ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

Un approccio multi-omico per interpretare l'effetto di Balancius™ nel broiler

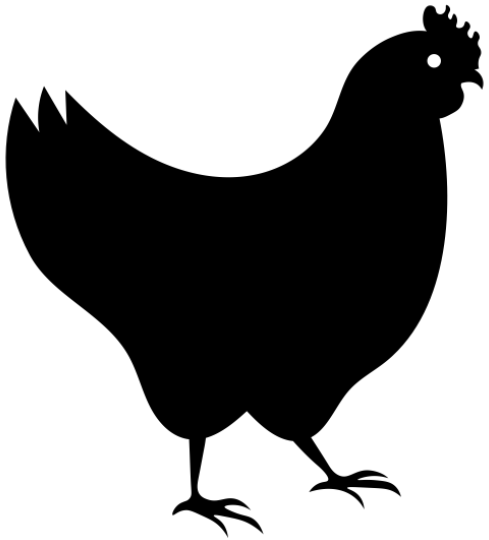
Giorgio Brugaletta [a], **Alessandra De Cesare** [b], **Gerardo Manfreda** [a], **Luca Laghi** [a], **Marco Zampiga** [a], **Federico Sirri** [a]

[a] Dipartimento di Scienze e Tecnologie Agro-alimentari

[b] Dipartimento di Scienze Mediche Veterinarie

5 Maggio 2021

Balancius™-UniBo Project



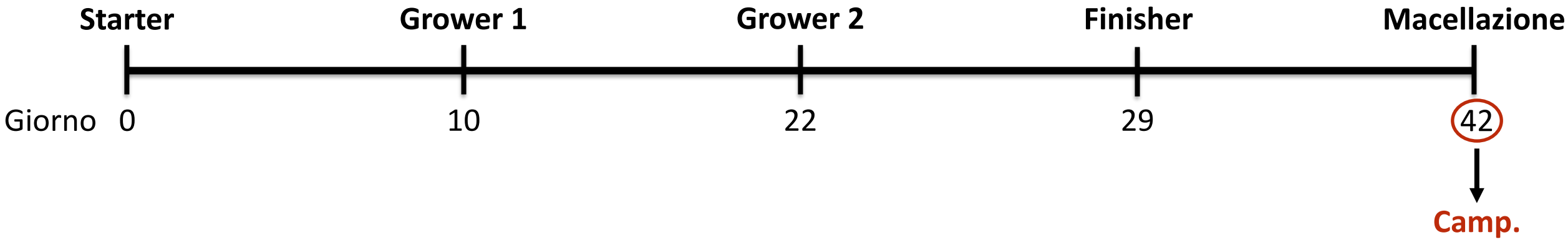
Design

2.340 Ross 308 ♂
3 gruppi × 12 repliche in blocchi
65 soggetti/replica

CON
Dieta base

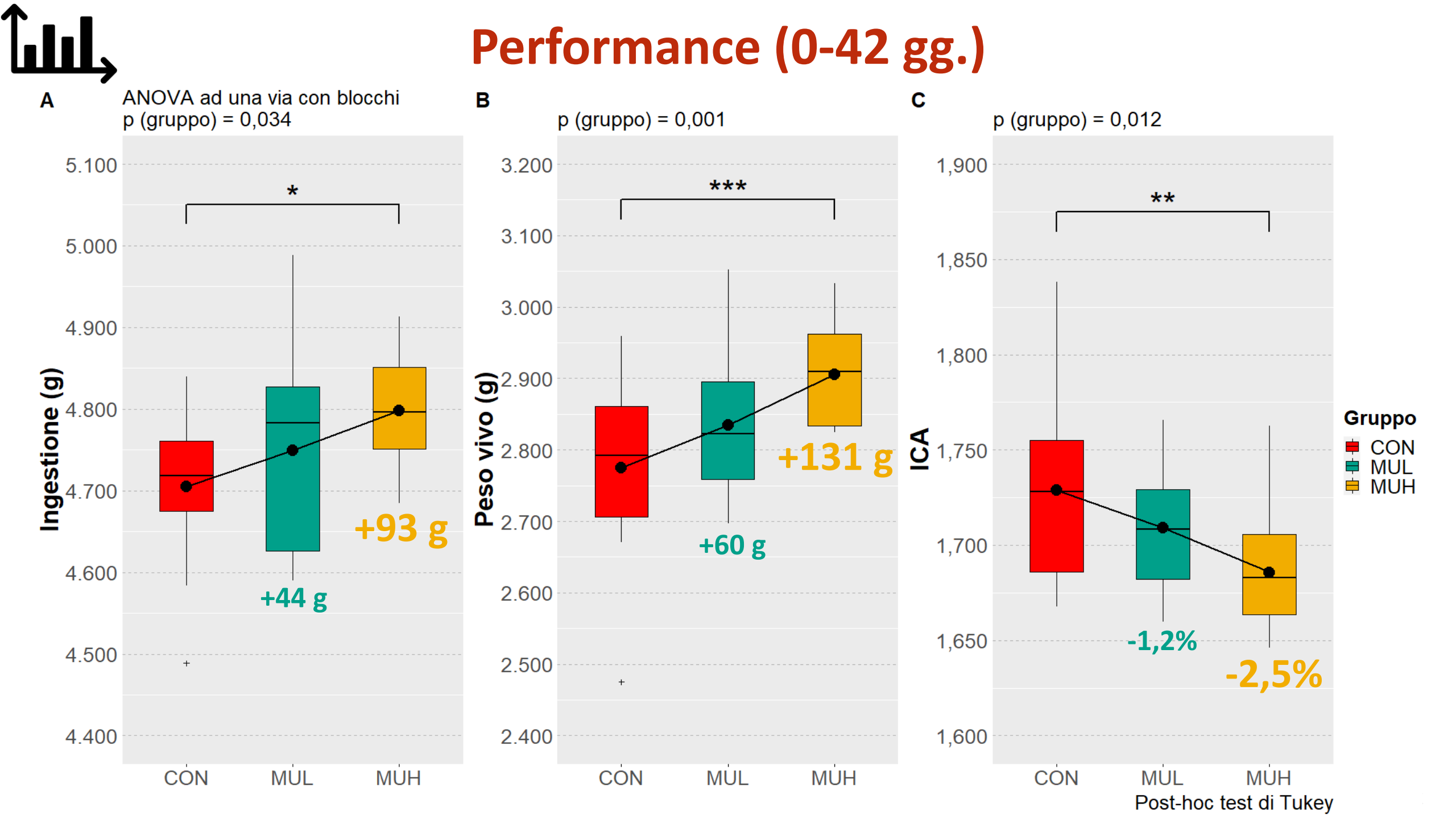
MUL
25.000 LSU(F)/kg
↕
250 g/ton

MUH
45.000 LSU(F)/kg
↕
450 g/ton



Rilevazioni: ingestione giornaliera, ingestione tot, PV, IPG, ICA, rese di macellazione, FPD
Campioni: sangue e contenuto cecale

