



NASC Preferred Supplier Educational Webinar





Polyphenols: Nature's Gift for Improving Health and Well Being in Pets

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Polyphenols: Nature's Gift for Improving Health and Well Being in Pets



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Educational Webinar Series

Delivering Botanical Innovation Leadership



#1
IN
SWEETENERS

for stevia
& monk fruit

3
DECADES

botanical
innovation and
leadership

6
INNOVATION
CENTERS

around
the world

80
PATENTS

for science and
innovation achieved
globally

297
THOUSAND
M²

state-of-the-art
extraction facility

5300
FARMING
COMMUNITIES

and families
supported
with sustainable
agronomy

170,000
METRIC
TONS

biomass
processed
annually

global secure &
transparent
supply chain

Investing Strategically In Botanical Innovation



1995

PRODUCTION BEGINS

(1995 – 2002)

Layn pioneers natural movement and leverages local plant resources of **Ginkgo Biloba, Monk Fruit, Sweet Blackberry Leaf**



2002

BOTANICAL EXPANSION

(2002– 2010)

Layn upgrades to state-of-the-art facility to supply more natural ingredients, portfolio broadens to **80+ NEW botanical extracts**



2010

INNOVATION & SCALE

(2010– 2017)

New facility with increased automation, scale, and R&D, to position for **global leadership in Natural Sweeteners**



2017

GLOBAL LEADERSHIP

(2017– Present)

Layn invests in **cutting edge facility, quadrupling capacity and establishing global leadership**, reaching over \$100 million in worldwide sales



2019

HEMPRISE IN USA

(2019)

Layn invests \$70 million in **US based, purpose-built CBD & hemp extracts production facility** in Jeffersonville, Indiana



2020

WAGOTT TEA

(2020)

Strategic acquisition of **leading global tea extracts** production facility to broaden direct-manufacturing portfolio



2024

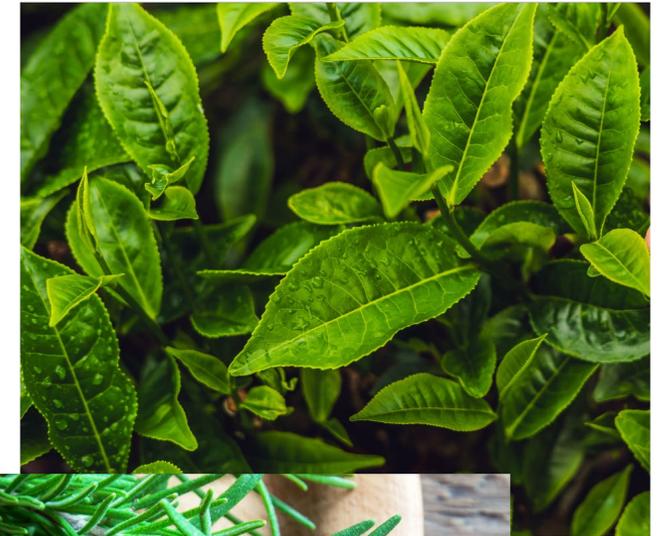
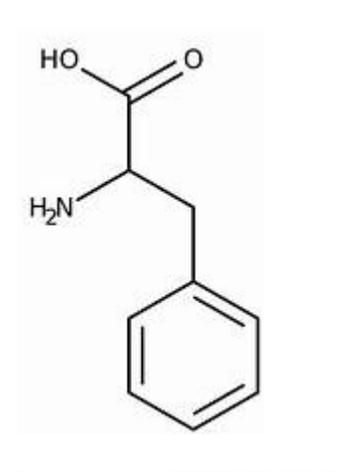
BIOLOGICAL ADVANCEMENT

(2024)

New complex specializes in **biosynthesis & fermentation**, represents a nexus of innovation & global leadership in biological advancements

