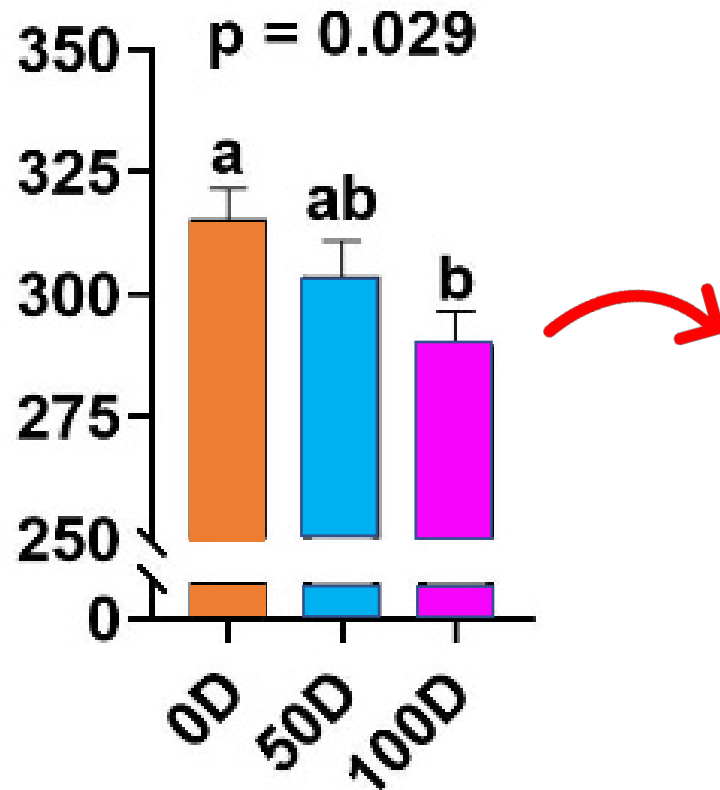
h^* : hue
 C^* : Chroma
 L^* : Lightness
 a^* : Redness
 b^* : Yellowness

