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newfeed

FEED FROM FOOD INDUSTRY BY-PRODUCTS

Valorization of Olive Cake as a By-product as a Solution for Olive waste and validating the obtained ingredients with Poultry

25/6/2025

12th International Conference on Solid Waste Management-CYPRUS 2025

Valorization of Olive Cake as a By-product as a Solution for Olive waste and validating the obtained ingredients with Poultry

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25/6/2024

Turn food industry by-products into secondary feedstuffs via circular-economy schemes

Case study 3: olive cake-based ingredients for poultry, broiler chicken

Lead: HUSD-SDF-ISIS (Egypt)

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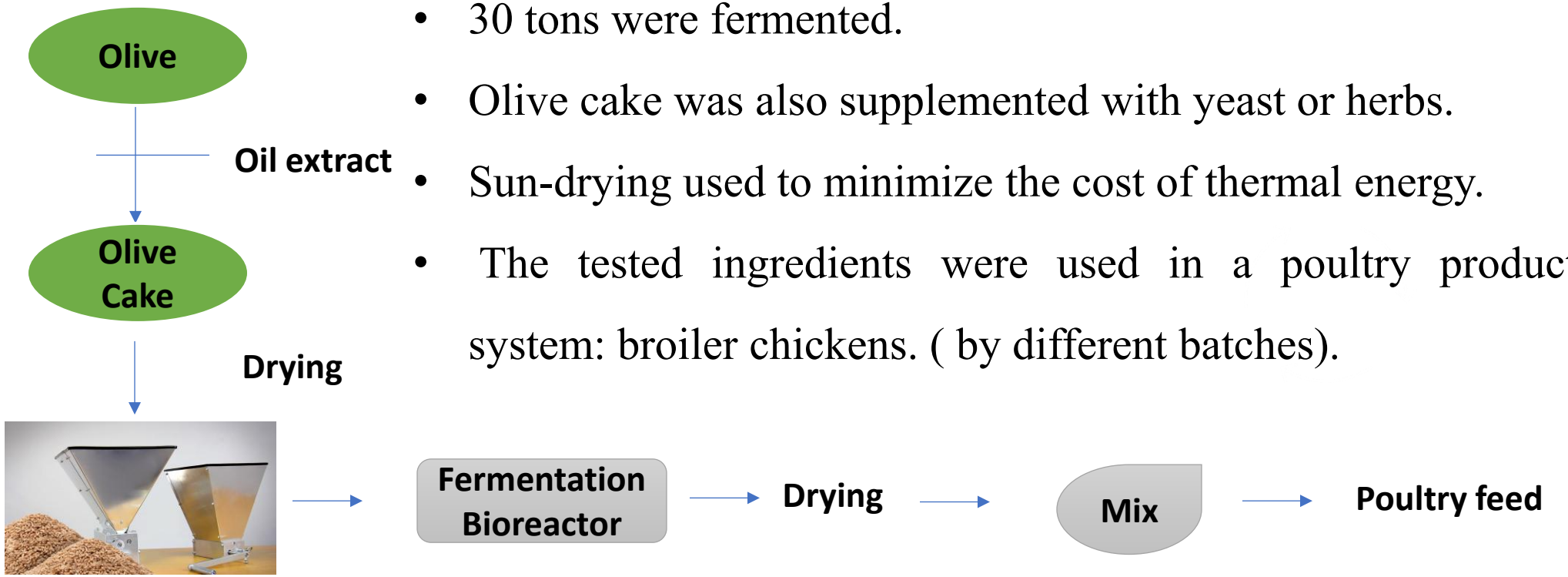
Case study 3: Olive cake-based ingredients for Poultry (Lead: HUSD)

Case study 3 (Egypt):

- 47 tons of olive cake (ISOF) were processed;
- 30 tons were fermented.
- Olive cake was also supplemented with yeast or herbs.
- Sun-drying used to minimize the cost of thermal energy.
- The tested ingredients were used in a poultry production system: broiler chickens. (by different batches).



Case study 3: Olive cake-based ingredients for Poultry (Lead: HUSD)

Tabel 1. Chemical analysis for un-fermented Olive Cake (on DM basis).

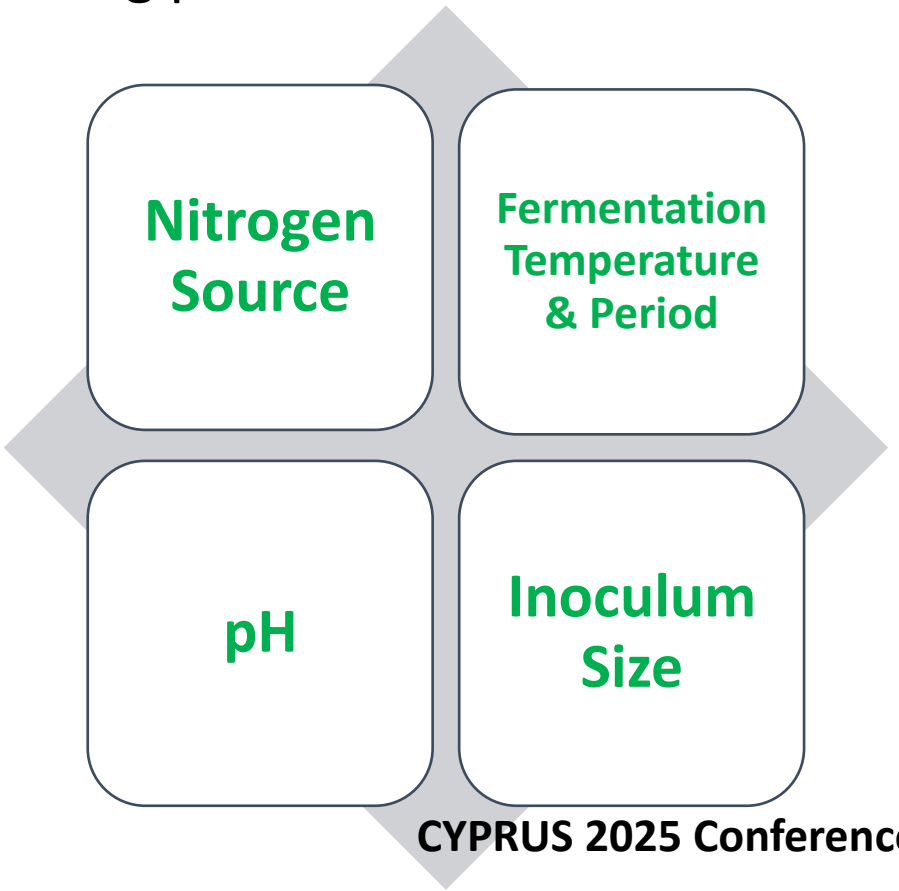
	Untreated OC
Ash	3.43
CP	6.53
CF	45.25
EE	14.77
NFE	35.19
NDF	91.77
ADF	74.26
ADL	41.74
HEMI.	17.83
CELL.	32.19
LIGN.	39.78
GE cal/Kg	4613

Lab Scale Valorization of Olive Cake…..

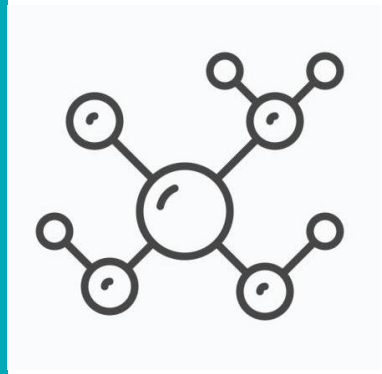
The most promising microbial isolate

Optimization and Identification

The **Mold** isolate that exabit the best results of degradation of the crude fiber through solid-state fermentation was optimized for the following parameters in the lab to be used in the large/Pilot scale (WP3).

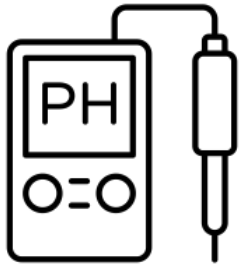


Best Solid-State Fermentation Conditions based on the Optimization Results:



Nitrogen Source

Beef Extract



pH Value

6

Incubation Temperature & Period

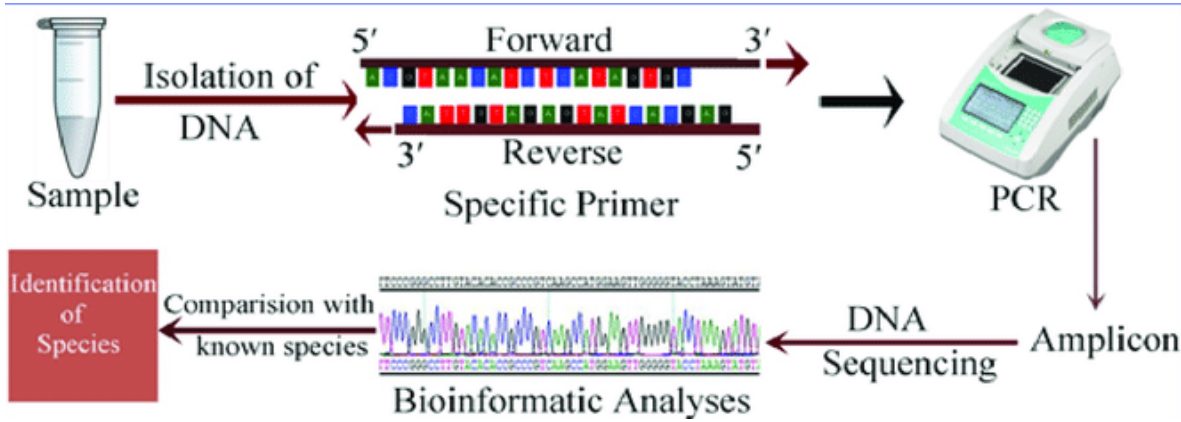
28°C for 14 Days

Inoculum Size

3%

Mold Isolate Identification

Molecular Identification was done for the mold isolate using ITS gene sequencing.