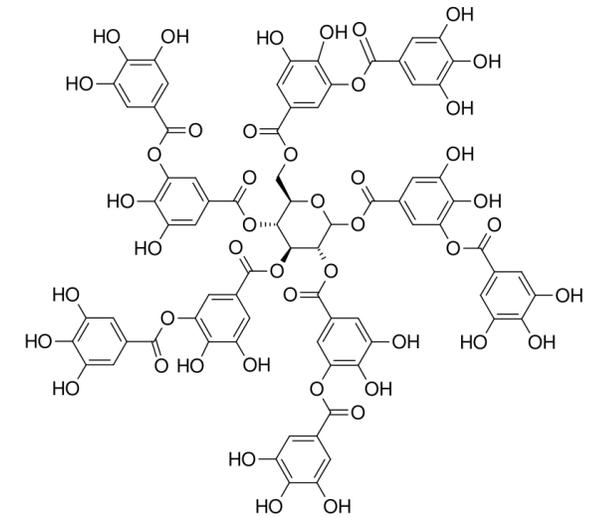
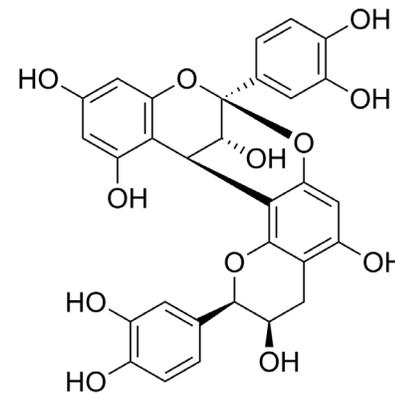
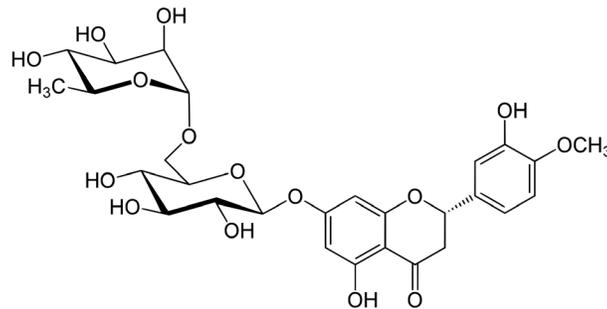
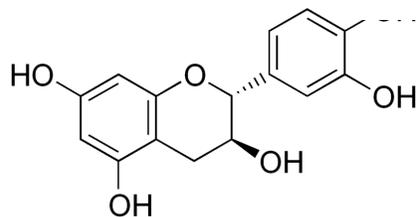
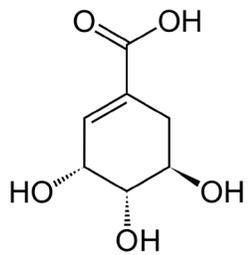
Polyphenols and Plant Life

- Polyphenols are an important part of a plant's physiology
- Their role in the growth and development of plant is key to their survival.
- Most of these phenolic compounds are produced as secondary metabolites from the amino acid phenylalanine.
- They are part of a plant's defense mechanism against drought, disease and pests.

