USE OF FAT BY-PRODUCTS IN HEN DIETS

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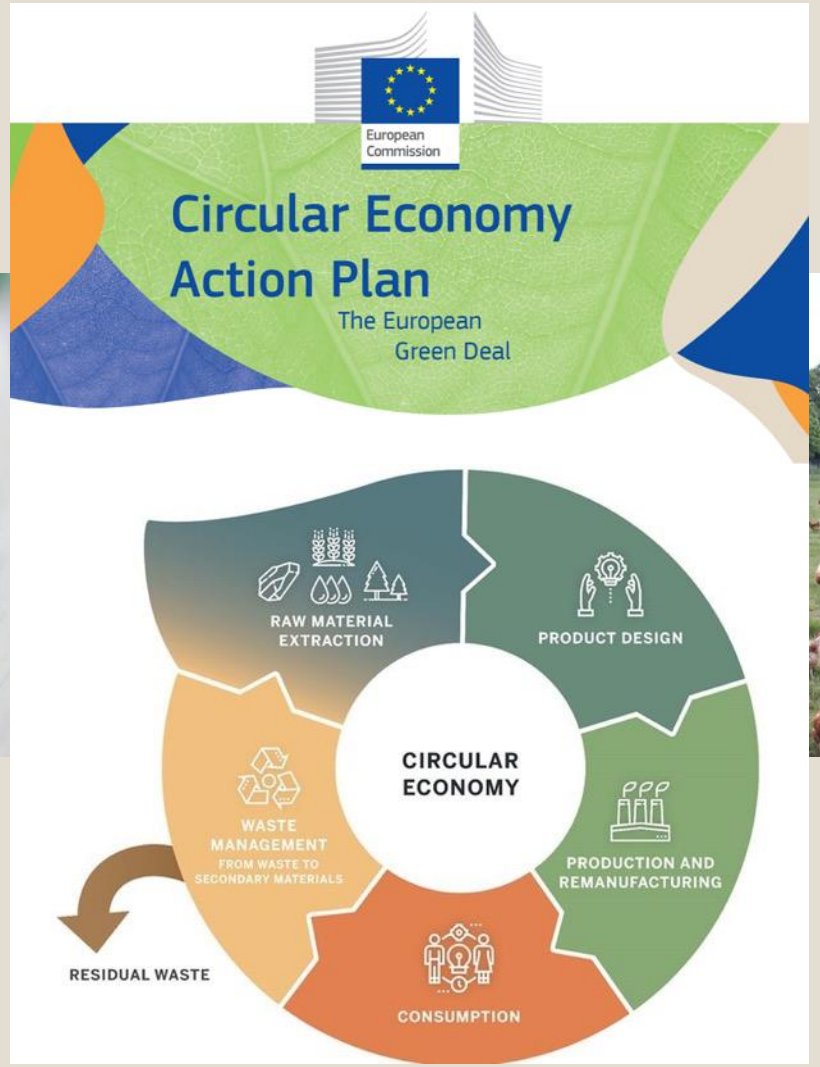


1. By-products as alternative feedstuffs

Article

Degree of Saturation and Free Fatty Acid Content of Fats Determine Dietary Preferences in Laying Hens

María Palomar [1], María Dolores Soler [1], Eugeni Roura [2], Roser Sala [3], Olga Piquer [1] and Carlos Garcés-Narro [1,*]

Article

Soybean Lecithin High in Free Fatty Acids for Broiler Chicken Diets: Impact on Performance, Fatty Acid Digestibility and Saturation Degree of Adipose Tissue

Alberto Viñado, Lorena Castillejos *, and Ana Cristina Barroeta

Article

Soybean Oil Replacement by Palm Fatty Acid Distillate in Broiler Chicken Diets: Fat Digestibility and Lipid-Class Content along the Intestinal Tract

Beatriz Jimenez-Moya [1], Ana C. Barroeta [1], Alba Tres [2,3], María Dolores Soler [4] and Roser Sala [1,*]

Effects of dietary free fatty-acid content and saturation degree on lipid-class composition and fatty-acid digestibility along the gastrointestinal tract in broiler starter chickens