60%-70% Crud Fiber Degradation

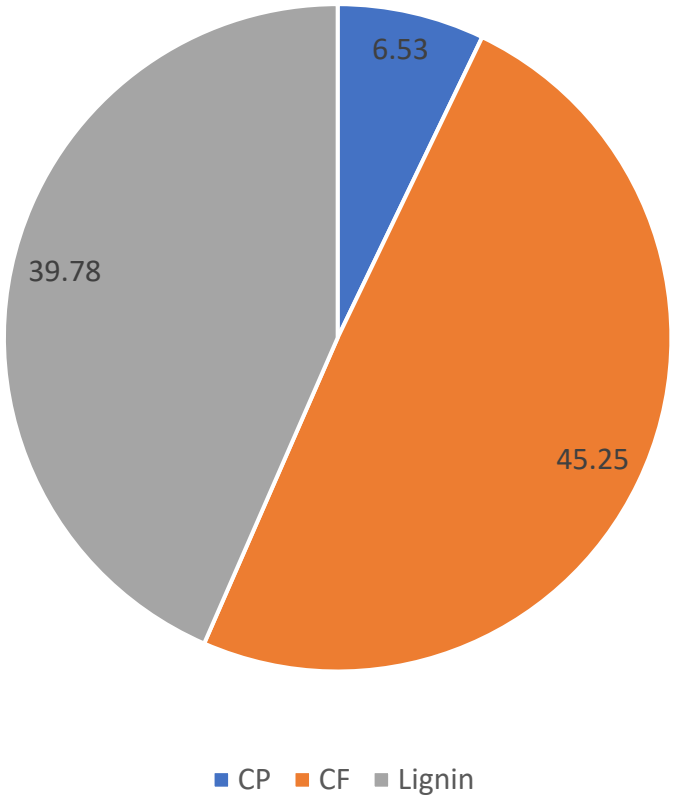
Industrial Pivotal Role

Aspergillus oryzae

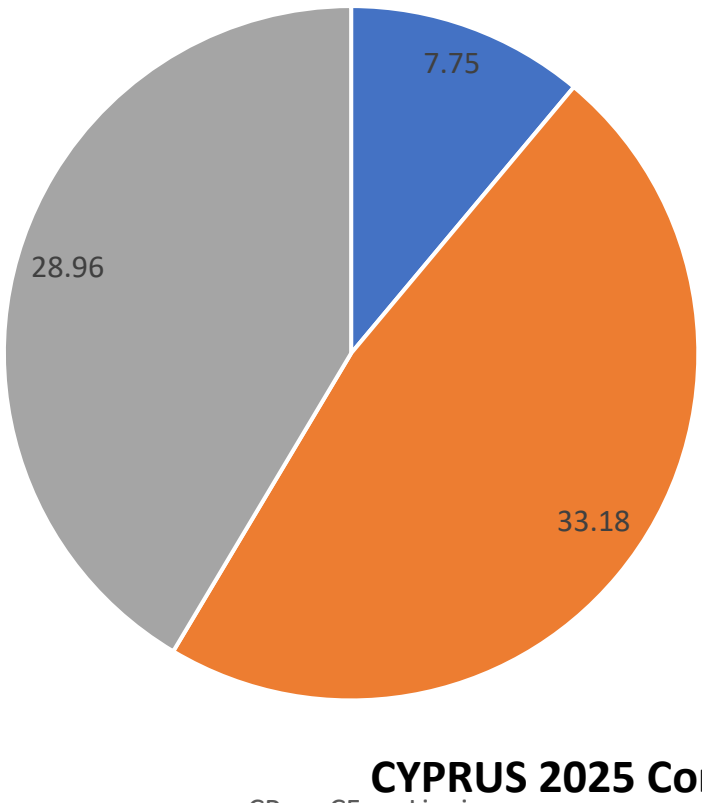
Feedstuff Ingredients

Analysis

UnFermented



Fermented



Case study 3: Olive cake-based ingredients for Poultry (Lead: HUSD)

Assessment 1
An ingredient for broiler feed can be used from olive cake

→

Test ingredient
Develop more than one fermented way then the promising determined in digestibility trail on roosters

→

Results
New technology is used to develop and validate the raw material

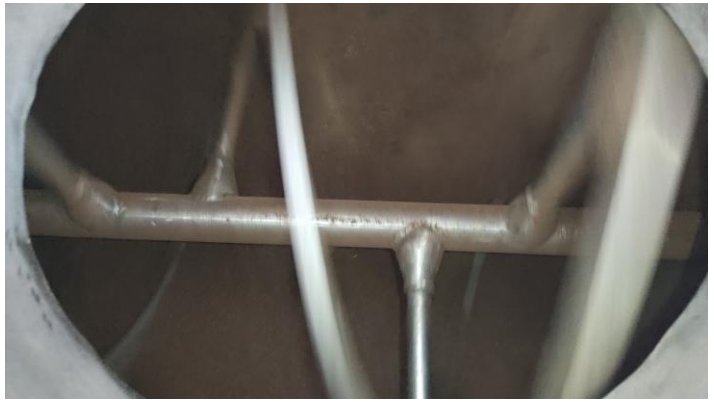
24 Mature rooster

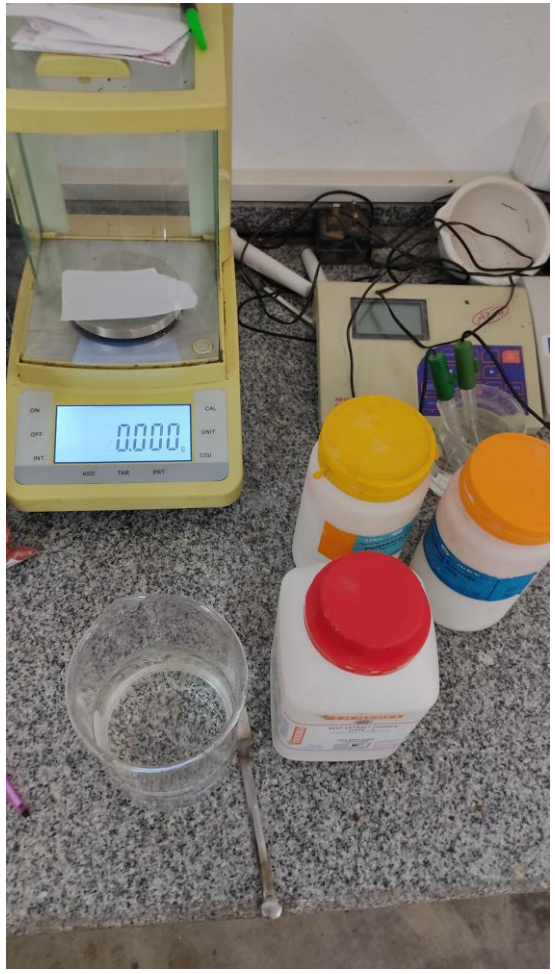
Pilot / Large Scale
Solid State Fermentation(SSF)

500 Kg of Olive Cake was fermented and Valorized in the Solid-State Fermentor by *Aspergillus oryzae* under the optimized condition









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The 500 Kg Fermented Olive Cake was sundried and Subjected to Processing and Feed Preparation

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WP3

Validation of the Valorization and Feeding strategies at pilot scale

Assessment 2
An ingredient from the olive industry for broiler feed.

Test ingredient
Develop more than one experimental trail on broilers with different inclusion (10-20-30-40 and 50 %)

Providing of Herbal and aromatic plants

Mint

Lemongrass

Chamomile

In the Farm Scale

Housing unit (in-vivo) Five batch's

Finished

In the Farm Scale

experimental Grouping

Experimental Design

Feeding trial

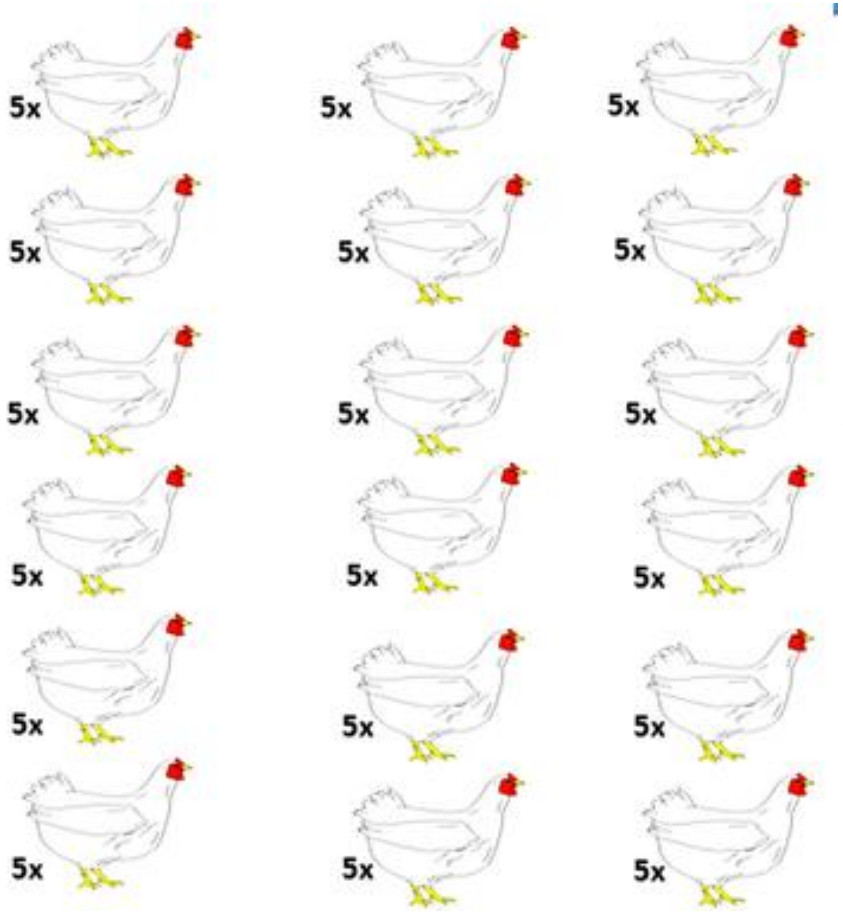
C: Control
(0% - FOC)

T1: FOC + W
(10, 20,30, 40 & 50 %)

T2: FOC + WO
(10, 20,30, 40 & 50 %)