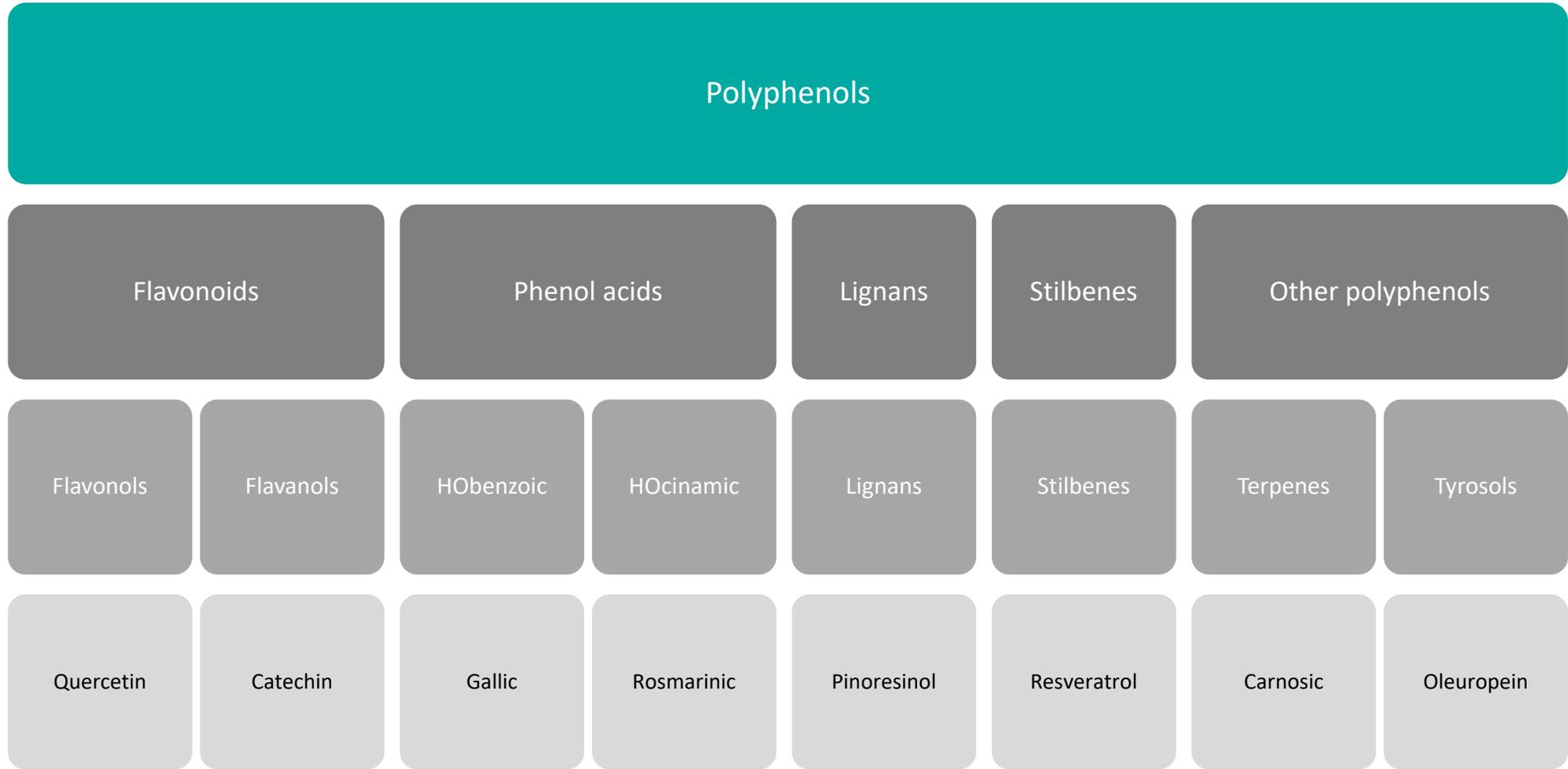


Polyphenol: A Diverse Group of Compounds

- Polyphenols as a category includes over 8,000 compounds.
- These compounds are can be broadly divided into four groups based on their number of phenolic rings and the structural elements that bind them.
- Phenolic acids, flavonoids, stilbenes and lignans
- In addition to acting as a prophylactic, polyphenols are also responsible for the color, aroma, and other characteristics of a plant.



Polyphenol Classification



Polyphenols for the Animal's Wellbeing

- The benefits that polyphenols provide are not limited to plants alone.
- Extensive research has been done on the contributions that they can provide to animal health.
- The number of research studies done on polyphenols and the role they play in animal welfare are in the tens of thousands.
- These studies have demonstrated their effectiveness in supporting growth, immunity, joint function, and well being

Polyphenols for Animal's Wellbeing

- Role of plant-based ingredients and phytonutrients in canine nutrition and health. J Anim Physiol Nutr (Berl). 2022 May; 106 (3): 586-613
- Biological potential of polyphenols in the context of metabolic syndrome: An analysis of studies on animal models. Biology (Basel). 2022 Apr 7;11(4):559
- Adding a polyphenol rich fiber bundle to food impacts the gastrointestinal microbiome and metabolome in dogs. Front Vet Sci 2023
- Potential of plant polyphenols to combat oxidative stress and inflammatory processes in farm animals. J Anim Physiol Anim Nutr (Berl). 2017 Aug; 101(4): 605-628

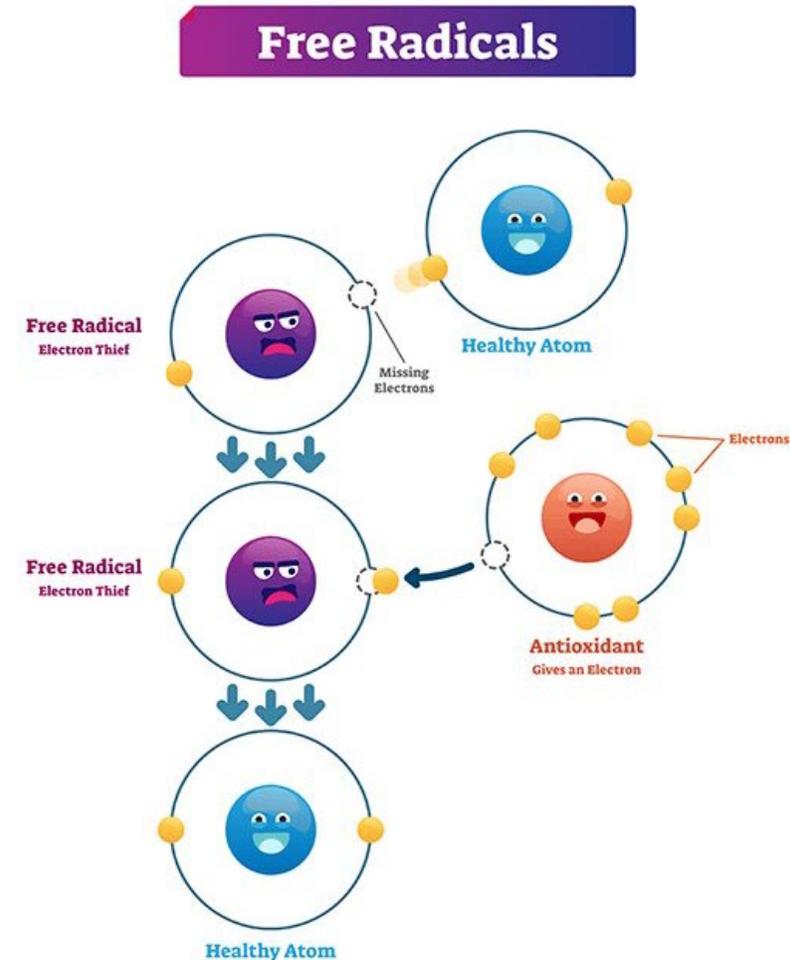
Oxidative Stress: Protection against Free Radicals