Performance (0-42 gg.)



ELSEVIER

Poultry Science
Volume 98, Issue 5, 1 May 2019, Pages 2080-2086

Metabolism and Nutrition

Evaluation of a microbial muramidase supplementation on growth performance, apparent ileal digestibility, and intestinal histology of broiler chickens

Goodarzi Boroojeni, F. *, Männer, K. *, Rieger, J. †, Pérez Calvo, E. ‡, Zentek, J. *

ELSEVIER

Poultry Science
Volume 99, Issue 1, January 2020, Pages 235-245

Metabolism and Nutrition

Evaluation of dietary supplementation of a novel microbial muramidase on gastrointestinal functionality and growth performance in broiler chickens

Mounira Sais *, Ana C. Barroeta *, Paola López-Colom *, Miquel Nofrarías †, Natàlia Majó †, ‡, Rual Lopez-Ulibarri §, Estefanía Pérez Calvo #, Susana M. Martín-Orúe *

BRITISH POULTRY SCIENCE
2021, VOL. 62, NO. 1, 131–137
https://doi.org/10.1080/00071668.2020.1817330

Taylor & Francis
Taylor & Francis Group

Check for updates

Dietary microbial muramidase improves feed efficiency, energy and nutrient availability and welfare of broilers fed commercial type diets containing exogenous enzymes

V. Pirgozliev [a], A. Simic [a], S. P. Rose [a] and E. Pérez Calvo [b]

Rese

Parametro	Gruppo		
	CON	MUL	MUH
n	755	754	751
Carcassa eviscerata (%)	70,1	70,4	70,8
Petto (%)†	30,6	30,9	31,3
Sovracoscia-fuso (%)†	43,0	43,0	43,0
Ali (%)†	19,2	19,1	19,1

† Calcolato come percentuale del peso della carcassa eviscerata

Multidisciplinarietà & Multi-omica

Contenuto cecale

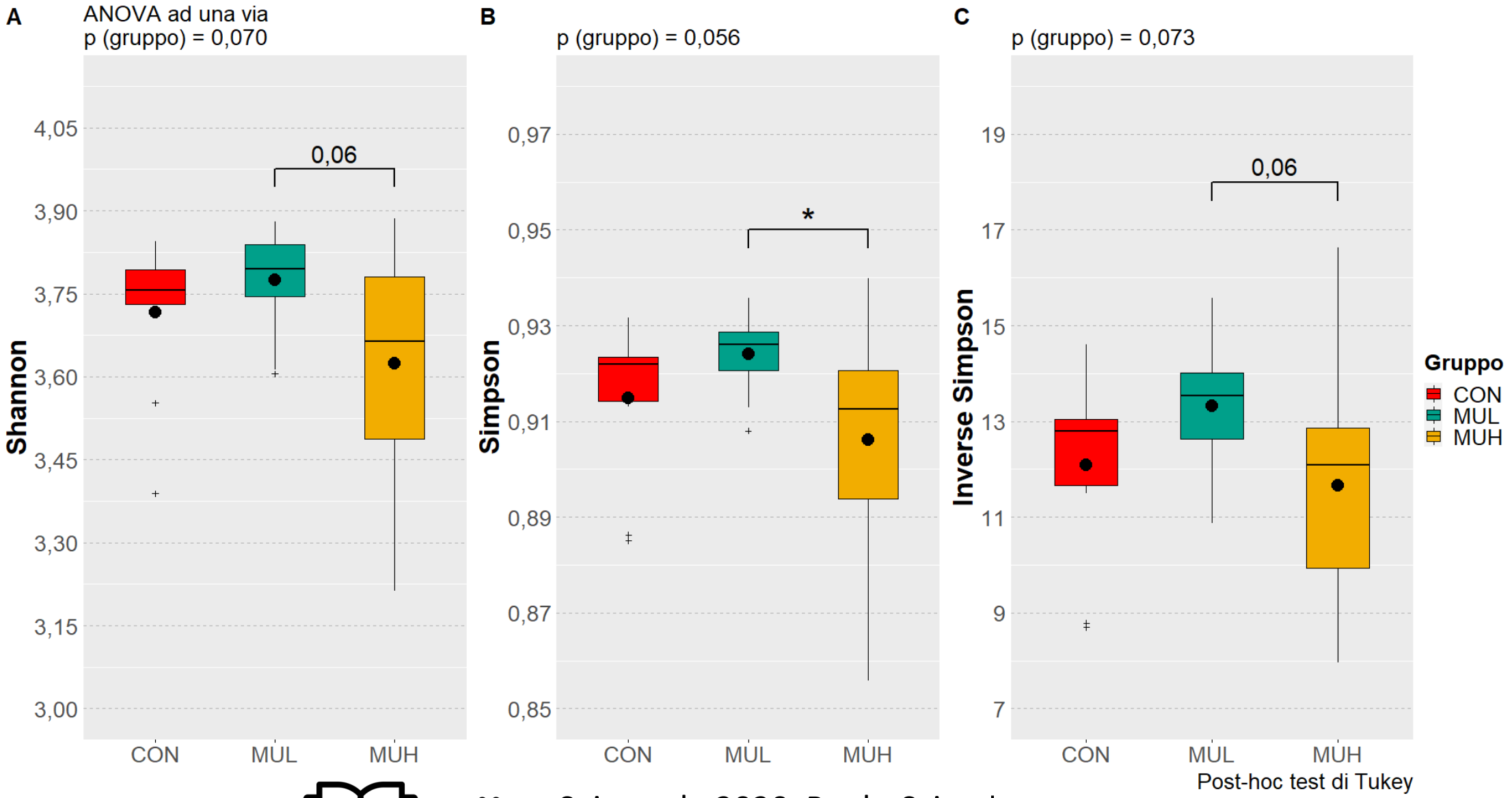
Sequenziamento del genoma microbico completo (WGS)