T3: FOC + W
(10, 20,30, 40 & 50 %)

T4: FOC + WO
(10, 20,30, 40 & 50 %)



6000 +/- 500 unisex

5 Batch

Experimental Diet

Item	Experimental Diet (%)
Yellow corn	50.35
Soybean meal	42.00
Soybean oil	3.65
Corn Gluten meal	0.00
Olive cake	0.00
Herbal mixture	0.00
Calcium carbonate	1.30
Calcium dibasic phosphate	1.60
Common salt	0.30
Premix1	0.30
DL- Methionine	0.25
Lysine	0.15
Toxenil	0.10

Measurement parameters

The Feed Efficiency for broiler chickens had been assessed by:

(a) Body weight gain (BWG), Feed intake, and Feed conversion ratio (FCR)

Follow up weight

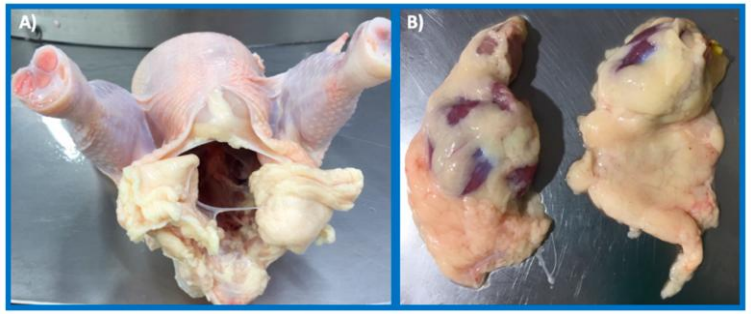
(b) Survival rate (%)

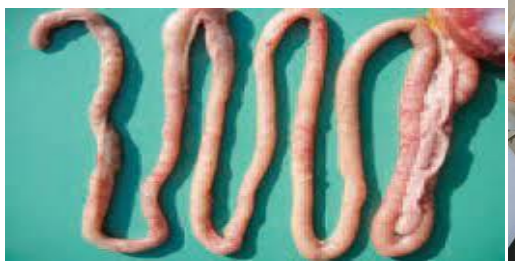
(c) The European Production Efficiency Index (EPEI)

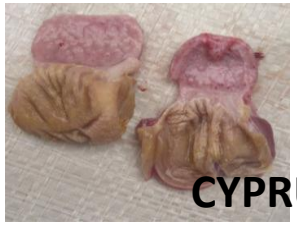
Measurement parameters

<u>The Feed Efficiency for broiler chickens had been assessed by:</u>

(d) Carcass characteristics, inner body organs, and lymphoid organs (spleen and bursa of Fabricius) ratios to live body weight





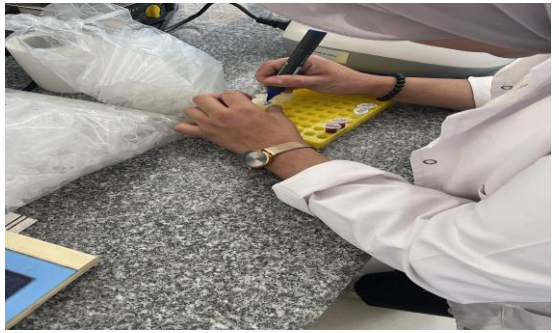


Measurement parameters

The Feed Efficiency for broiler chickens had been assessed by: <u>Cont.</u>

(e) Blood plasma lipid profiles (triglycerides, total cholesterol, low-density lipoprotein (LDL), high-density lipoprotein (HDL, Plasma very-low-density lipoprotein (VLDL) and total cholesterol-HDL-LDL)

(f) Health status of all birds at weekly intervals as well as whenever the responsible animal scientists observe any sign of malaise.



Measurement parameters

The Feed Efficiency for broiler chickens had been assessed by: <u>Cont.</u>

(g) The Sensory Evaluation of final products: meat (broiler chickens), will be performed by a consumer panel.

Results

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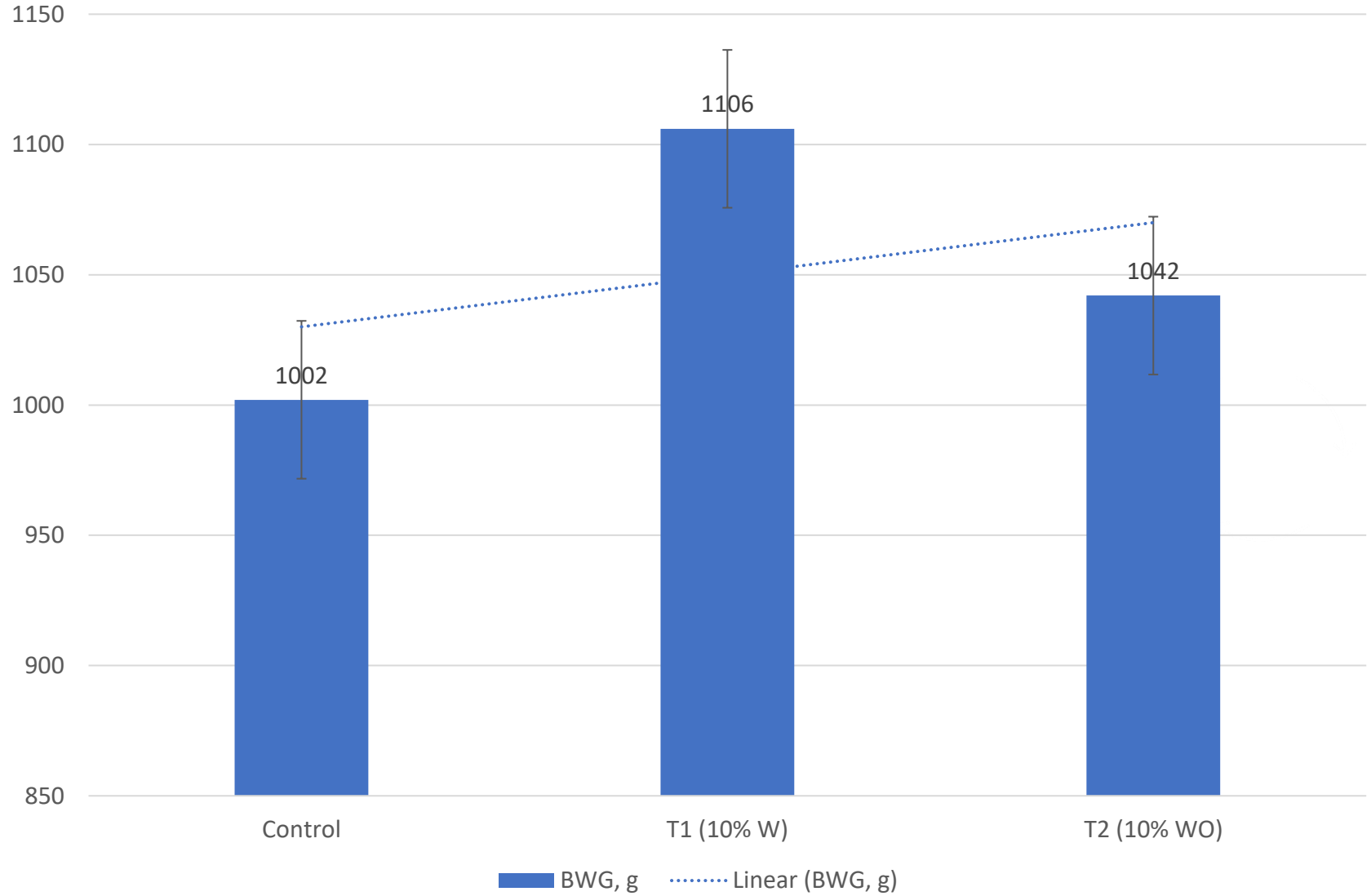
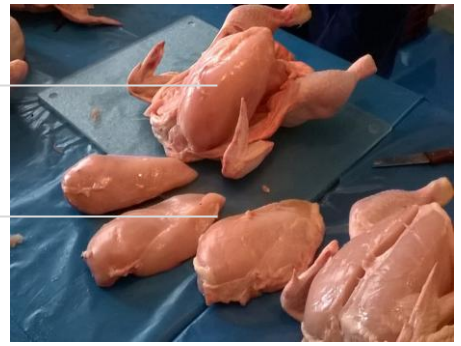
Inclusion of 10 %