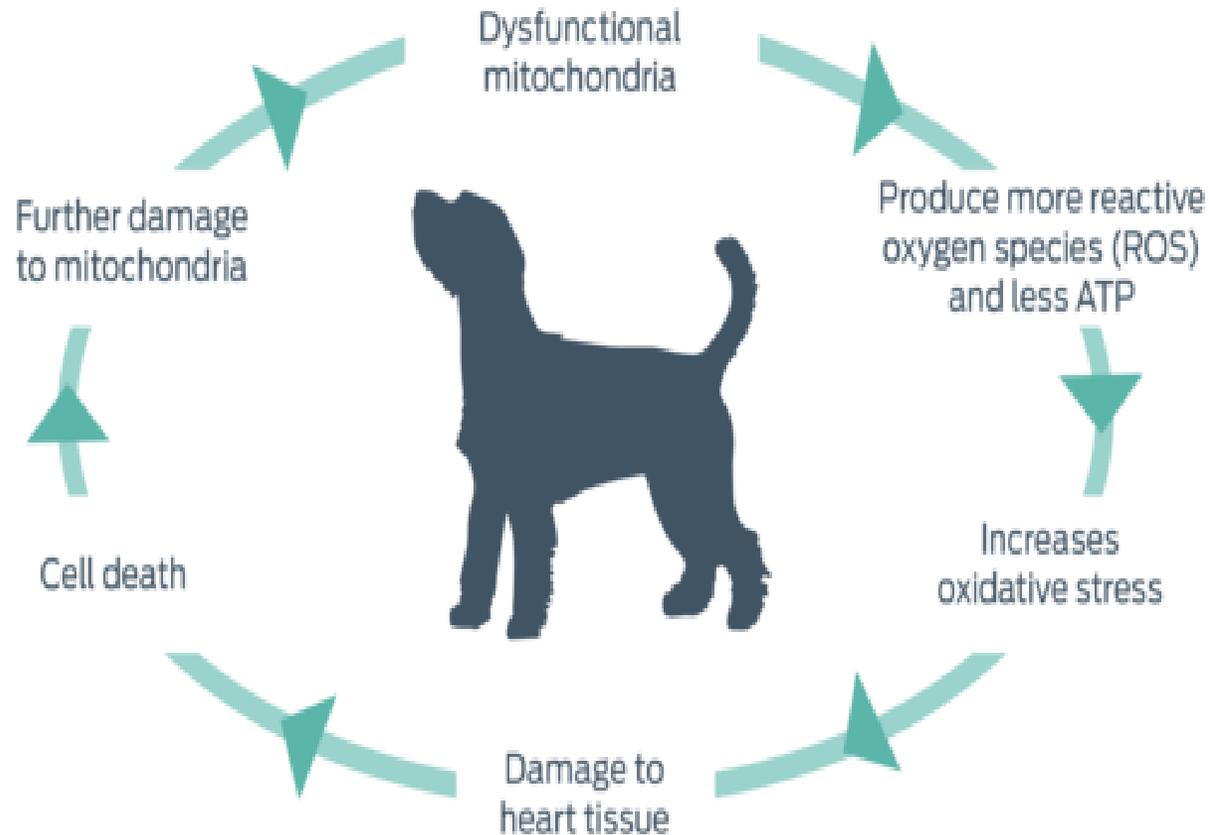
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Polyphenols Role: Protection Against Oxidative Stress

- Oxidative stress occurs when an imbalance exists between free radical formation and the ability of cells to neutralize them.
- Free radicals can damage cell membranes, proteins, DNA, and disrupt cellular signaling which become important factors in creating conditions that can lead to degraded general condition.
 - Hydroxyl (OH)
 - Superoxide (O₂⁻)
 - Nitric oxide (NO)



Harmful Effects of Oxidative Stress



Oxidative Stress in Dogs

Factors contributing to high levels of oxidative stress

- Aging
- Environmental Factors
- Poor Diet
- Physical Injury
- Noise/Stress
- Allergies
- Obesity