Metabolomica (^{1}H-NMR)

Plasma

Metabolomica (^{1}H-NMR)

Diversità α

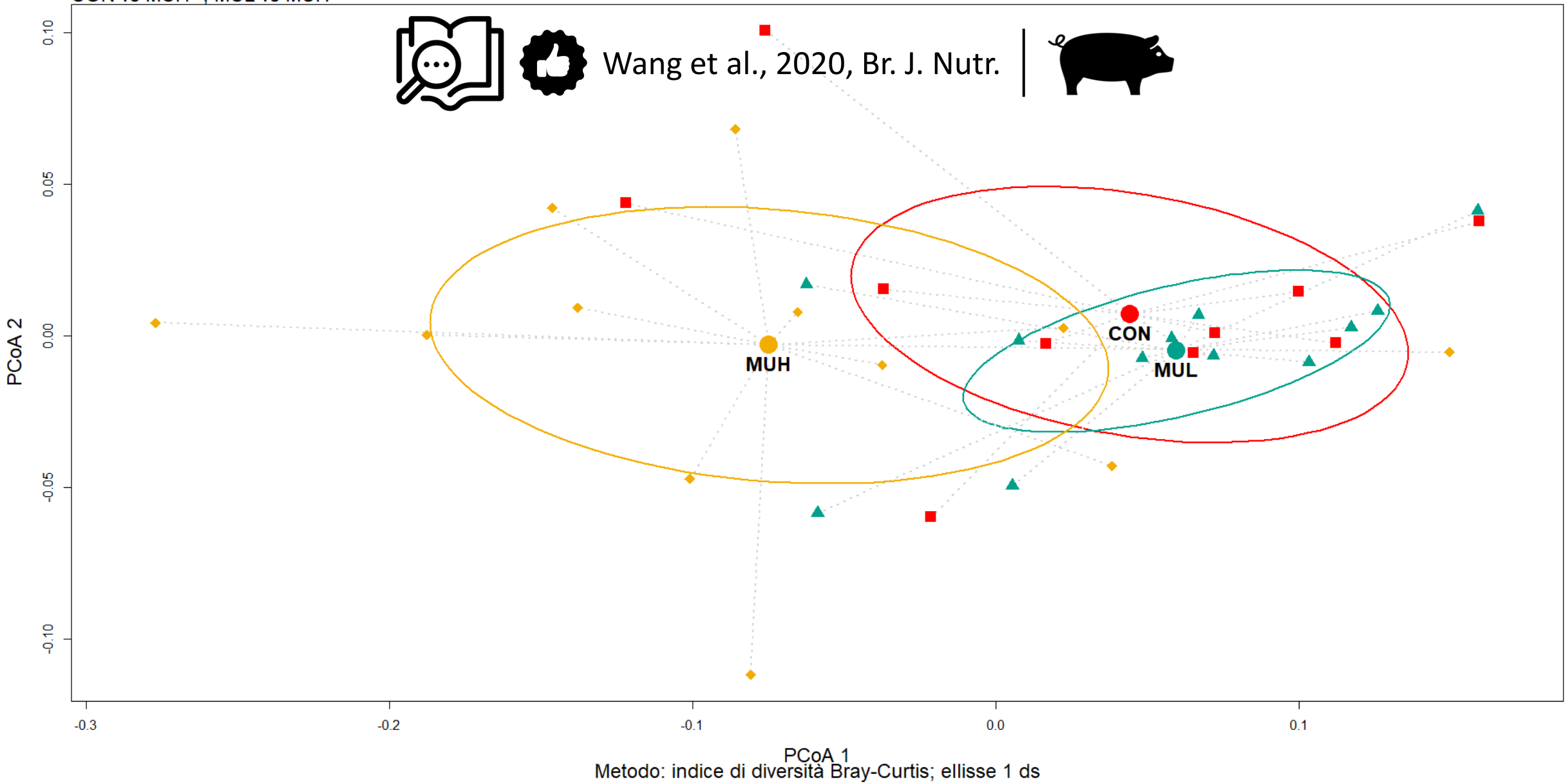


Sais et al., 2020, Poult. Sci.
Wang et al., 2020, Br. J. Nutr.