RESULTS & DISCUSSION

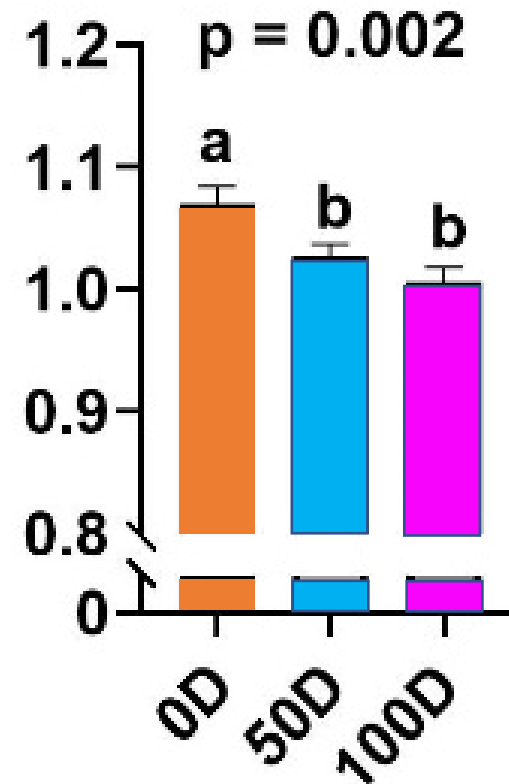


BIOMETRIC PARAMETERS

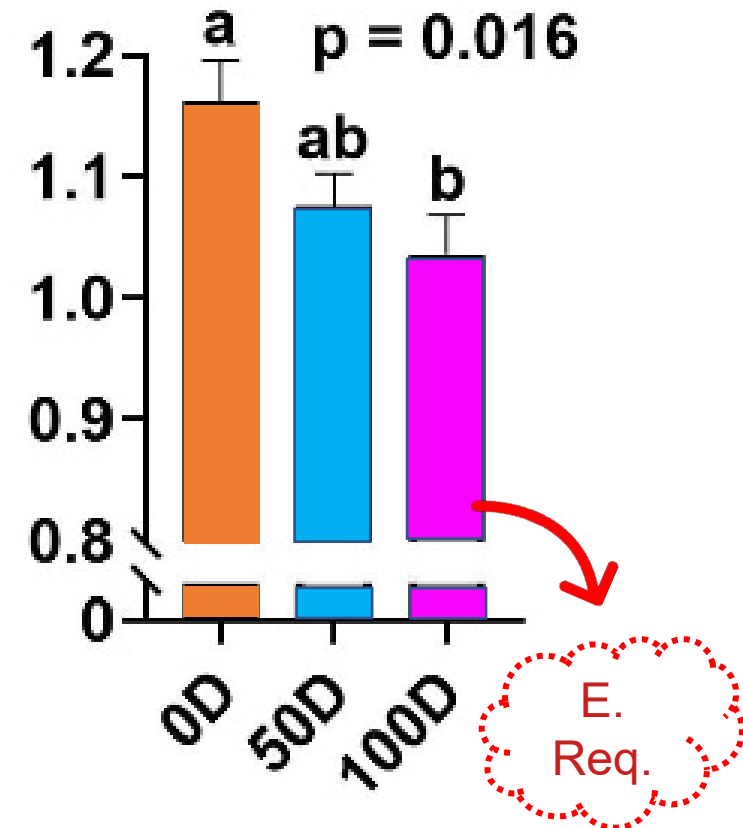
Slaughter Weight



Body Condition

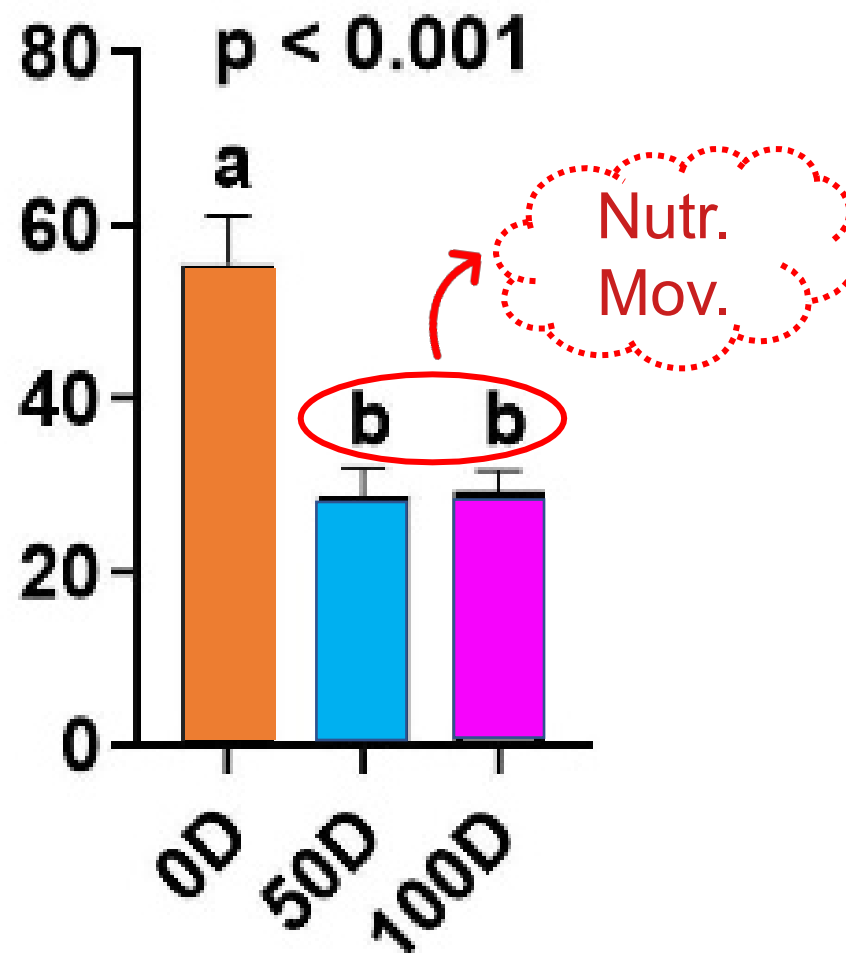


Hepatosomatic Index



■ **0D:** No fasting
 ■ **50D:** 65.5°C d
 ■ **100D:** 131.3°C d

LIVER GLYCOGEN