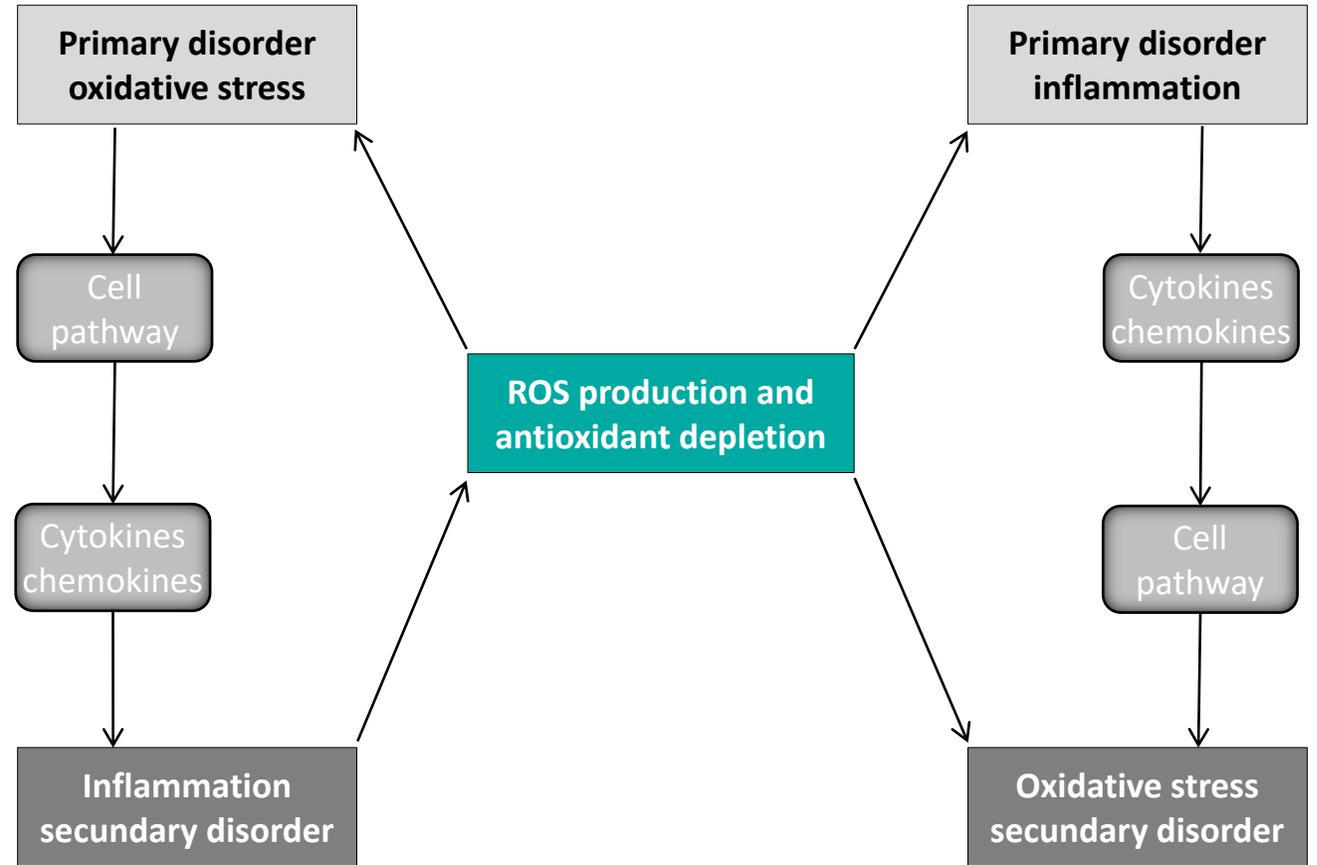
Prevalence of Oxidative Stress (OS) in Dogs

- In a study conducted by W. Jean Dodds, DVM, Biomarkers of Oxidative Stress In Dogs, Medical Research Archives vol 8 Issue 5, 2020
- Study described a rapid salivary method for testing OS in dogs to help address their health and longevity
- Using 8 Isoprostane levels (a biomarker for OS) 282 dogs were tested
- 31.4% of the dogs had isoprostane levels above the canine normal reference standard of 0.5 -1.75 pg/mL of saliva.

Oxidative Stress and Inflammation

Oxidative stress and inflammation are natural processes providing reciprocal feedback.

This happens when antioxidant enzymes are depleted and can't cope with increased ROS levels in the body.



Polyphenols as a Supplement

Improvements to a Pets Quality of Life

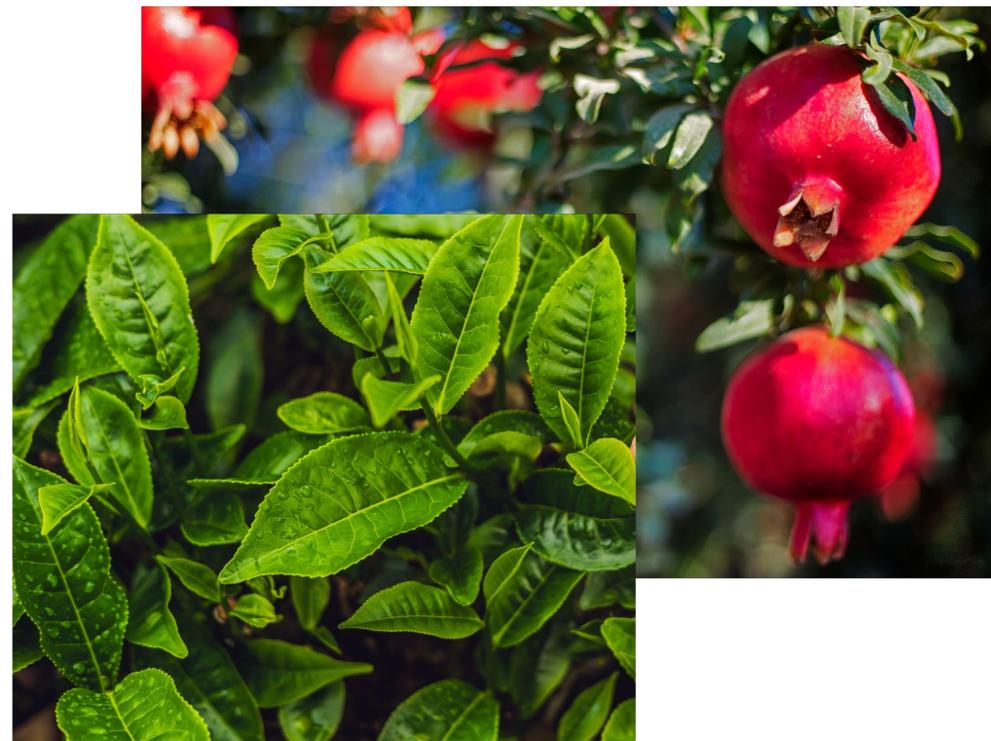
- Greater Stamina
- Immune Support
- Reduced Stress
- Preservation of Joint Integrity
- Improved digestion