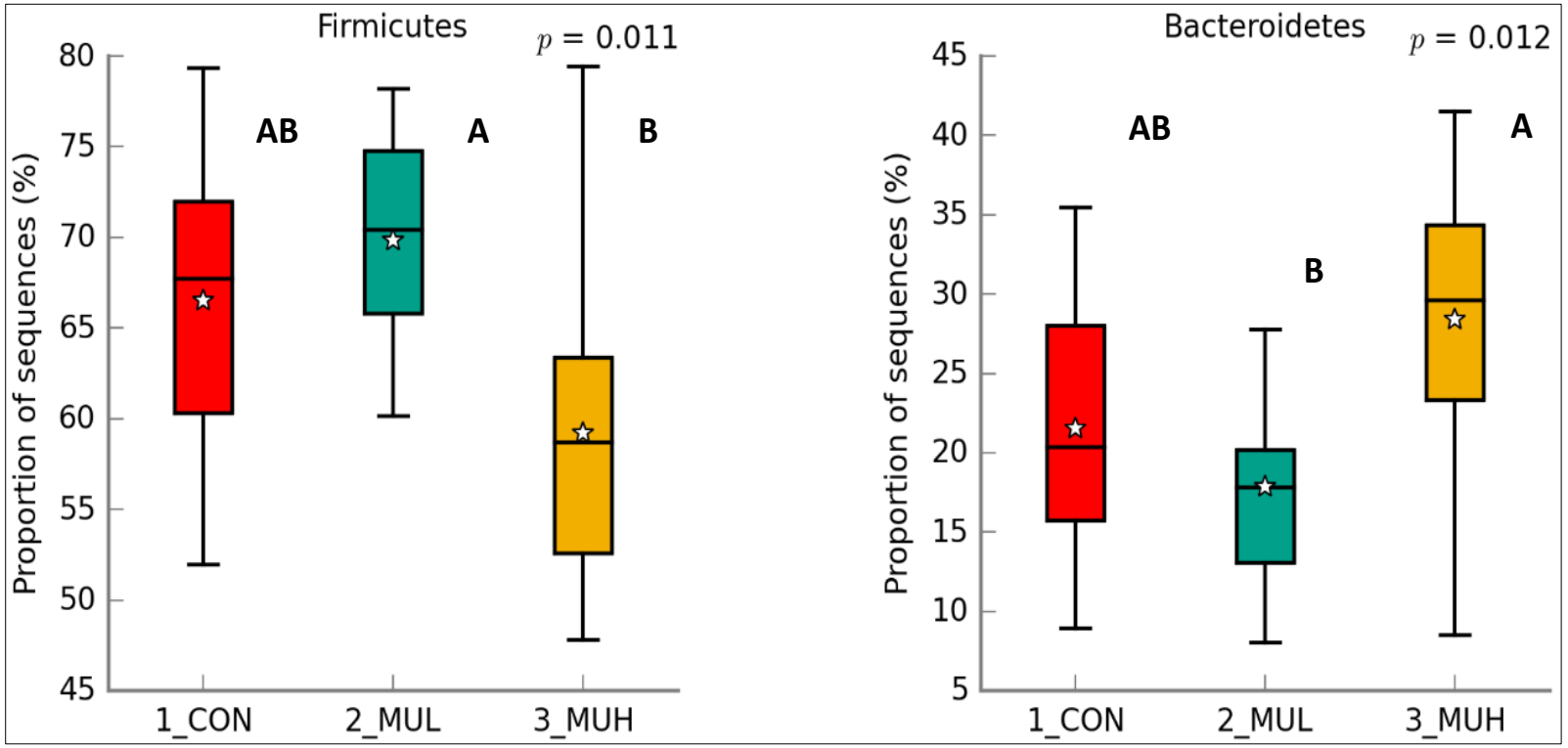
Diversità β

PERMANOVA con metodo "adonis"
R2 = 0,22; p (gruppo) = 0,004
CON vs MUH *; MUL vs MUH **

Wang et al., 2020, Br. J. Nutr.