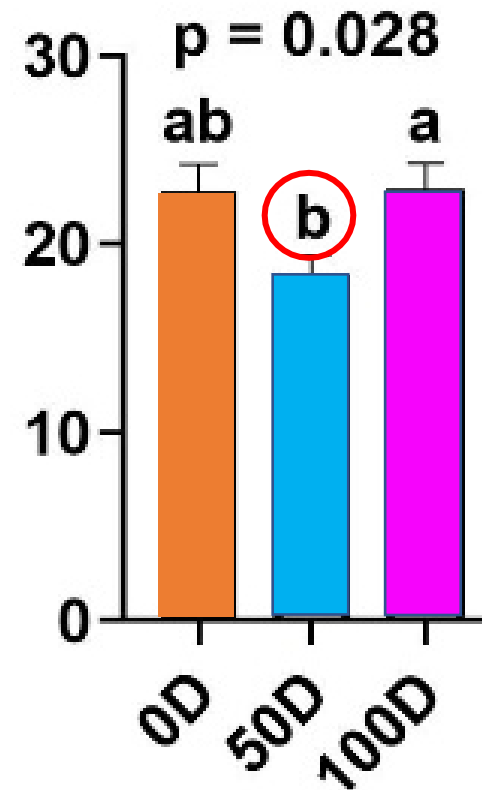
0D: No fasting 50D: 65.5°C d 100D: 131.3°C d

LIVER COLOUR

Lightness L*



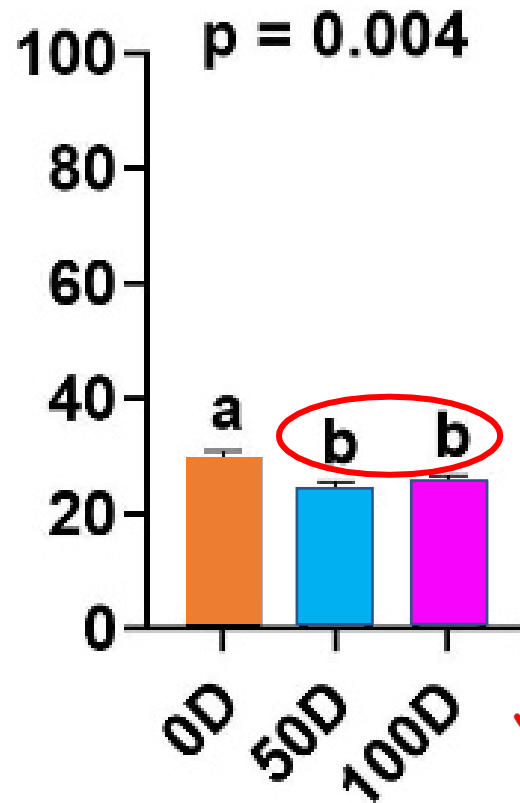
Hue h°



0D: No fasting 50D: 65.5°C d 100D: 131.3°C d

RIGOR MORTIS

(0h *post mortem*) (°)

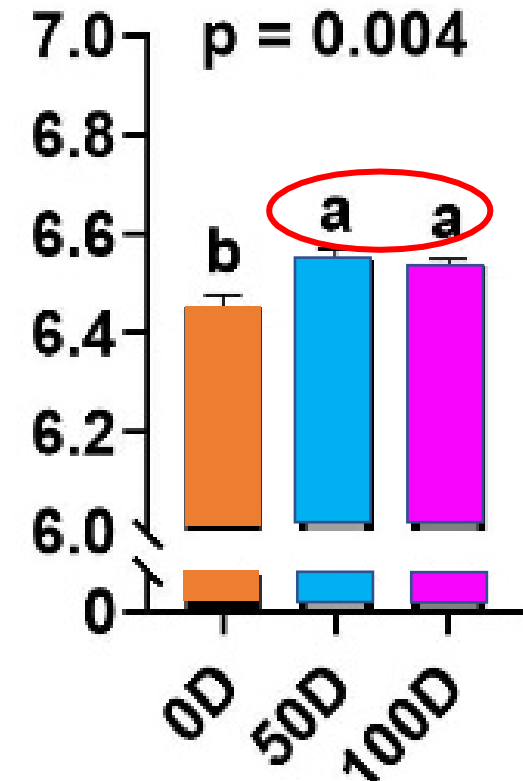


pH MUSCLE

(0h *post mortem*)