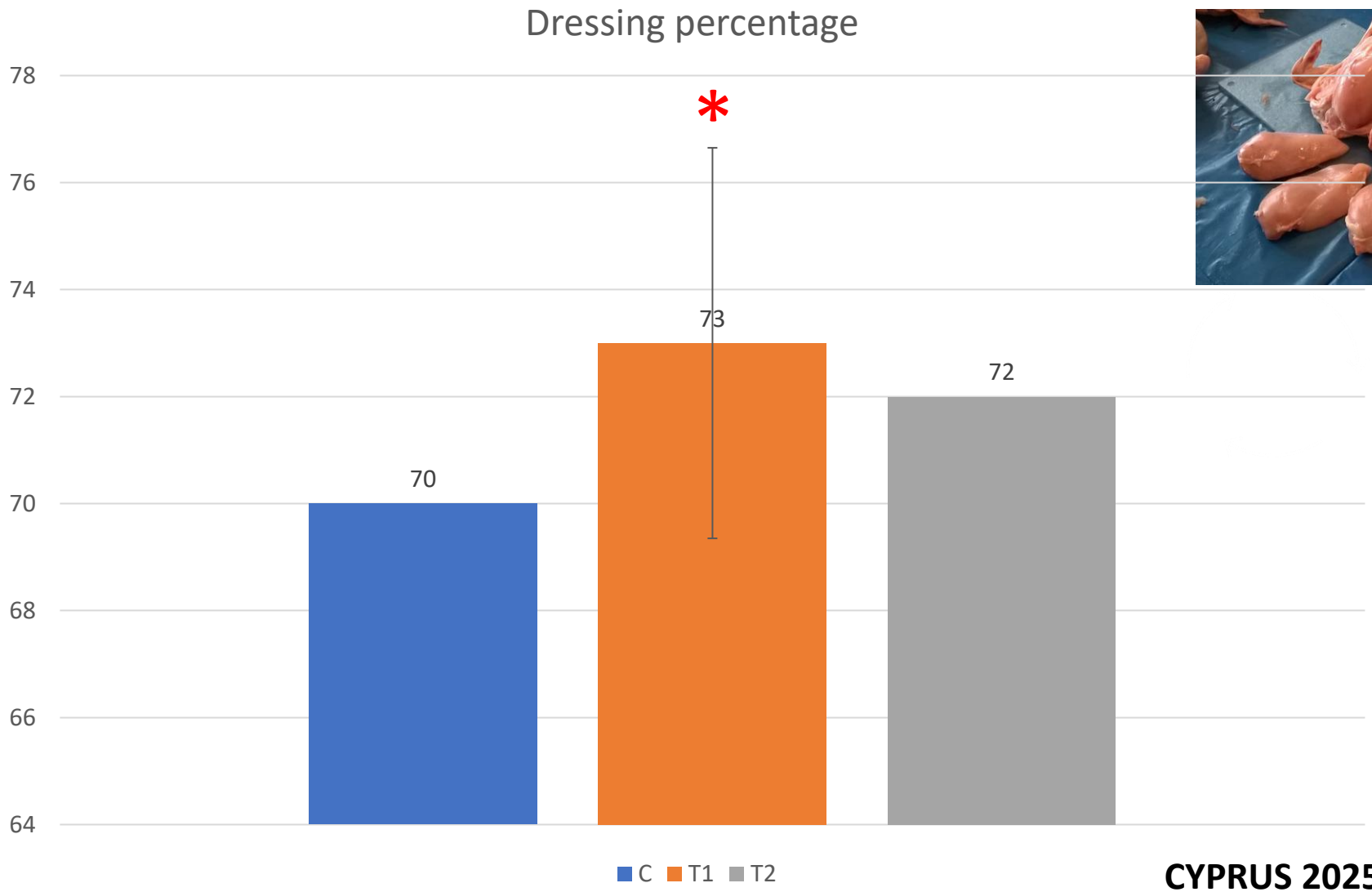
Body weight gain (BWG) of broiler chickens fed diets with varying amounts of 10% F-olive cake



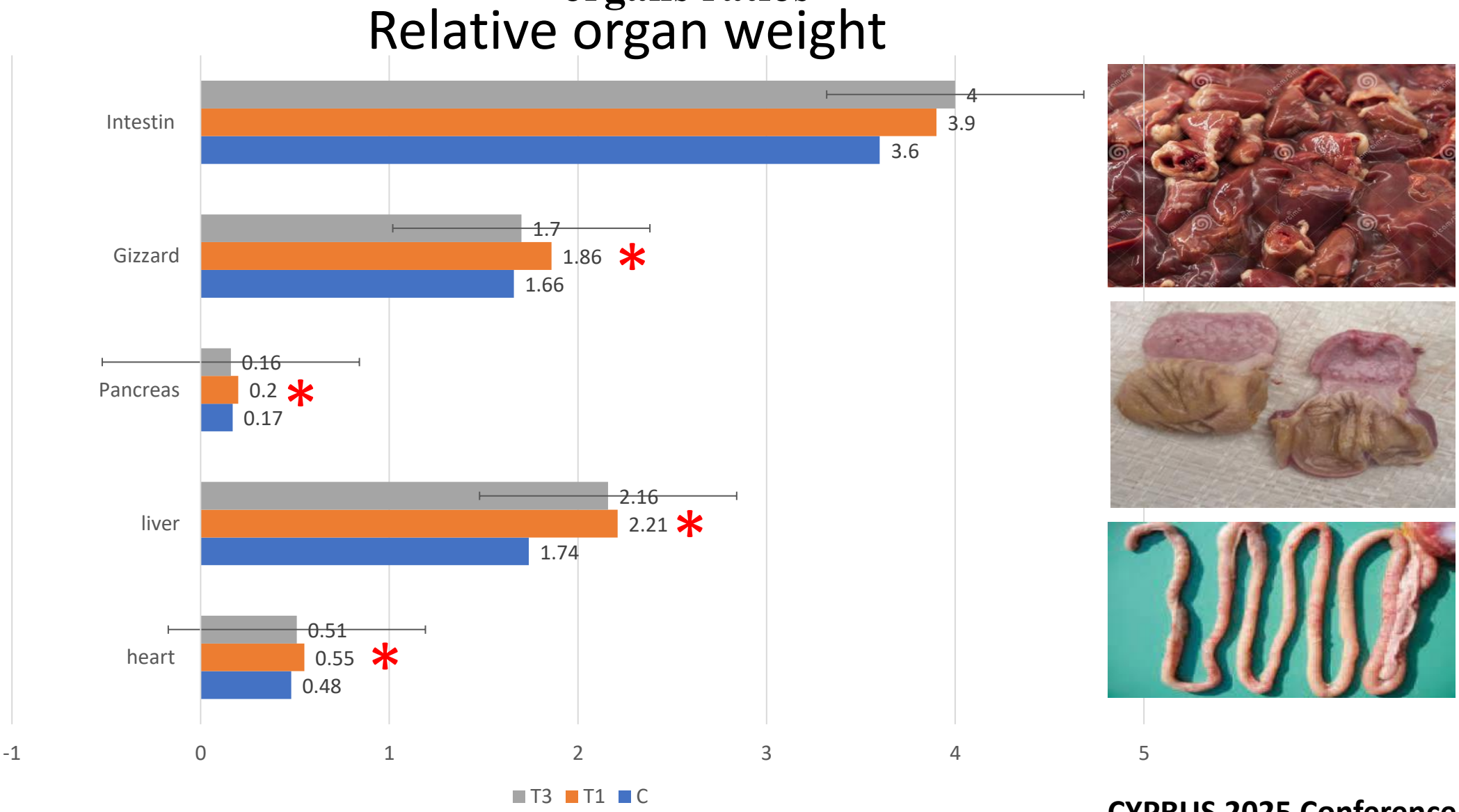
1 to 38 d of age in gams

The effect of F-olive cake with and without herbal mixture on carcass ratios





The effect of F-olive cake with and without herbal mixture on inner organs ratios



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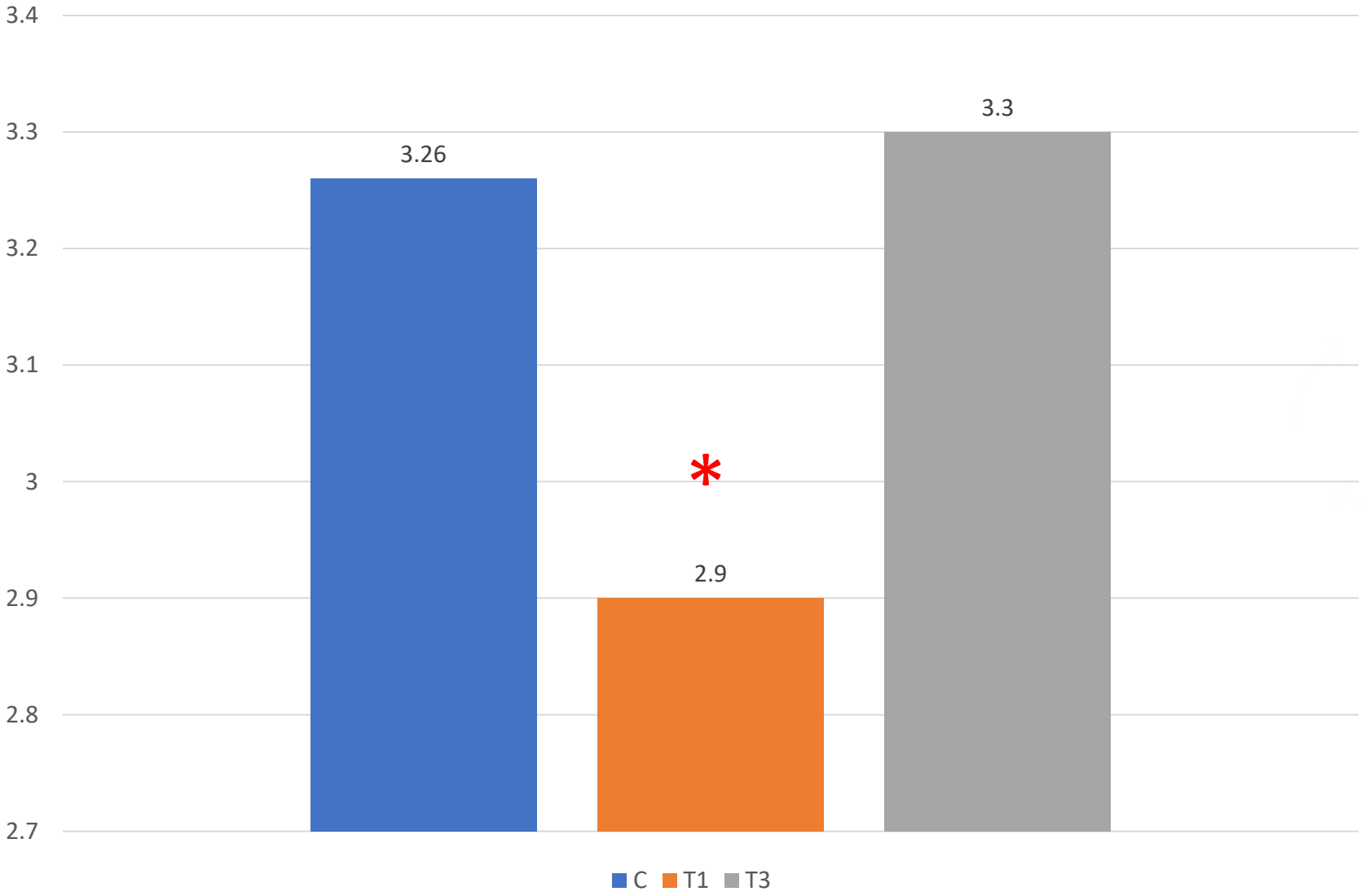
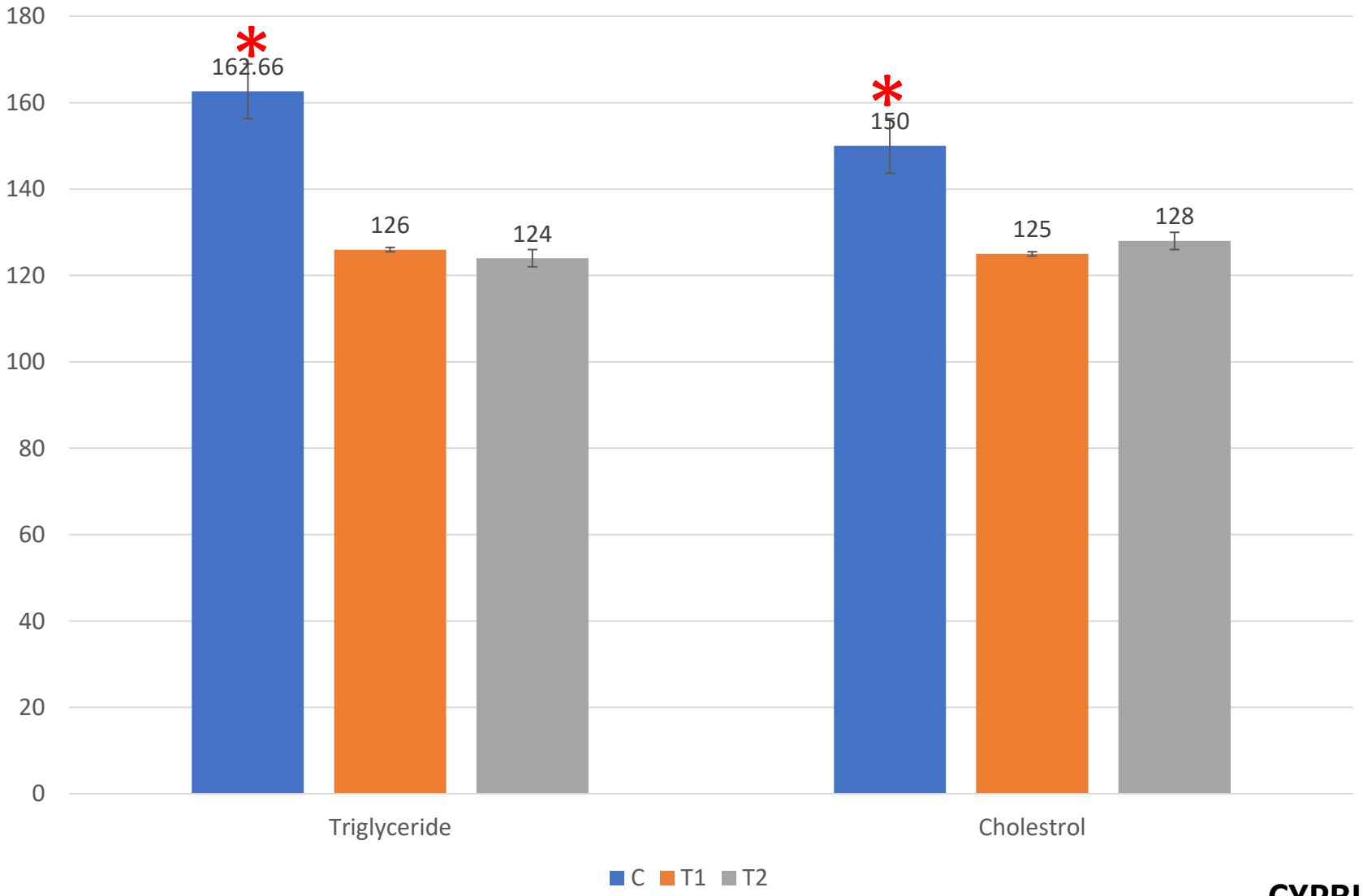
Effect of diets containing olive Cake with and without herbal mixture on Total Protein of broiler chickens