Tassonomia – Phylum



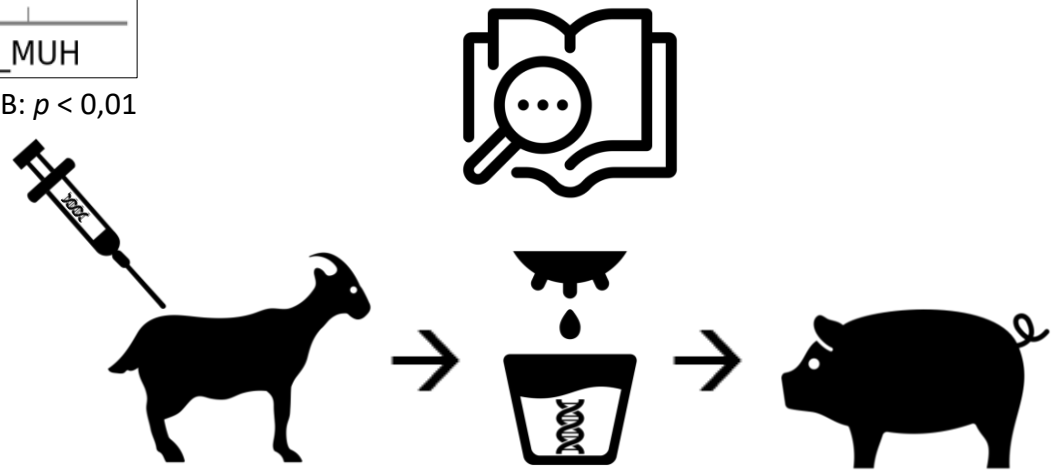
A, B: $p < 0{,}01$

MUH

↓ Firmicutes

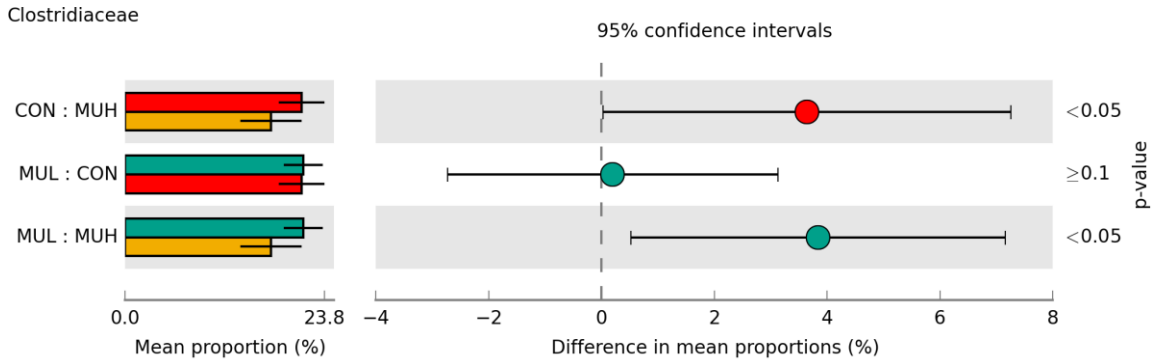
↑ Bacteroidetes

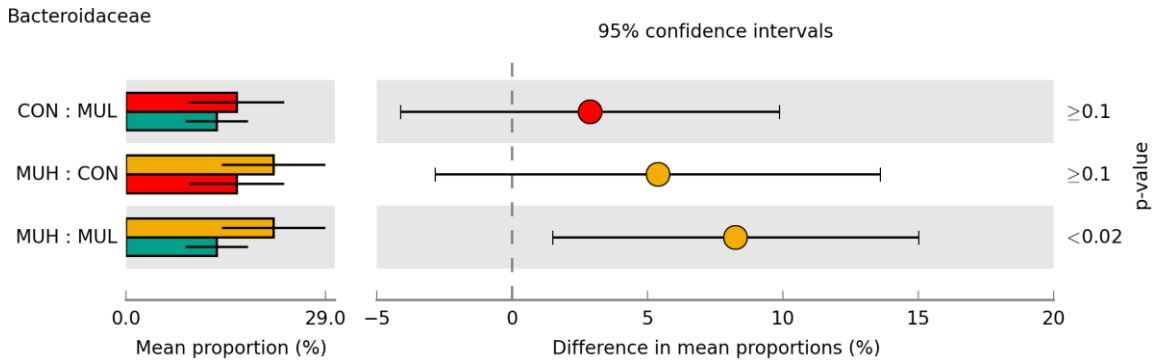
↓ F:B

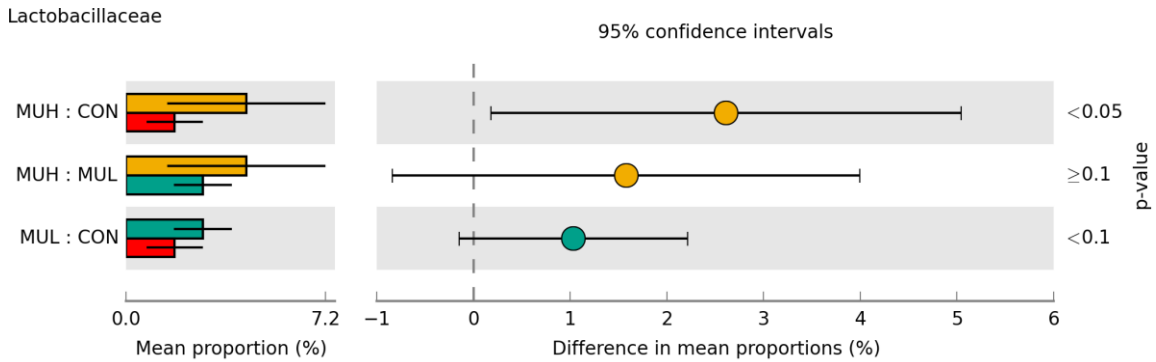


(Maga et al., 2012, Appl. Environ. Microbiol.)

Tassonomia – Famiglia







MUH

↓ Clostridiaceae

Sais et al., 2020, Poult. Sci.

↑ Bacteroidaceae

MUH & MUL

↑ Lactobacillaceae

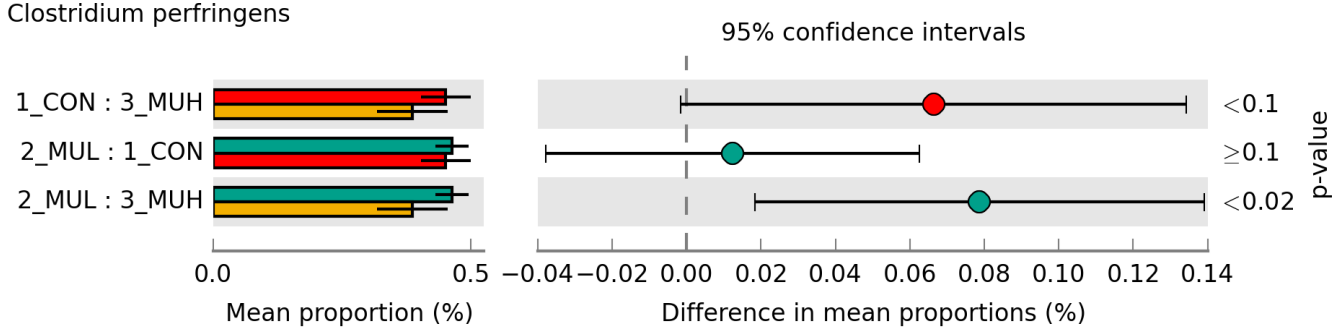
Lichtenberg et al., 2017, Regul. Toxic. Pharmacol.
Sais et al., 2020, Poult. Sci

Wang et al., 2020, Br. J. Nutr.

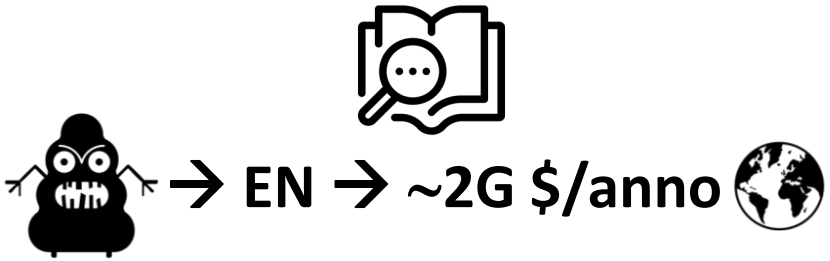
ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

Tassonomia – (*Food-borne*) *Pathogens*

Clostridium perfringens



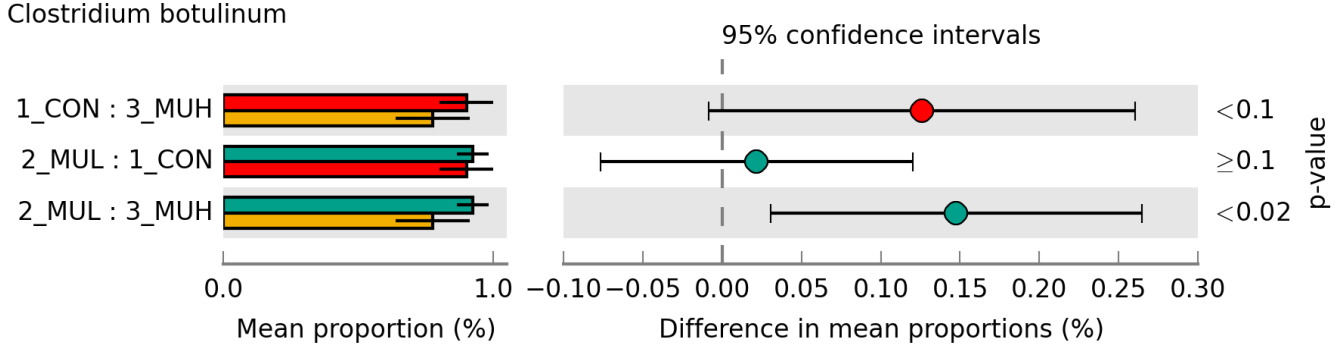
MUH



→ **EN** → **~2G $/anno**

(Van Immerseel et al., 2009, Trends Microbiol.)