TruGro® AOX+ as a Functional Supplement

Functional Ingredients

- This functional supplement contains pomegranate extract to help maintain the health, lubrication and resiliency of joints, supporting healthy cartilage and joint function.
- This functional supplement also contains tea extract, a potent free radical neutralizer that assist in maintaining healthy tissues in the face of normal metabolic stress, and to support proper cell cycle regulation, and supports liver health.

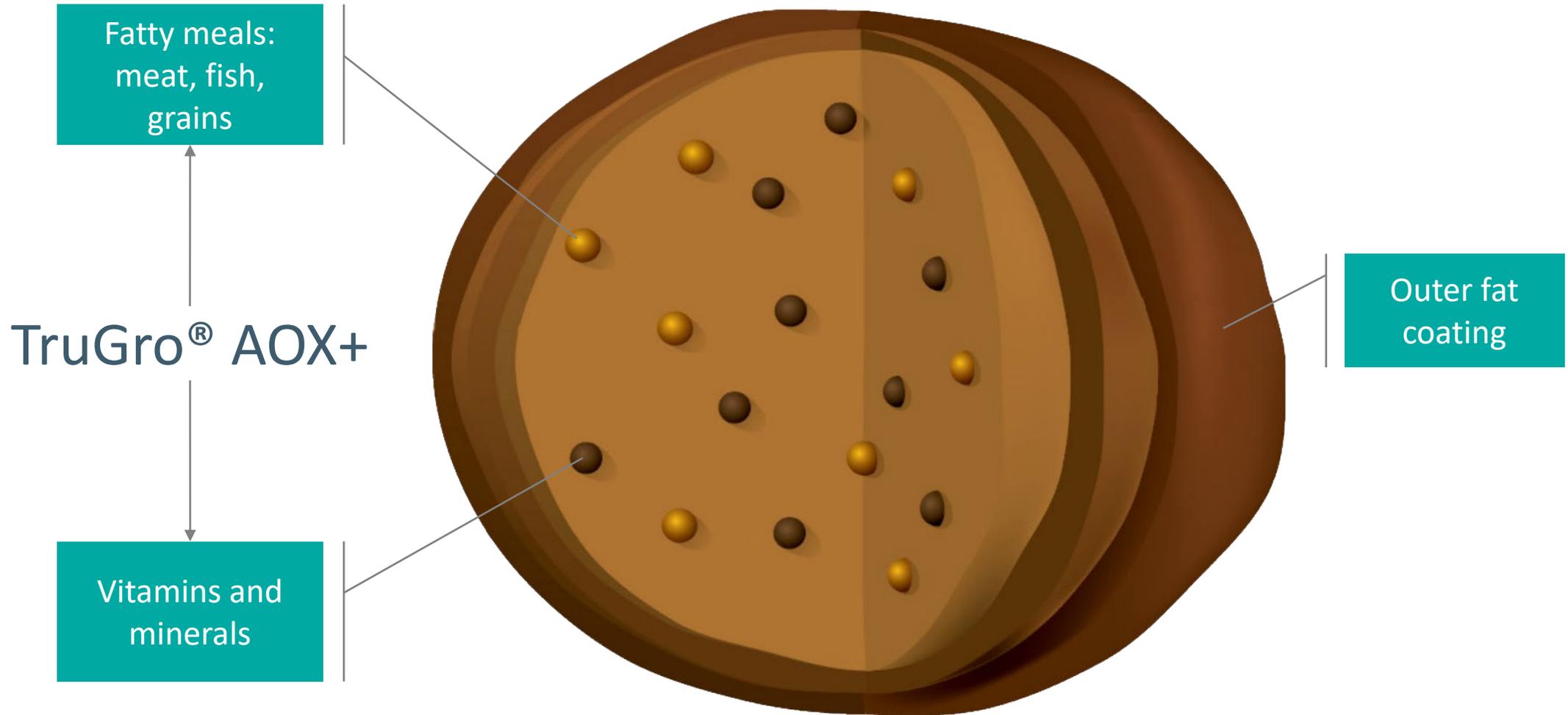


Technological Antioxidation : Protection against Oxidative Rancidity of Diets



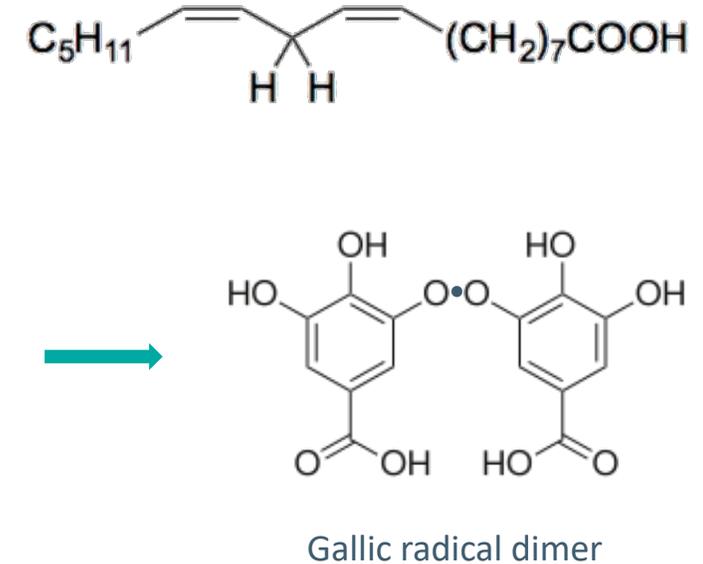
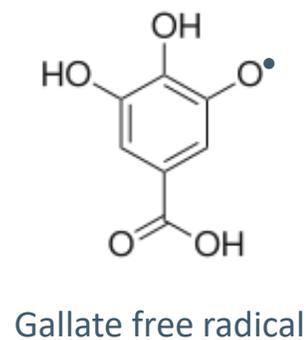
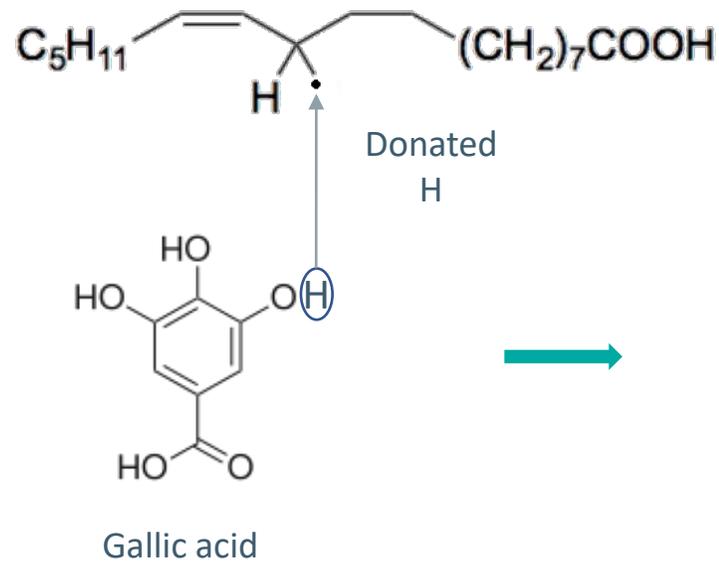
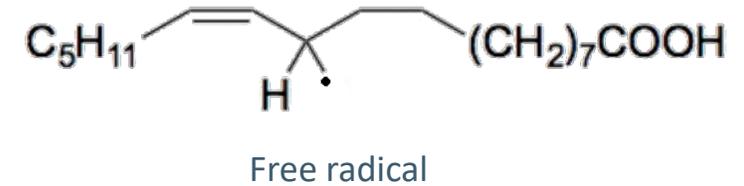
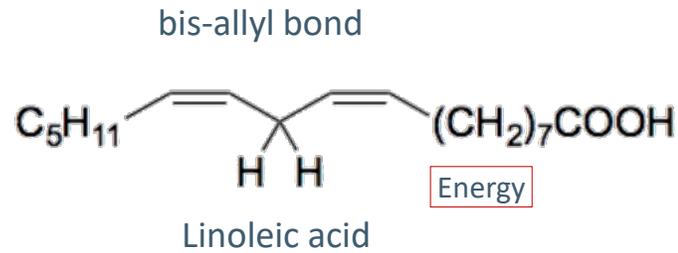
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Kibble Structure and Oxidation-Sensitive Ingredients