(24h *post mortem*)

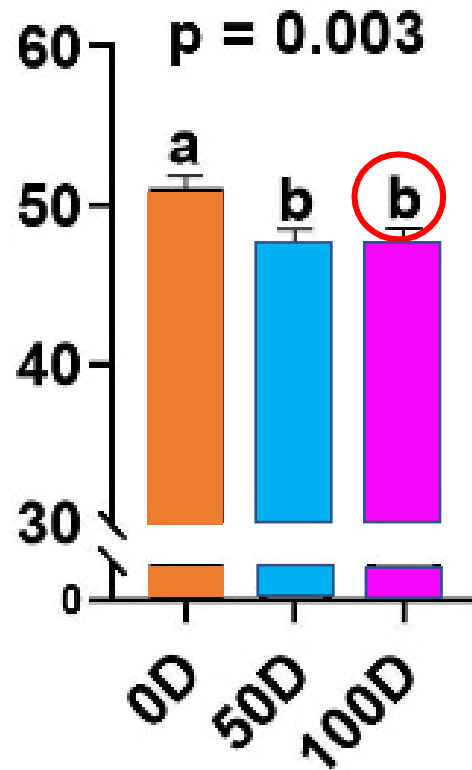


■ 0D: No fasting
 ■ 50D: 65.5°C d
 ■ 100D: 131.3°C d

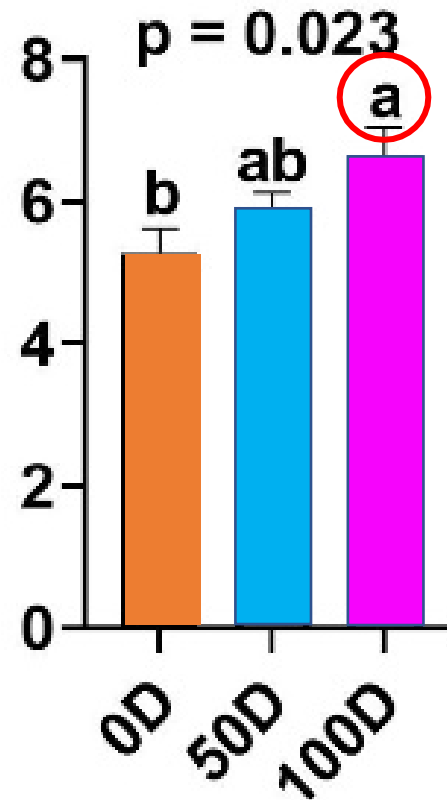


MUSCLE COLOUR

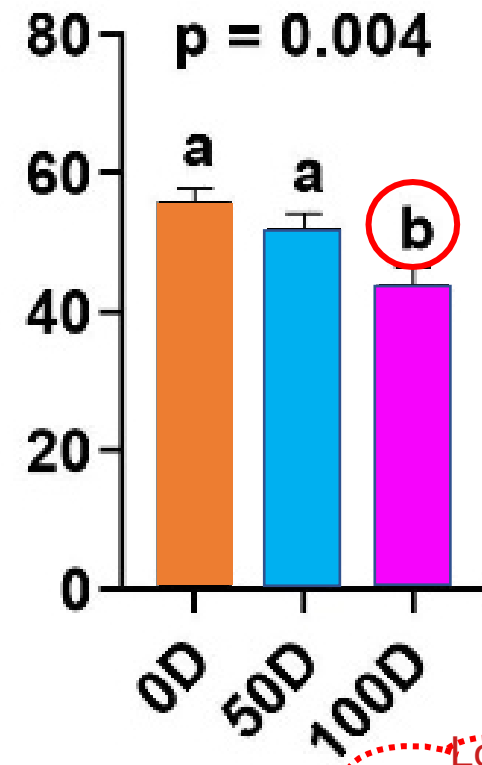
Lightness L*



Red index a*



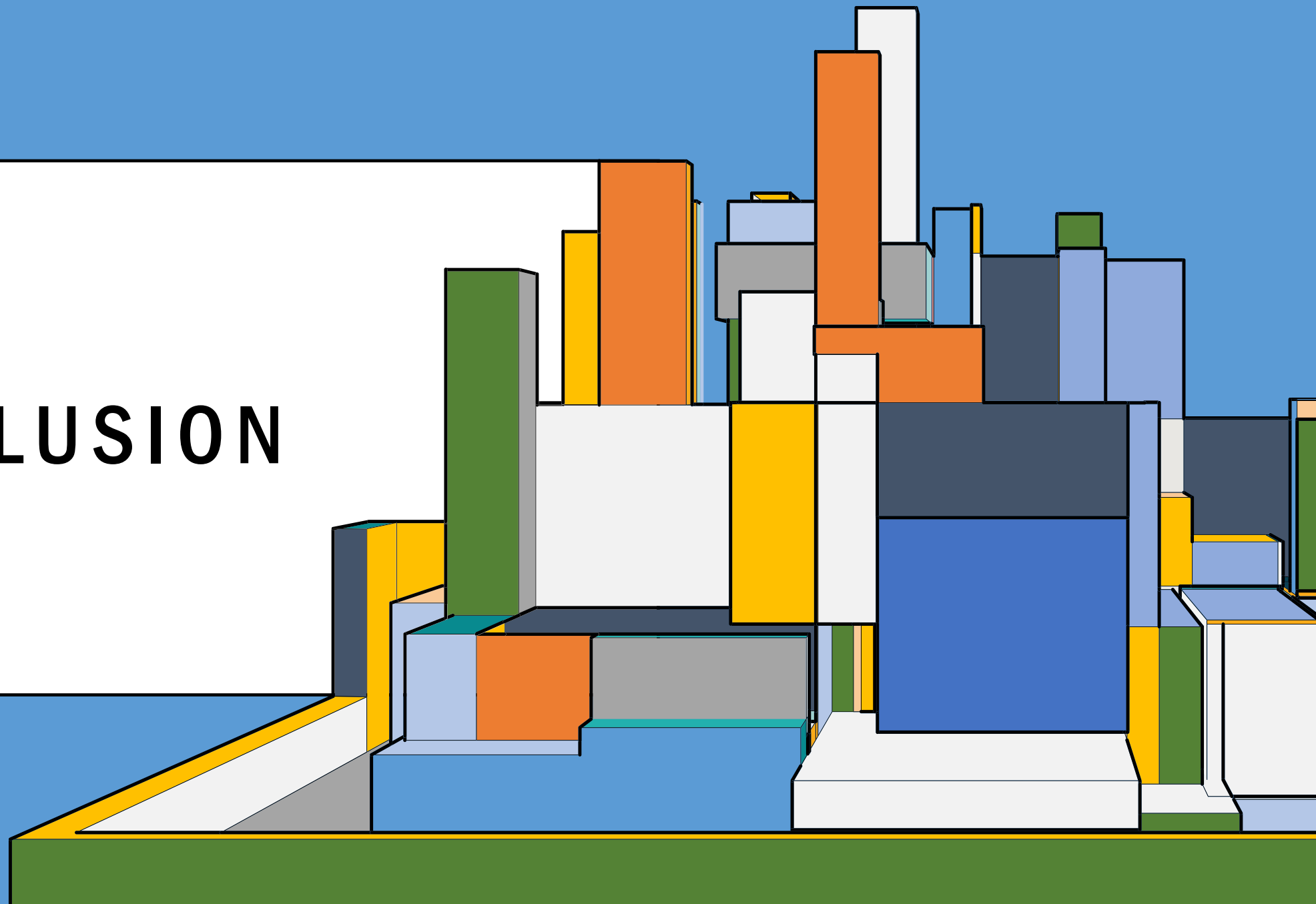
Hue h°



■ 0D: No fasting
 ■ 50D: 65.5°C d
 ■ 100D: 131.3°C d

Long-duration fasts

CONCLUSION



RECOMMENDATION



**Less than 3-days pre-slaughter fasting
(65.5°C days) during SUMMER in rainbow
trout.**

APPRECIATIONS

ueeca

UNIÓN DE ENTIDADES ESPAÑOLAS DE CIENCIA ANIMAL