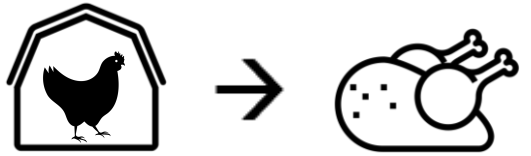
Clostridium botulinum



MUH

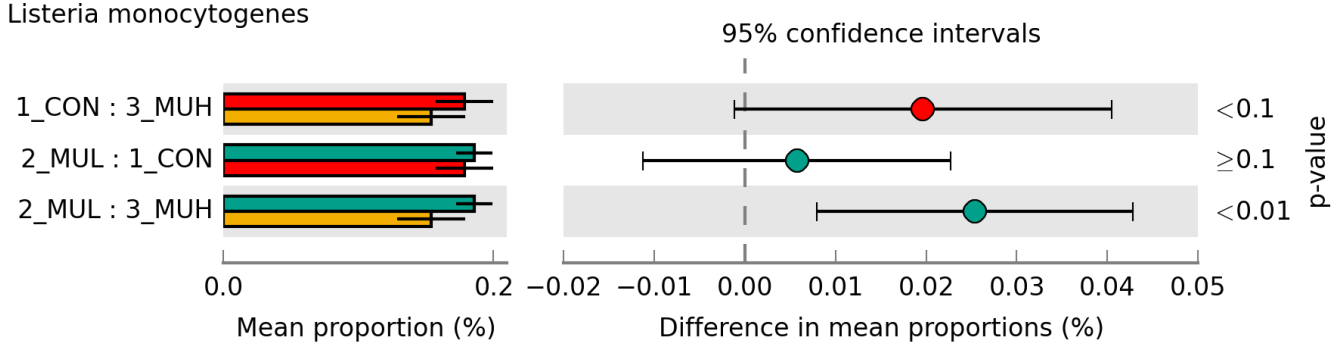
Botulismo aviario

(Souillard et al., 2014, Avian Pathol.)



(Rothrock et al., 2017, Front. Vet. Sci.)

Listeria monocytogenes



MUH

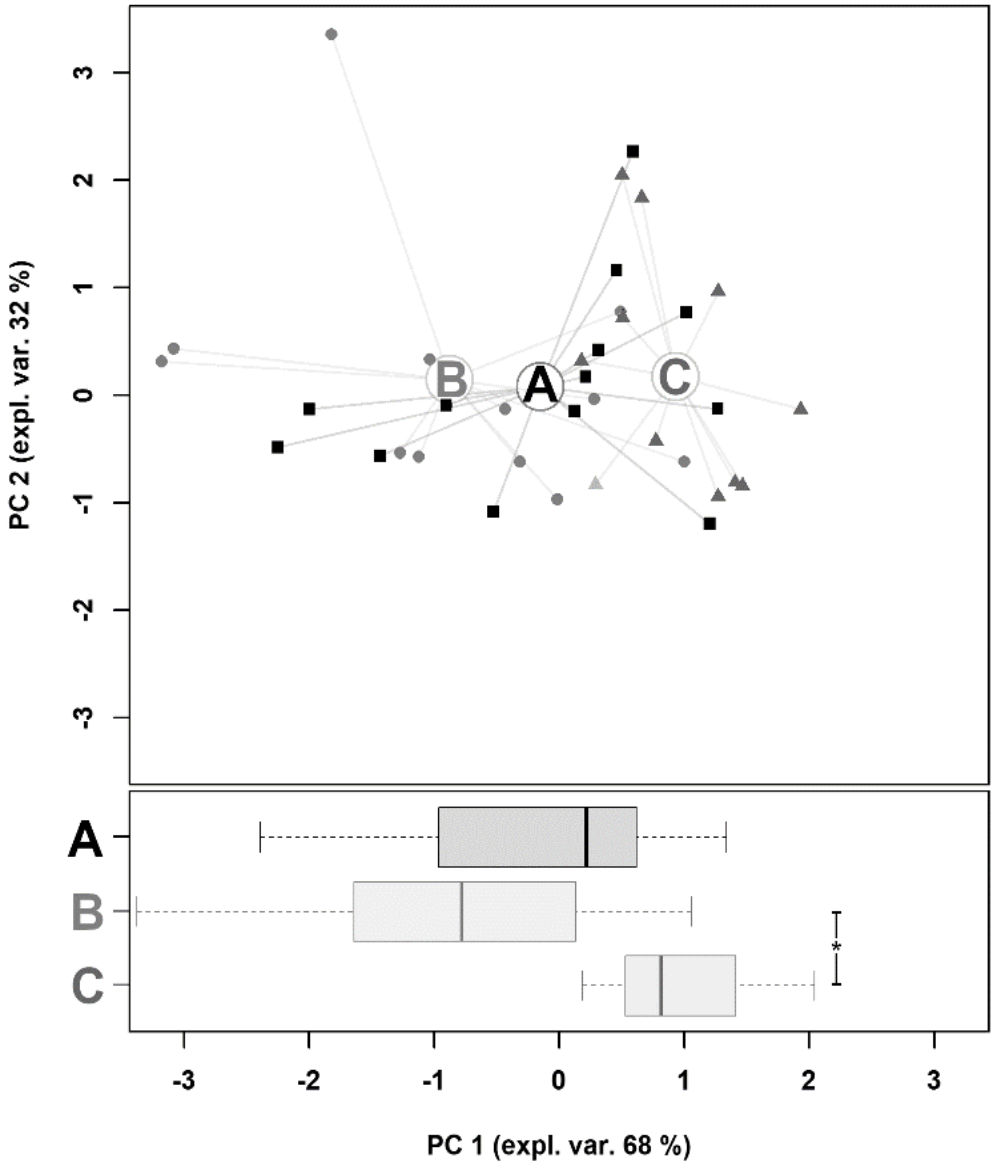
(EFSA Journal, 2021)