R. Rodriguez-Sanchez, * A. Tres, † R. Sala, * C. Garcés-Narro, † F. Guardiola, † J. Gasa, * and A. C. Barroeta *, †

Article

Composition and Nutritional Value of Acid Oils and Fatty Acid Distillates Used in Animal Feeding

Elisa Varona [1,2], Alba Tres [1,2,*], Magdalena Rafecas [2,3], Stefania Vichi [1,2], Ana C. Barroeta [4] and Francesc Guardiola [1,2]

Evolution of lipid classes and fatty acid digestibility along the gastrointestinal tract of broiler chickens fed different fat sources at different ages

R. Rodriguez-Sanchez, *,† A. Tres, † R. Sala, * F. Guardiola, † and A. C. Barroeta *

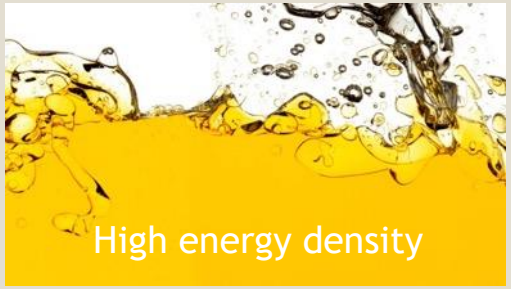
CEU Universidad Cardenal Herrera

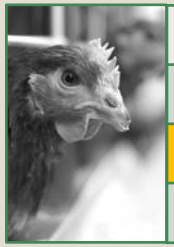
UAB Universitat Autònoma de Barcelona

Universitat de Barcelona

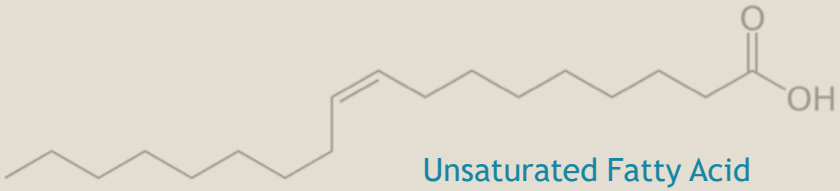
2. Fats and oils in poultry diets

Their chemical characteristics determine their nutritional value





Food Type	Kcal/g
Carbohydrate	4
Fat	9,4
Protein	4



Unsaturated Fatty Acid

Saturated Fatty Acid

2. Fats and oils in poultry diets

High energy density

Essential fatty acids

Fat soluble vitamins

Determine yolk composition

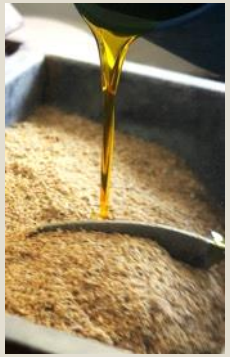
Affect egg quality traits

Increase egg weight

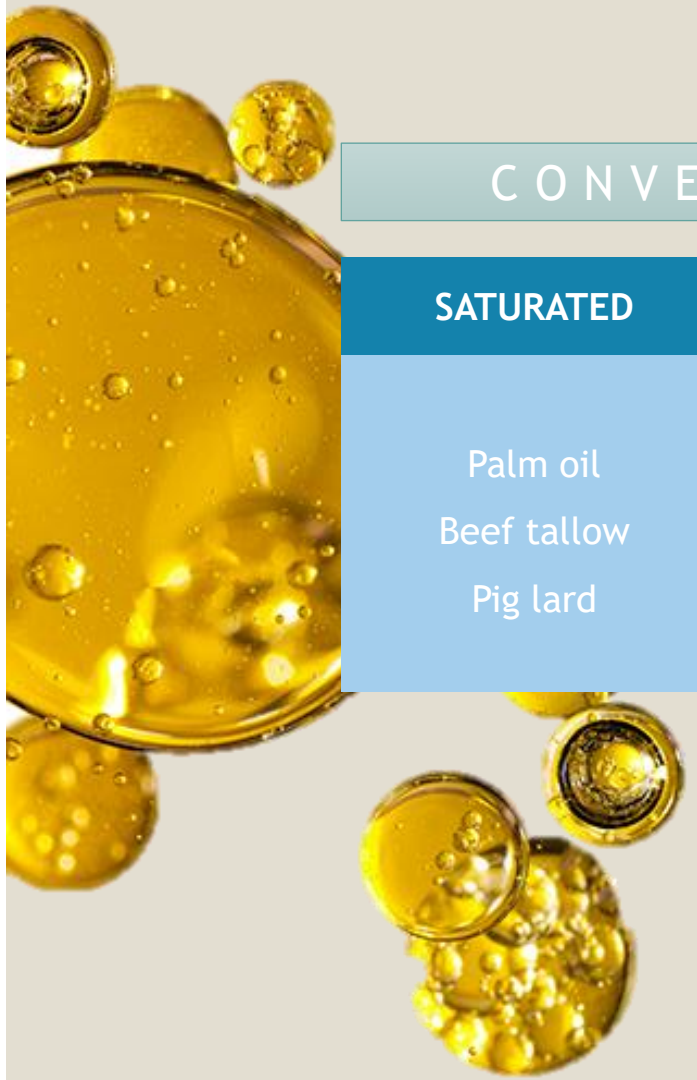
Reduce dustiness and ingredient separation