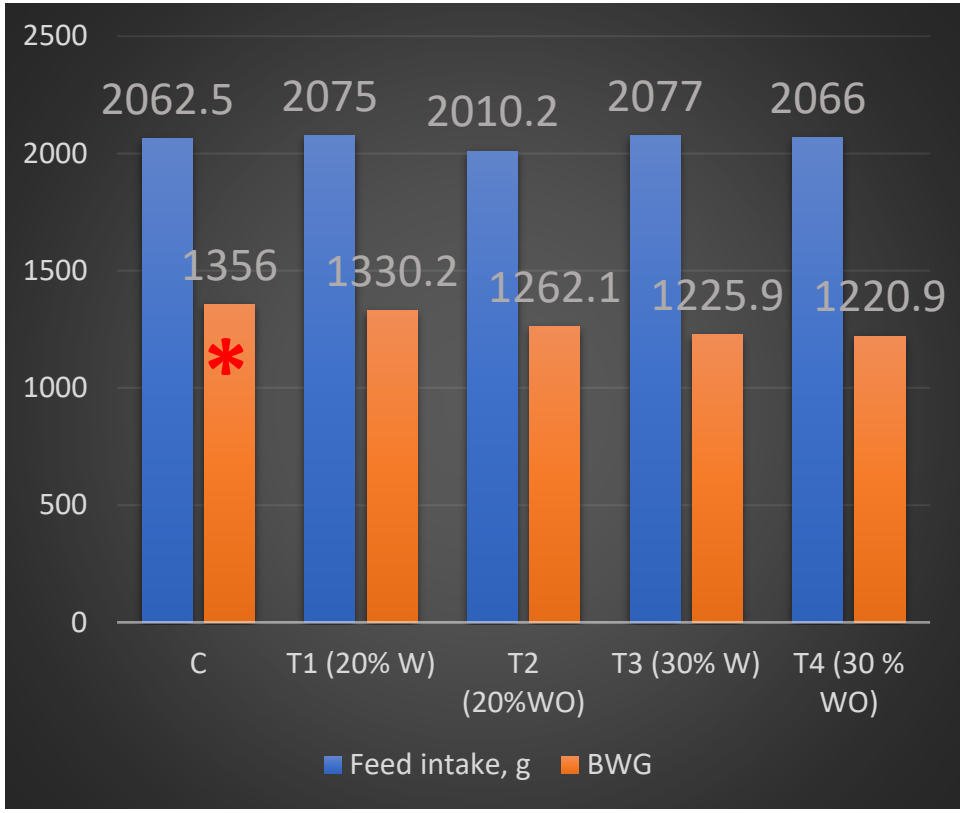


Effect of diets containing olive Cake with and without herbal mixture on Triglyceride and cholesterol of broiler chickens

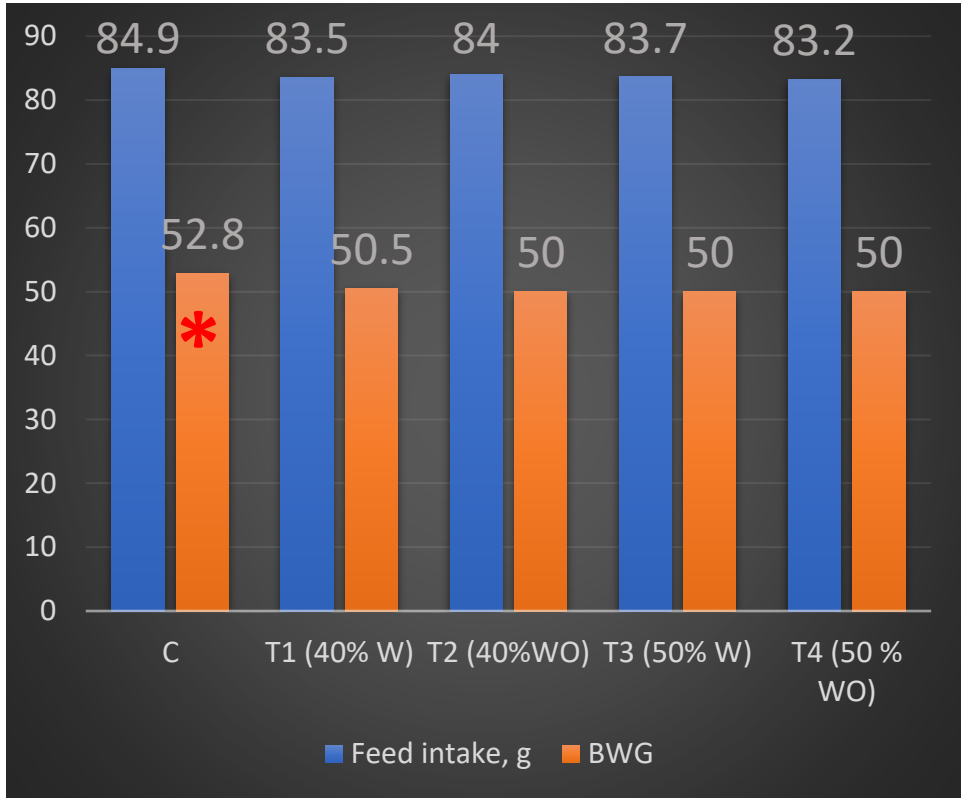


Inclusion of 20-30-40-50 %

Feed intake, body weight gain (BWG) of broiler chickens fed diets with varying amounts of F-olive cake