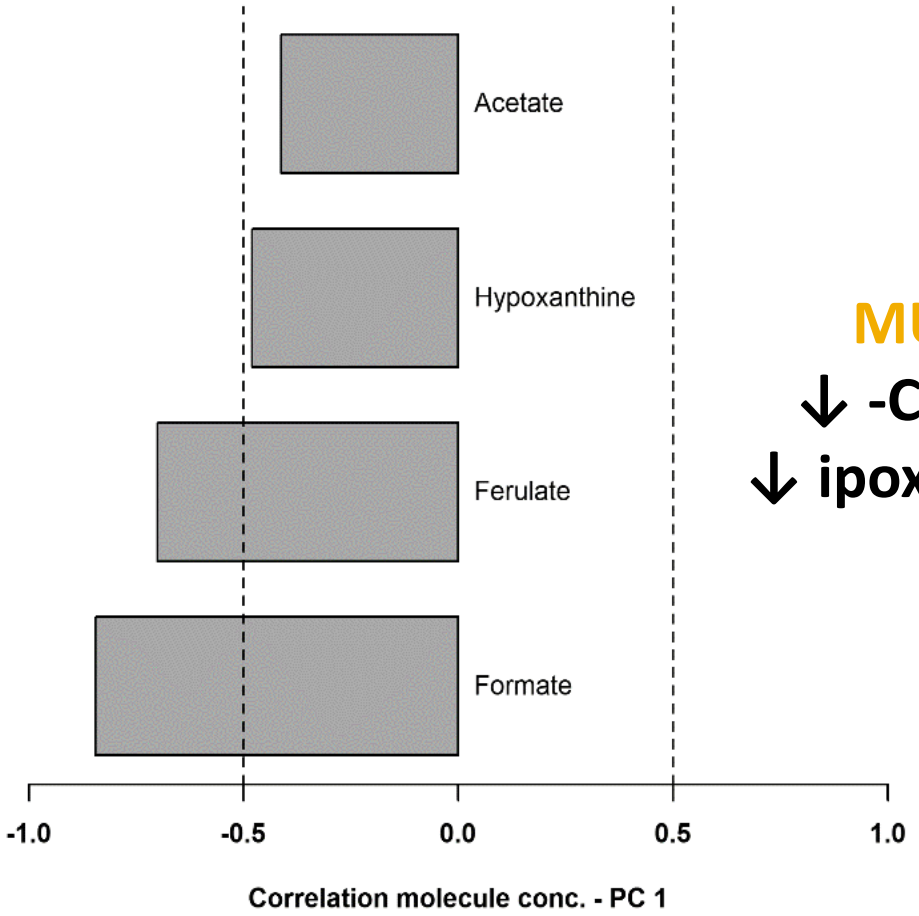
Lisi + inibizione

(Hughey & Johnson, 1987, Appl. Environ. Microbiol.; Liu et al., 2010, Avian Pathol.)