Increase palatability

Improve nutrient digestion and absorption



2. Fats and oils in poultry diets



CONVENTIONAL

SATURATED

Palm oil

Beef tallow

Pig lard

UNSATURATED

Soybean oil

Sunflower oil

Rapeseed oil

Fish oil

ALTERNATIVE

BY-PRODUCTS AND CO-PRODUCTS

Acid oil

Crude lecithin

Re-esterified oil

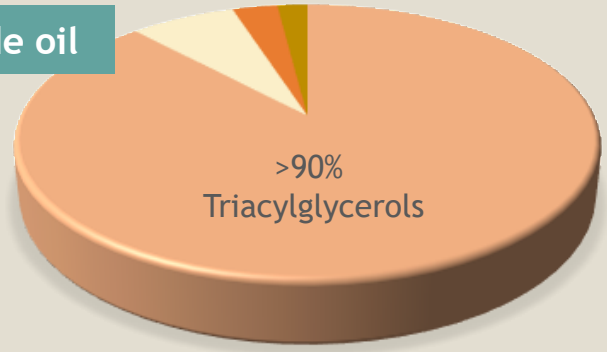
Economical and sustainable feedstuffs

2. Fats and oils in poultry diets

CONVENTIONAL

ALTERNATIVE

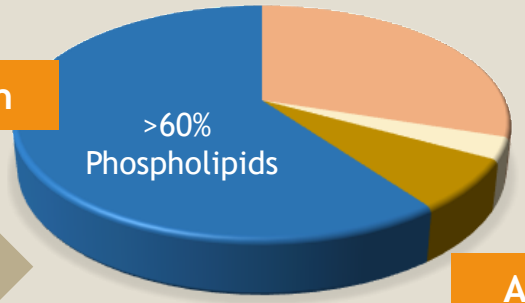
Crude oil



REFINING

DEGUMMING STEP

Lecithin

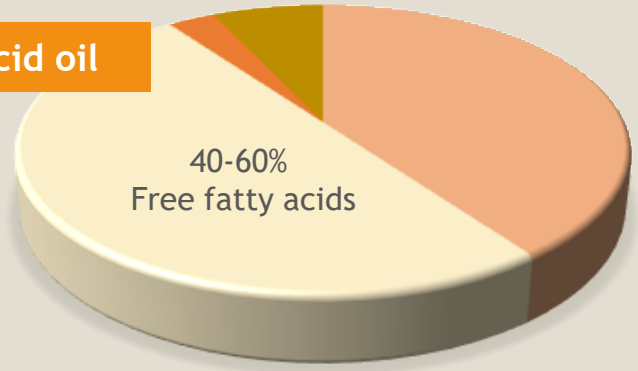


MIU

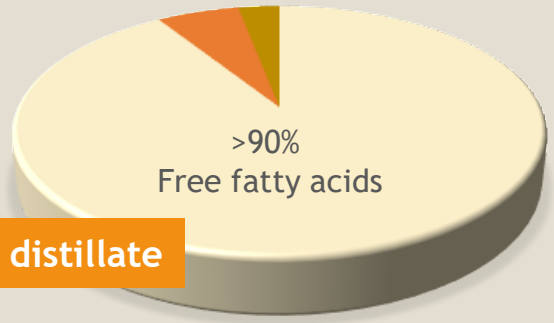
Moisture
Impurities
Unsaponifiable