UNIVERSIDAD
COMPLUTENSE
MADRID



POLITÉCNICA

WELLSTUN Project funded by MAPA (PNAC/21)



GOBIERNO
DE ESPAÑA

MINISTERIO
DE AGRICULTURA, PESCA
Y ALIMENTACIÓN

UPM RESEARCHERS



Dr. Morris Villarroel Robinson



Dr. Fernando Torrent Bravo

UCM PhD STUDENTS



Andrea Martínez Villalba



Roberto González Garoz

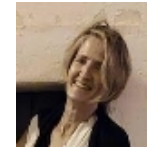
UCM RESEARCHERS



Dr. Jesús De la Fuente Vázquez



Dr. Concepción Pérez Marcos



Dr. Elisabet González de Chávarri



Dr. María Teresa Díaz Díaz-Chirón



Dr. Almudena Cabezas Albéniz



Dr. Rubén Bermejo Poza



BIANDOCARNE

THANKS FOR YOUR ATTENTION

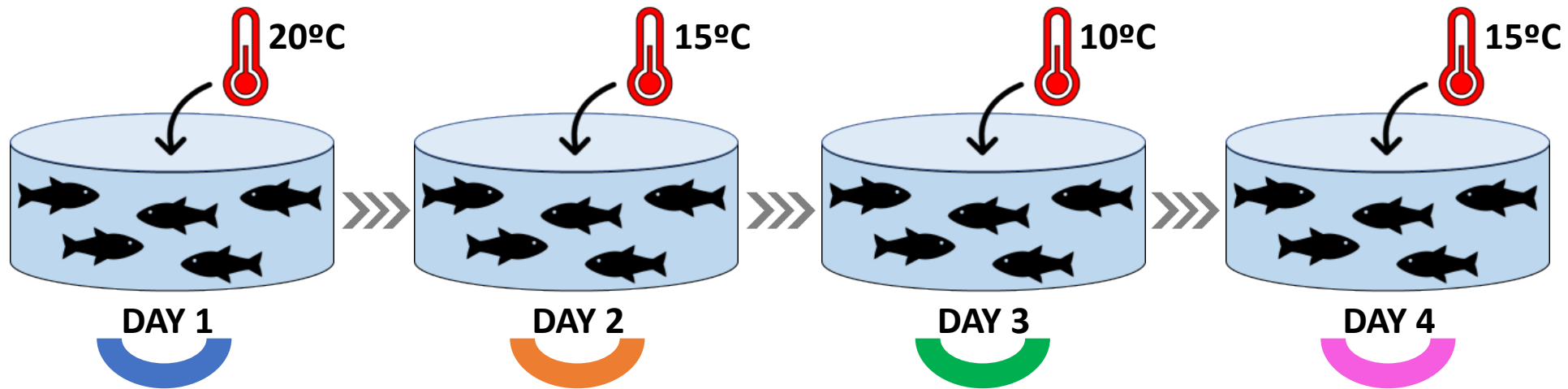
Contact: alvade03@ucm.es



WHAT ARE DEGREE-DAYS (°C DAY) IN FASTING?

Sum of the average water temperatures for each day without food supply.

EXAMPLE: How many degree-days (°C d) result from day 1 to day 4?



$$T^a \text{ (}^\circ\text{C d)} = \sum_{1 \rightarrow 4} (T^a_{\text{mean}}) = T^a_1 + T^a_2 + T^a_3 + T^a_4 = 20^\circ\text{C} + 15^\circ\text{C} + 10^\circ\text{C} + 15^\circ\text{C} = 60^\circ\text{C d}$$