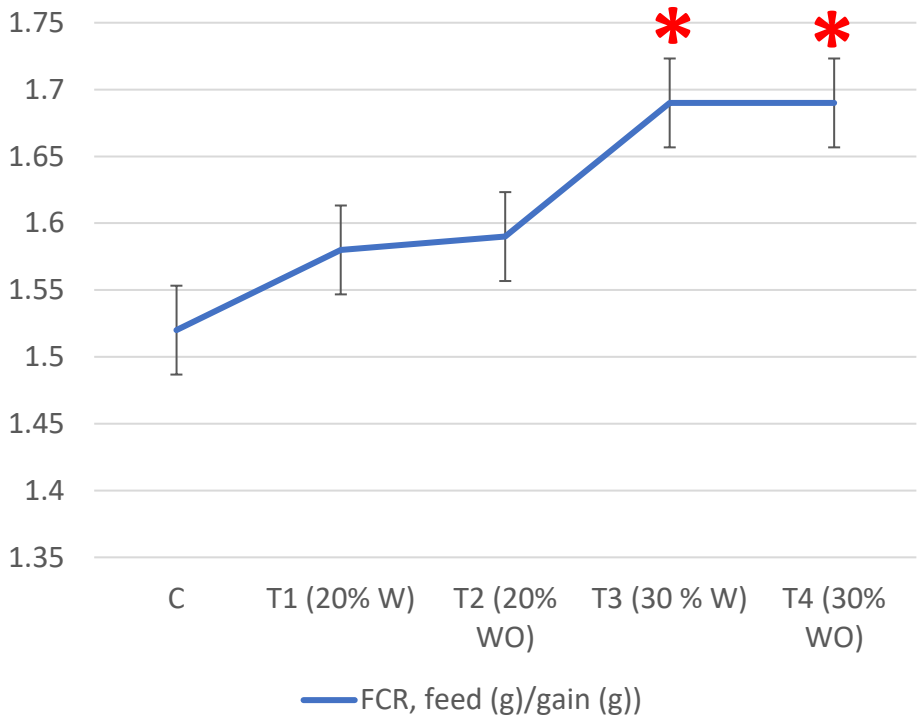


21 to 48 d of age in gams

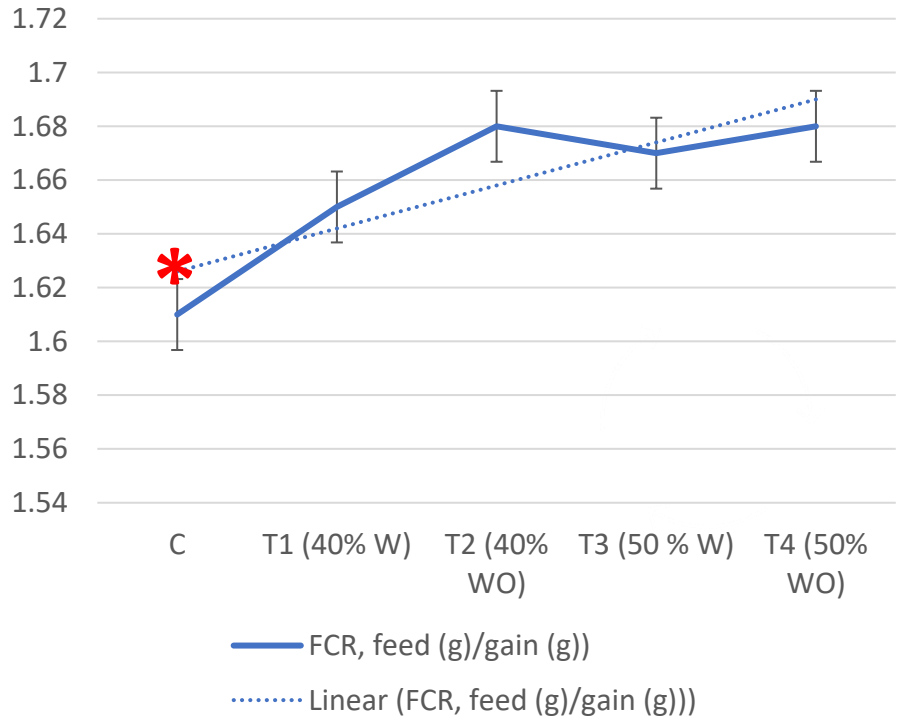


5 to 28 d of age in grams

FCR , feed (g)/gain (g))of broiler chickens fed diets with varying amounts of F-olive cake