CHEMICAL

Acid oil



PHYSICAL



Fatty acid distillate

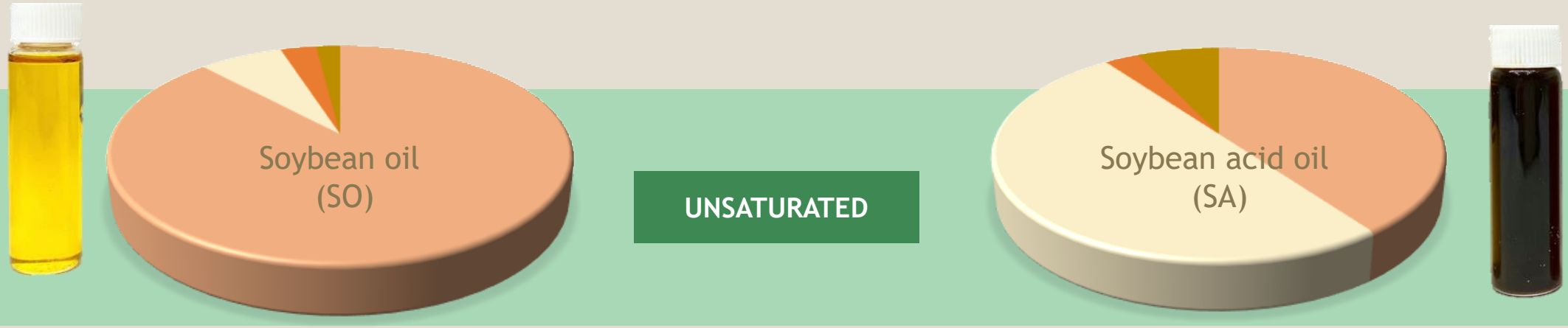
Refined oil

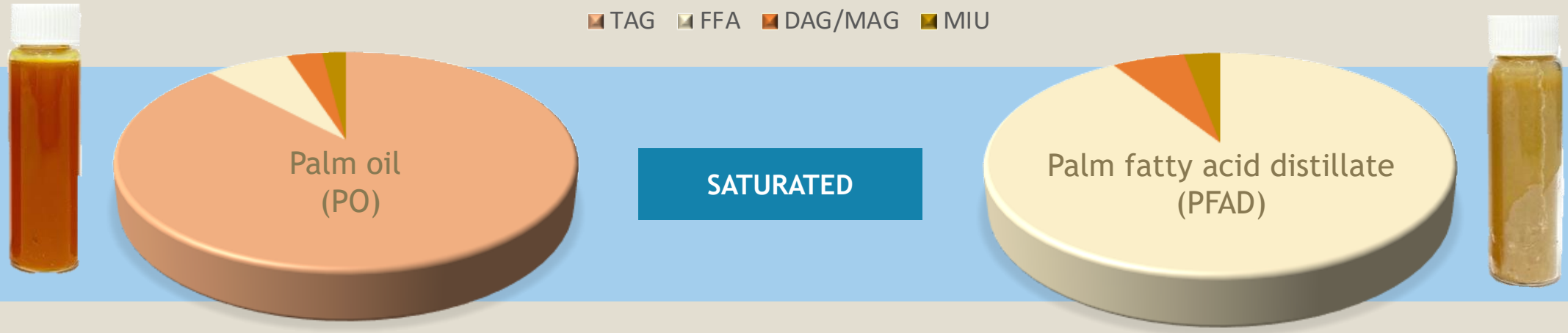
TAG FFA DAG/MAG MIU PL

3. Use of acid oils in hen feeds

CRUDE OILS: LOW %FFA

BY-PRODUCTS: HIGH %FFA





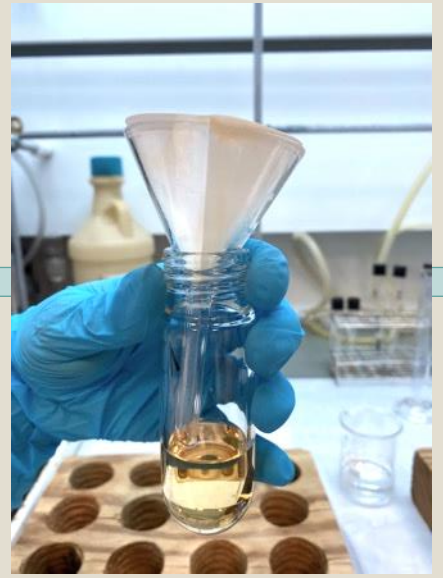
3. Use of acid oils in hen feeds

COULD THEY BE INCORPORATED?

Acid oils are included in the European Catalogue of feed materials

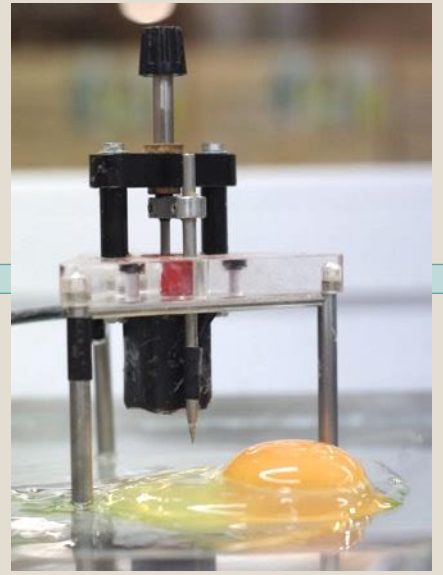
However, before being used in animal feed it would be necessary…

Control and standardization



Palatability and digestibility

Quality and safety



from FARM to FORK

3. Use of acid oils in hen feeds