Metaboloma cecale

A = CON; B = MUL; C = MUH





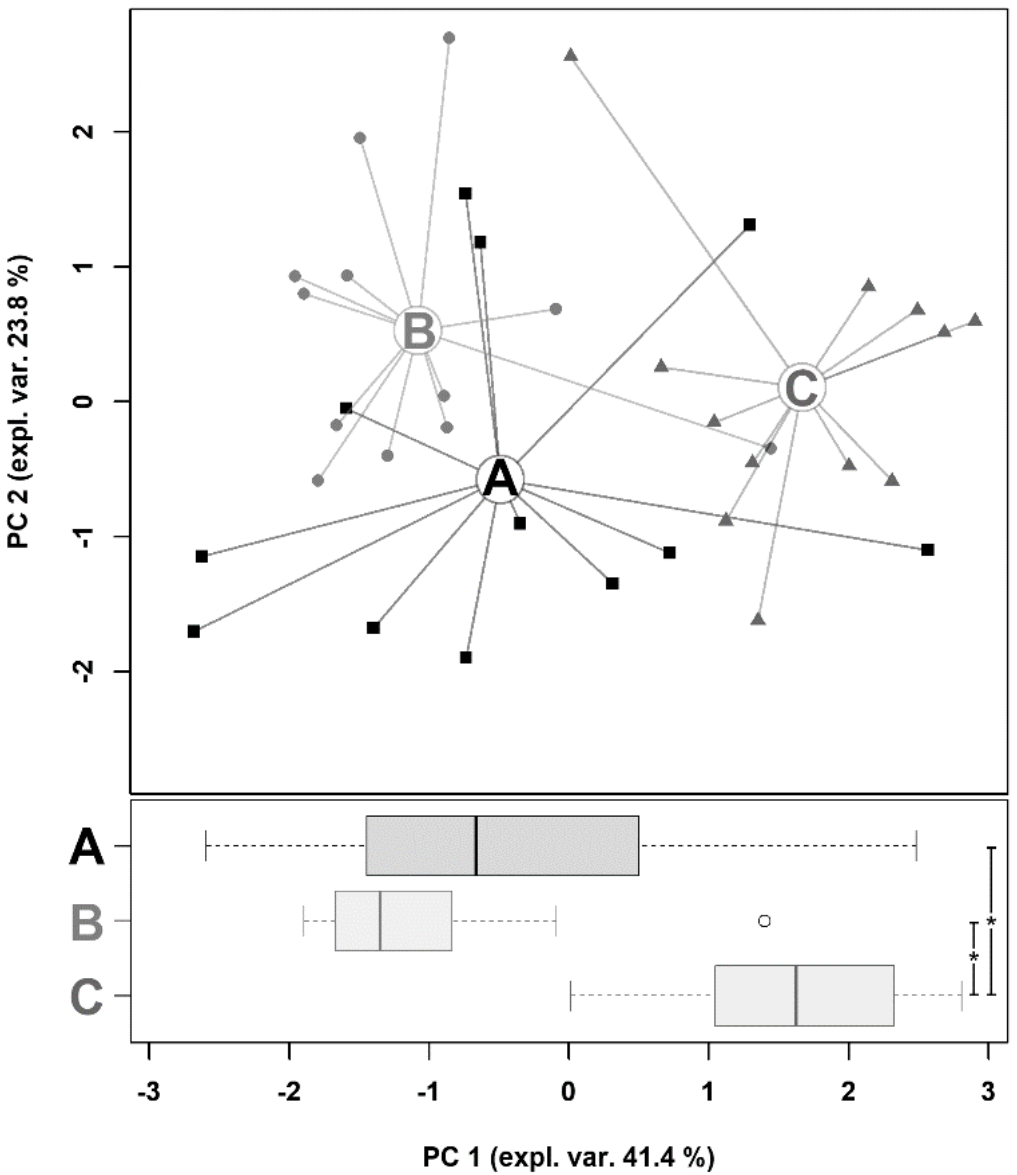
MUH

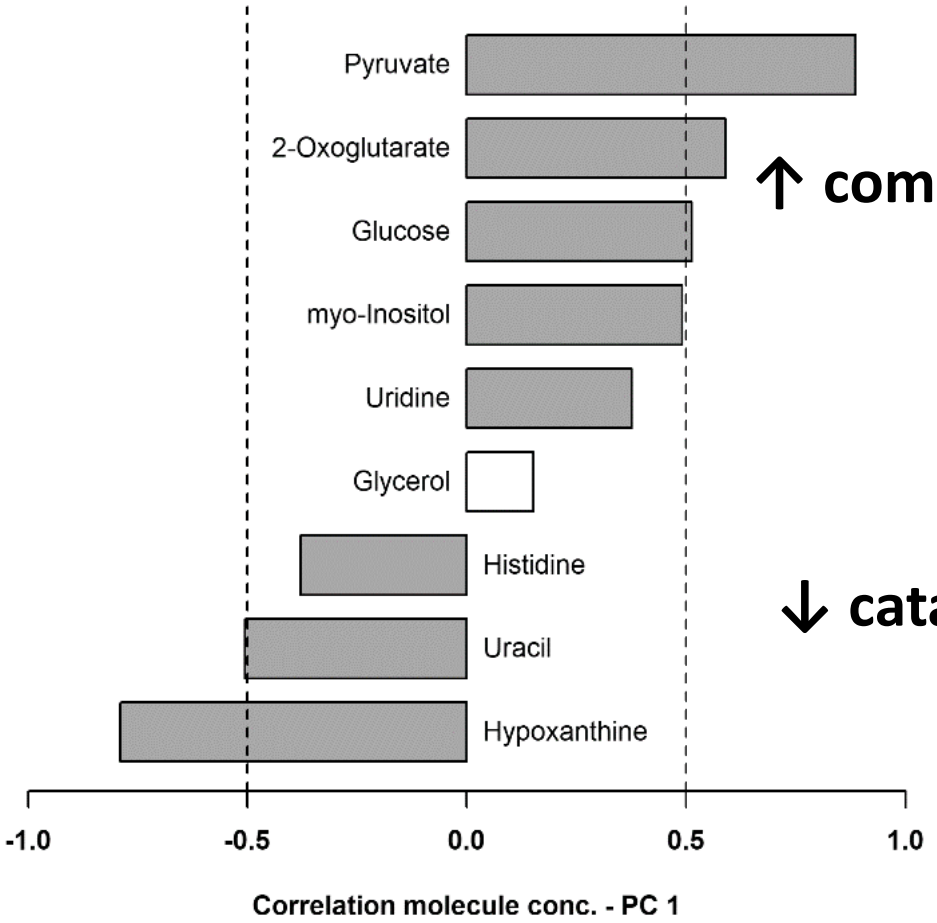
↓ -COOH

↓ ipoxantina

Metaboloma plasmatico

A = CON; B = MUL; C = MUH





MUH

↑ composti "bioenergetici"

MUH

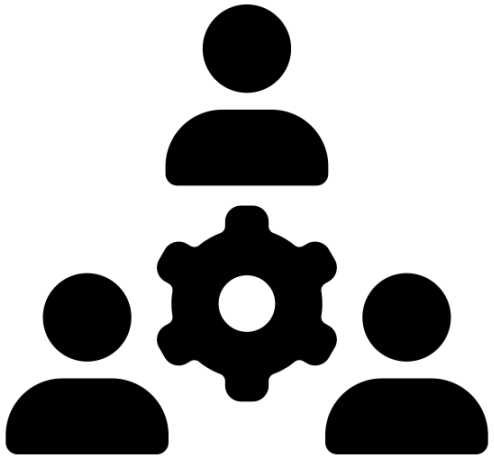
↓ cataboliti pro-ossidanti

↓ ipoxantina

ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

Riassumendo

	CON Dieta base	MUL 25.000 LSU(F)/kg ↔ **250 g/ton**	MUH 45.000 LSU(F)/kg ↔ **450 g/ton**
Ingestione	↓	↑	↑
Peso vivo	↓	↑	↑↑
ICA	↑	↓	↓↓
Firmicutes:Bacteroidetes	↑	↑↑	↓↓
Clostridiaceae	↑	↑	↓↓
Bacteroidaceae	↓	↓↓	↑↑
Lactobacillaceae	↓	↑	↑↑
(*Food-borne*) *Pathogens*	↑	↑	↓
Composti “bioenergetici”	↓	↓	↑
Cataboliti pro-ossidanti	↑	↑	↓



DSM

Aviagen®

zootecnica
INTERNATIONAL

ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

Giorgio Brugaletta

Poultry Science Research Group

Department of Agricultural and Food Sciences
Alma Mater Studiorum – University of Bologna
giorgio.brugaletta2@unibo.it
Institutional web page
LinkedIn