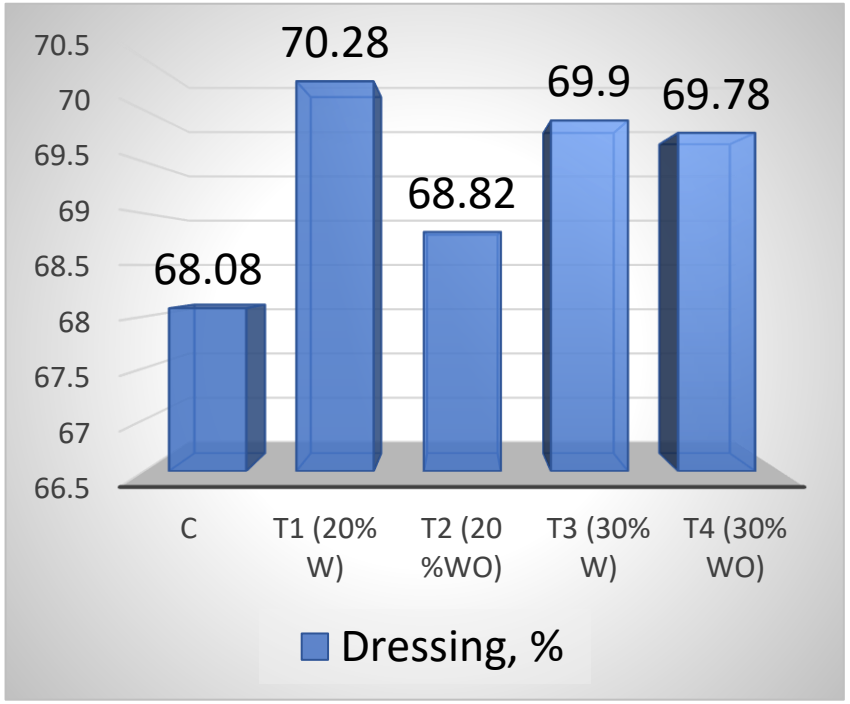


21 to 48 d of age

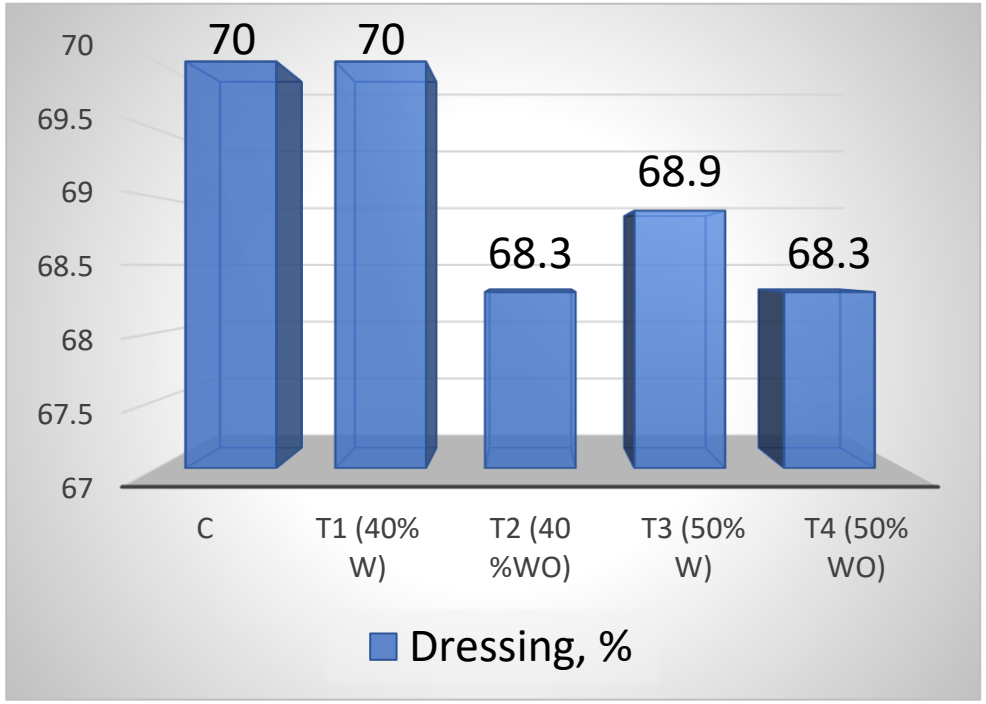


5 to 28 d of age

The effect of F-olive cake with and without herbal mixture on carcass ratios

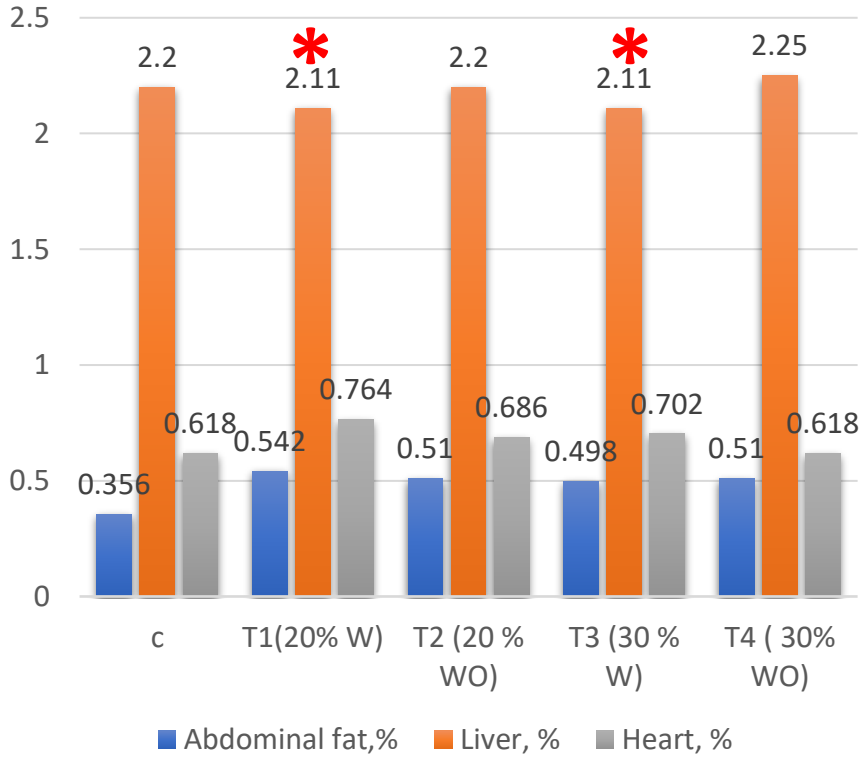


21 to 48 d of age

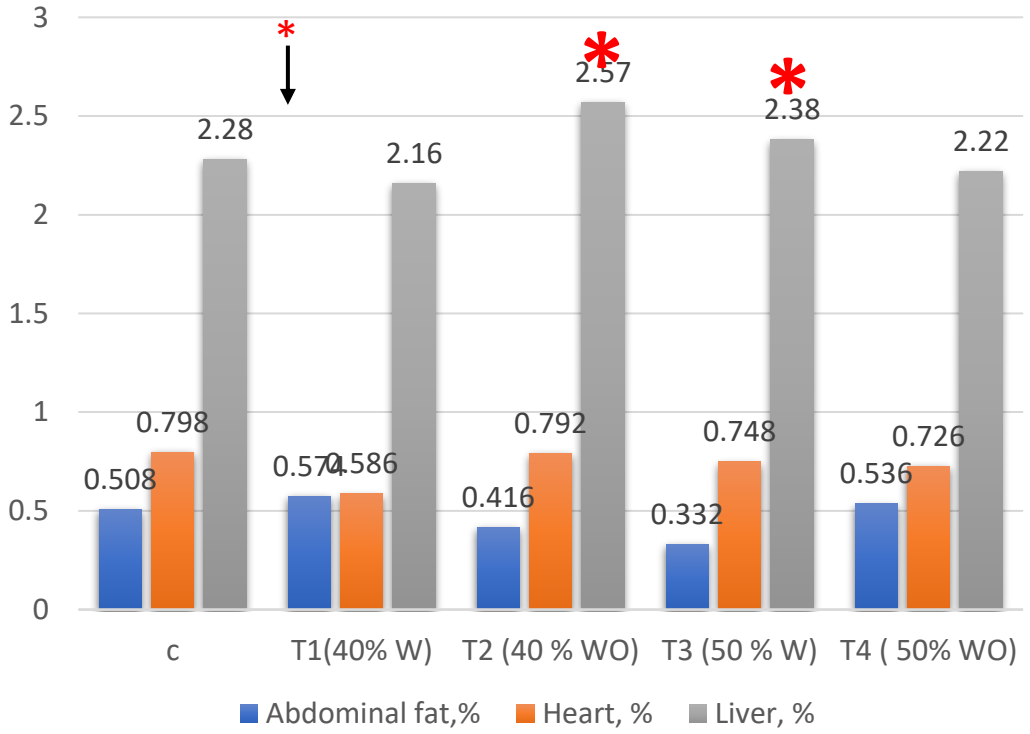


5 to 28 d of age

The effect of F-olive cake with and without herbal mixture on the inner organs ratios

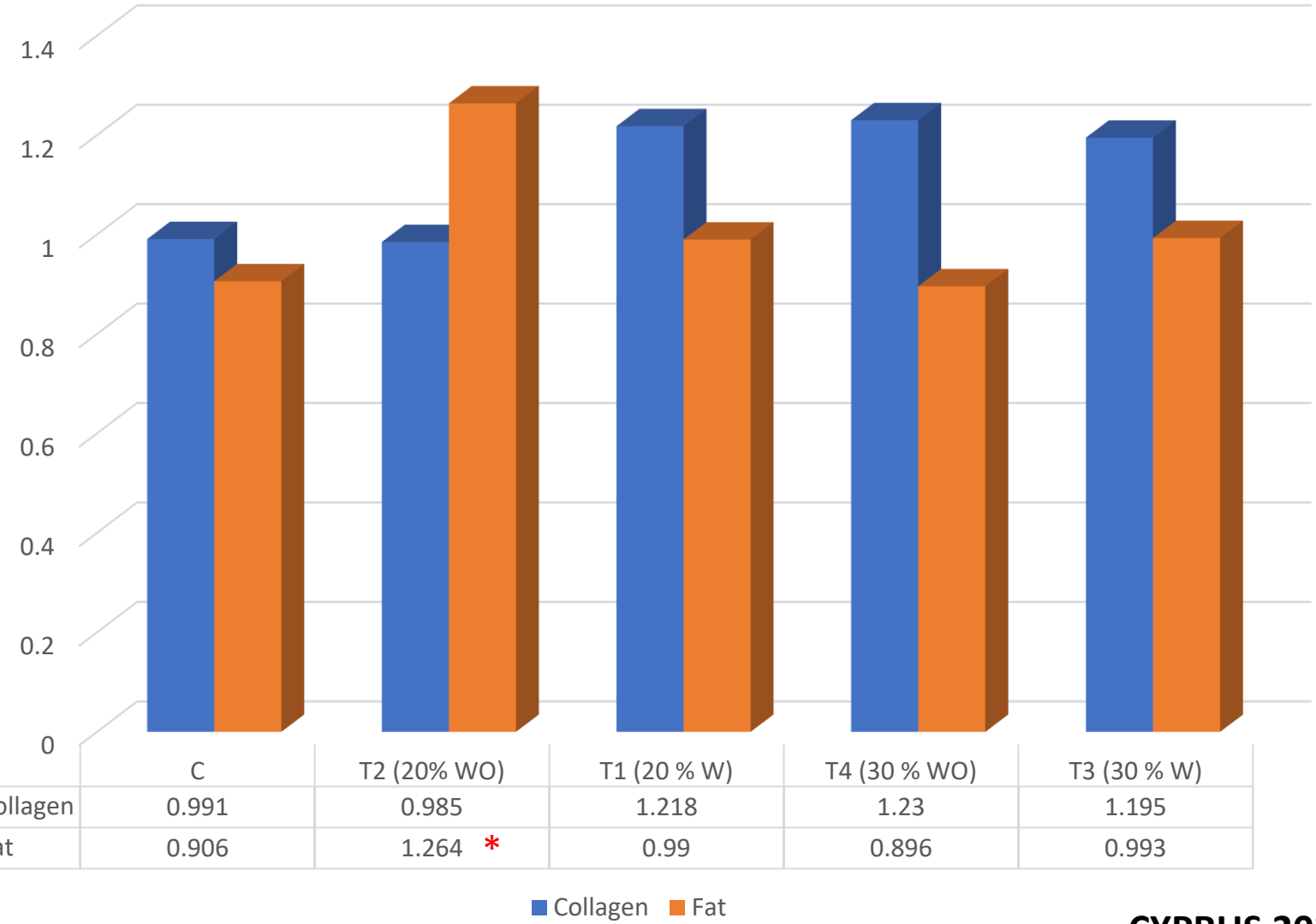


21 to 48 d of age



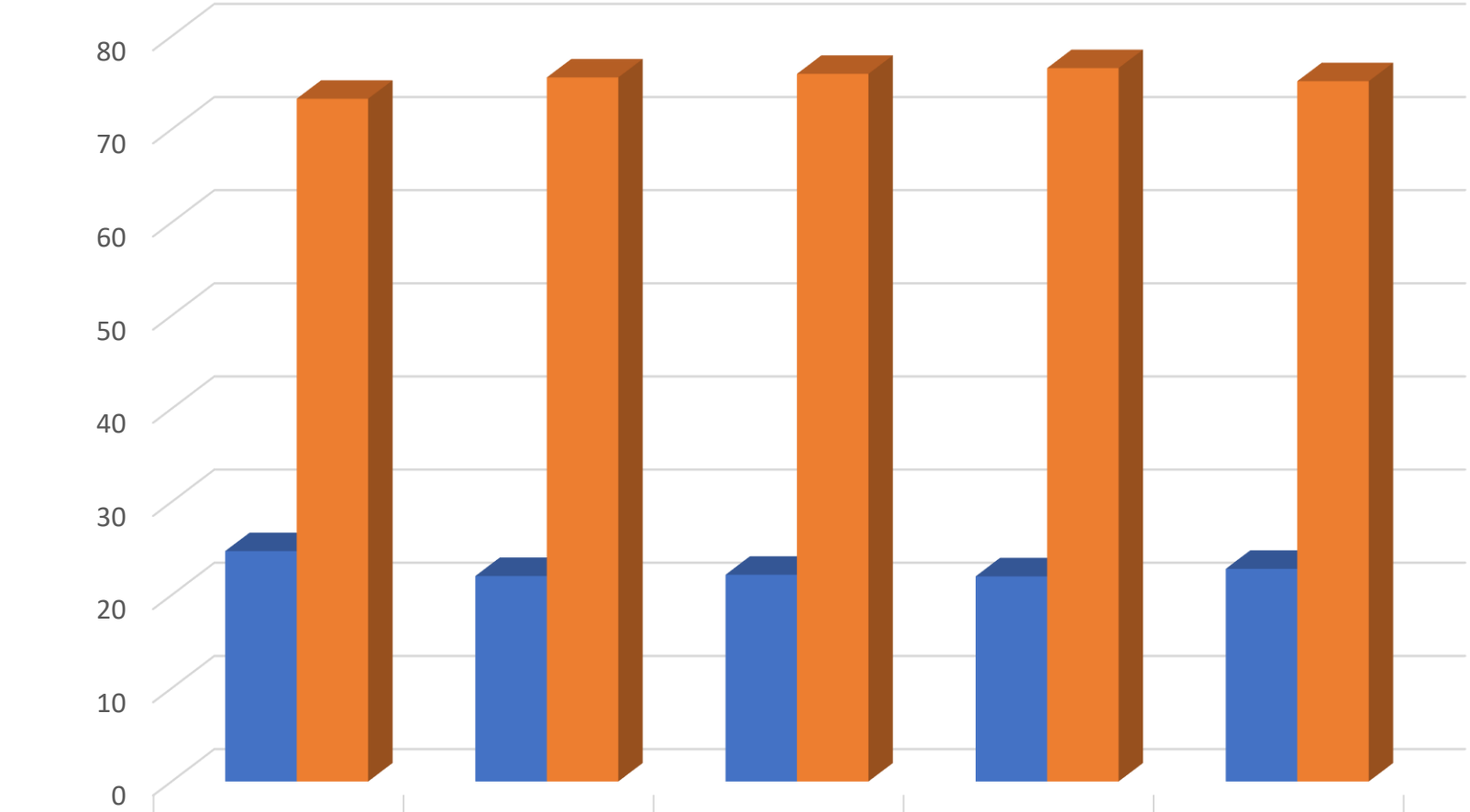
5 to 28 d of age

Chemical analysis of Carcass (Brest meat only) using olive cake with and without herbal mixture (21 to 48-day-old).