CONTROL AND STANDARDIZATION

High variable composition

MIU
Moisture (M)
Impurities (I)
Unsaponifiable matter (U)

Oxidized and polymerized lipids

Can dilute their energy content

Fatty acid composition

Acidity: FFA content

Saturation degree (UFA:SFA)

Determine their nutritional value

Varona *et al.*, 2021

3. Use of acid oils in hen feeds

PALATABILITY

Double-choice test

4 diets: SO, SA, PO, PFAD

$$\text{Preference (\%)} = \frac{\text{Test diet intake}}{\text{Total intake}} \text{ x } 100$$

Preference values were compared with the 50% no-effect level.

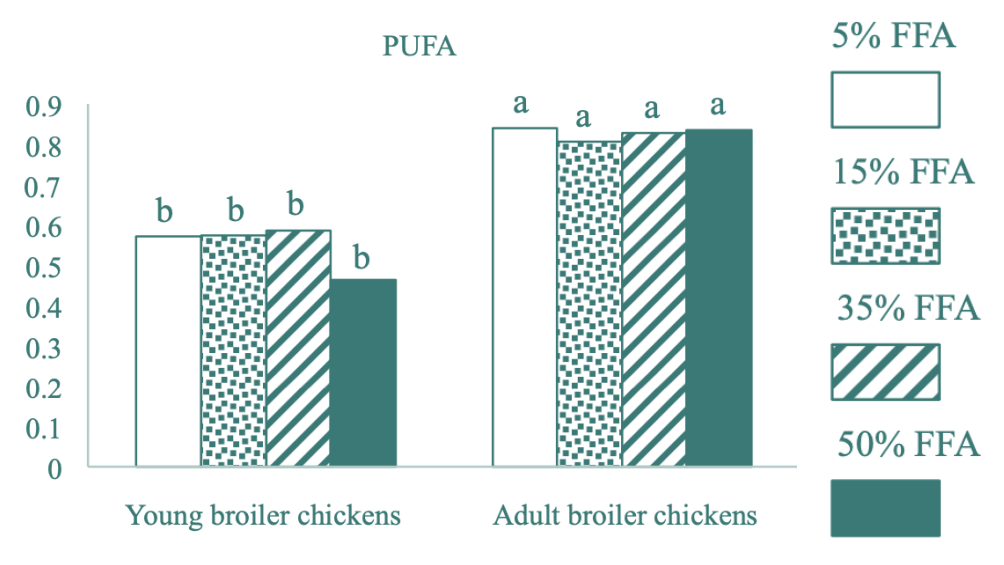
Hens prefer saturated oils (even when are rich in FFA)

PO, PFAD

Palomar *et al.*, 2020

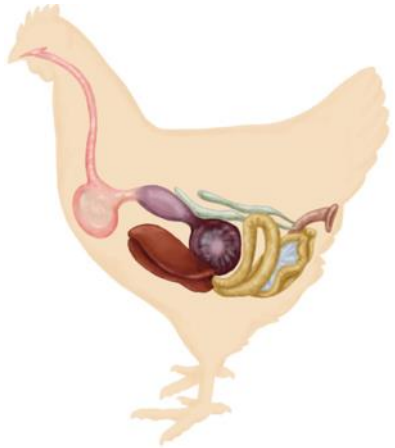
3. Use of acid oils in hen feeds

DIGESTIBILITY



The ability to digest and absorb dietary fat improves with the age

Unsaturated fats > Saturated fats



Saturation degree has a greater effect than does the FFA content

Rodriguez-Sanchez *et al.*, 2019

3. Use of acid oils in hen feeds

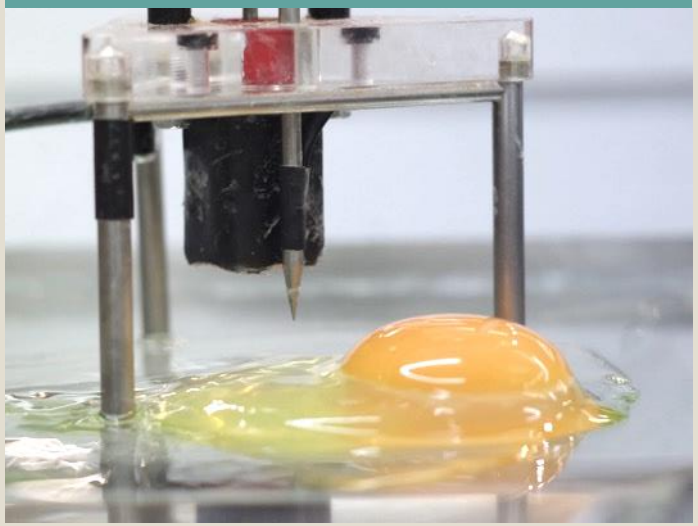
EGG QUALITY

Preliminary results

Egg weight

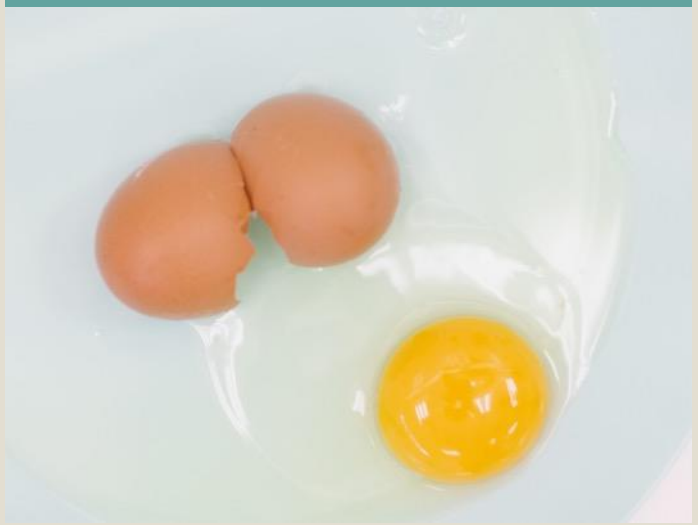
Increased with soybean acid oil supplementation

Internal and external quality



Little affected

Yolk fatty acid composition



Saturation degree has a greater effect than does the FFA content

MAIN IDEAS

Fat by-products: unconventional feed resources that present a growing interest in animal feeding.

Acid oils come from the refining process of edible oils. These by-products are **rich in FFA.**

FA composition, saturation degree and FFA content determine their nutritional value.

Saturation degree affect palatability, digestibility and egg quality **to a greater extent than the % FFA**.

Acid oils may have high potential for to be supplied as an alternative fat source for laying hens.

THANK YOU FOR YOUR ATTENTION

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