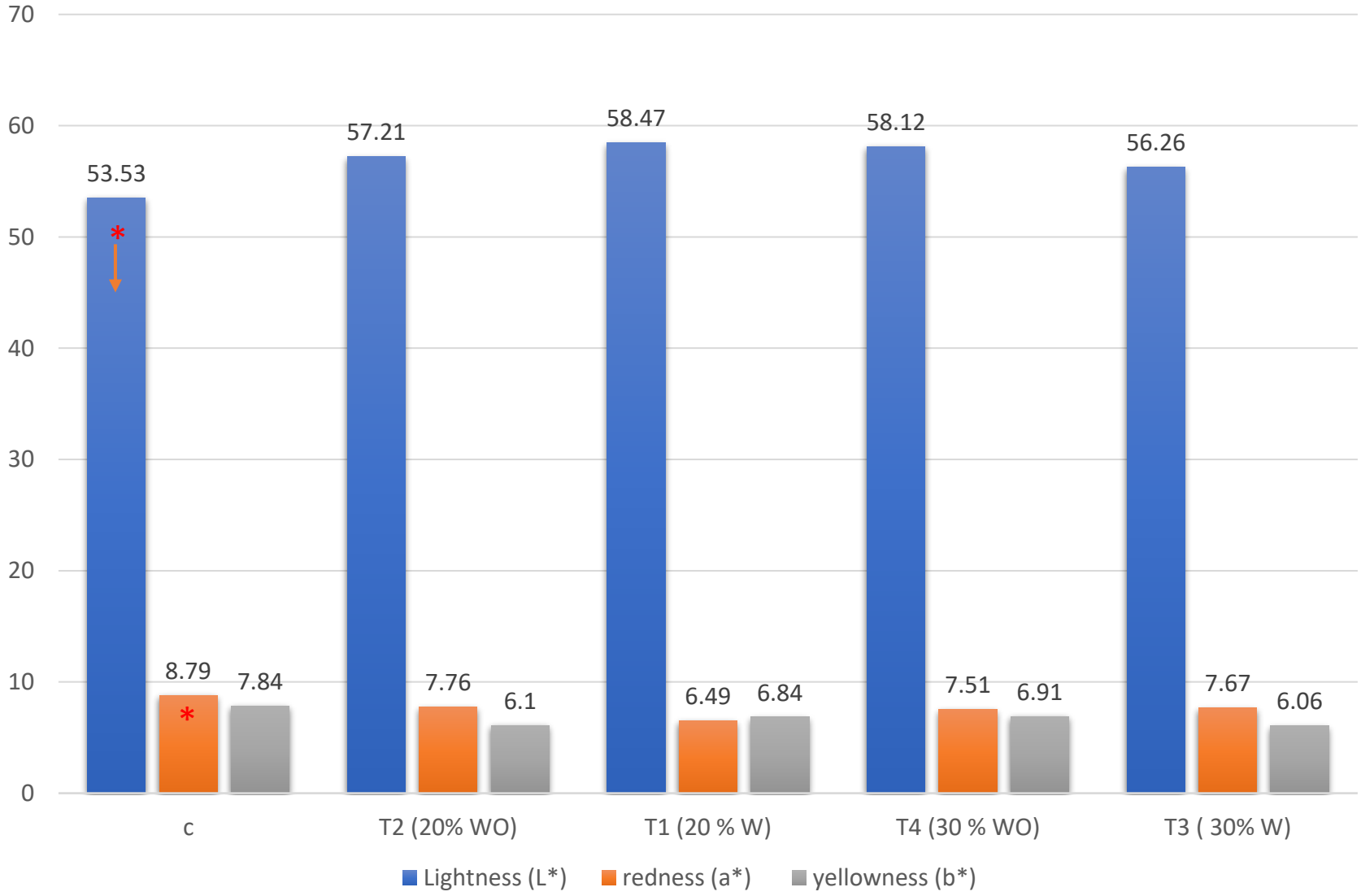
	C	T2 (20% WO)	T1 (20 % W)	T4 (30 % WO)	T3 (30 % W)
Collagen	0.991	0.985	1.218	1.23	1.195
Fat	0.906	1.264 *	0.99	0.896	0.993

Chemical analysis of Carcass (Brest meat only) using olive cake with and without herbal mixture (21 to 48-day-old).



	C	T2 (20% WO)	T1 (20 % W)	T4 (30 % WO)	T3 (30 % W)
Protein	24.723 *	22.048	22.184	22.015	22.819
Moisture	73.287	75.577	75.964	76.578	75.172

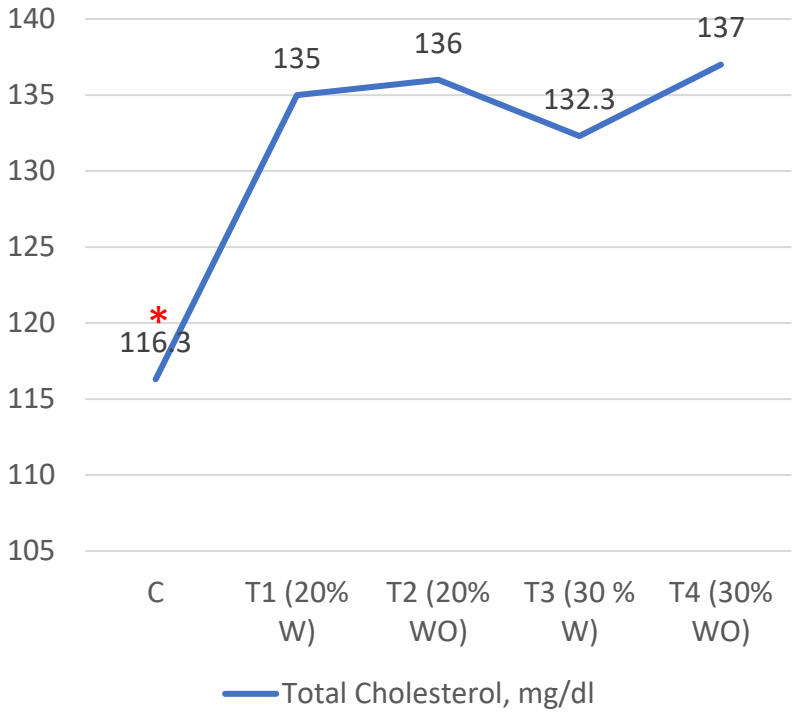
Color of Carcass using olive cake with and without herbal mixture on carcass ratios of 21 to 48-day-old.



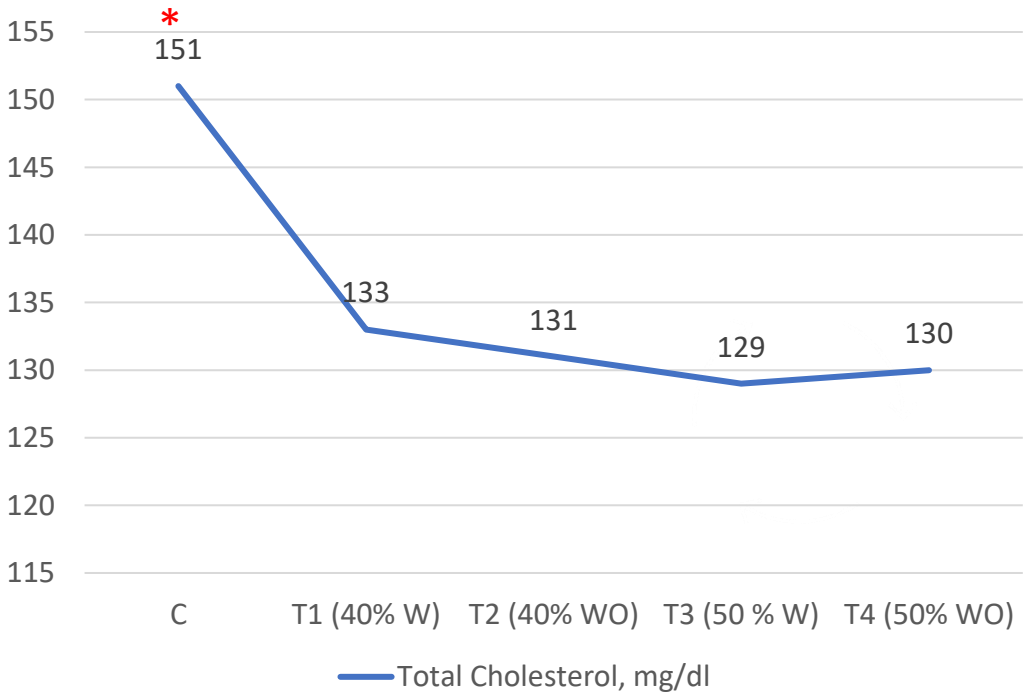
The sensory evaluation of fried chicken meat fortified by olive cake

Item		Taste	Texture	Odour	Overall acceptability
C	0%	8.2	8.8	8.5	8.5
T1	20 % WO	8.1	8.6	8.2	8.3
T2	20% W	8.1	8.6	8.1	8.2
T3	30 % WO	8.1	8.5	8.1	8.2
T4	30 % W	8.0	8.5	8.1	8.1
SEM		0.367	0.467	0.369	0.546
P-Value		0.268	0.354	0.348	0.365

Effect of diets containing olive Cake with and without herbal mixture on Total Cholesterol of broiler chickens



21 to 48 d of age



5 to 28 d of age

Conclusion

Feed efficiency animal trial with broiler chicken

Conclusions:

- The outcomes showed variations in body weight and weight gain between experimental groups.
- **The body weight gain of the 10% FOC diet with the herbal mixture group was considerably higher** than those of the other experimental groups.

Feed efficiency animal trial with broiler chicken

Conclusions:

- The **presence of this raw material could be utilized as a safe material in poultry diets with no detrimental effect on growth performance**.
- Economically, F**OC with herbal mixture can be used in broiler diets up to 30% of diet without negative effects on the growth and immune response of broilers**.

PRIMA
PARTNERSHIP FOR RESEARCH AND INNOVATION
IN THE MEDITERRANEAN AREA

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