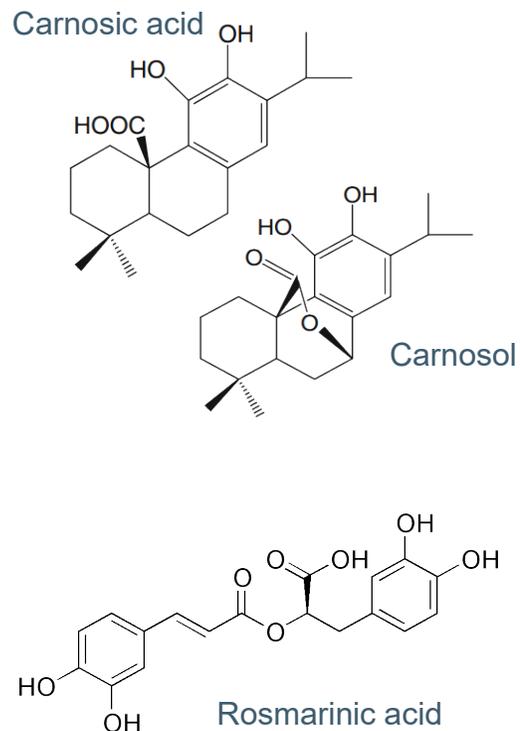
Radicalary Reactions and Antioxidant Mechanism

C=C-C=C: 75 kcal/mol C=C: 88 kcal/mol C-C: 101 kcal/mol

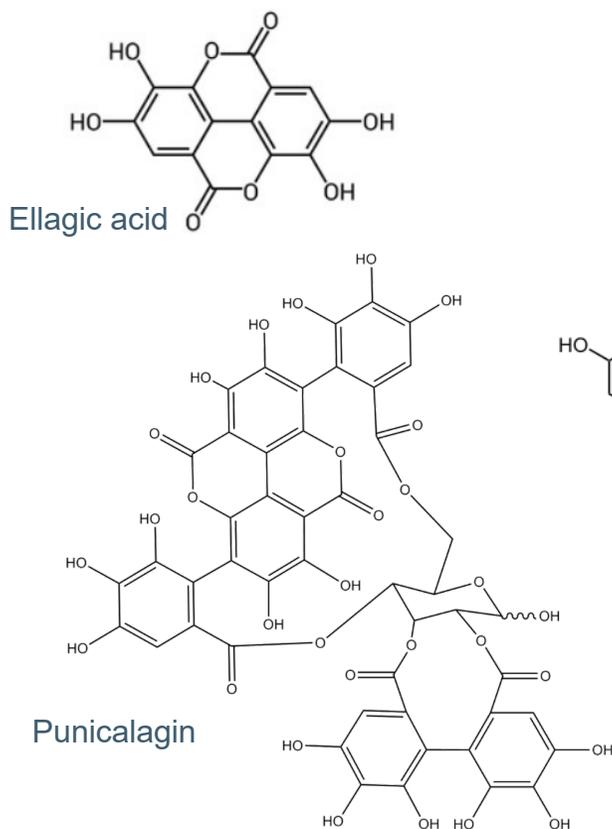


Antioxidant and Chelating Families in TruGro[®] AOX+

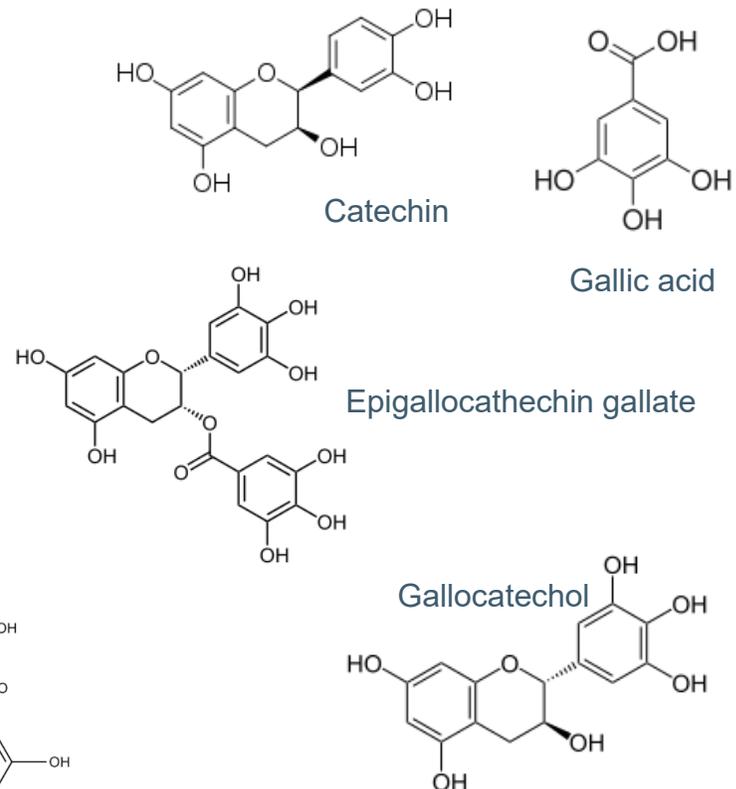
Rosemary diterpenes



Ellagic acid derivatives

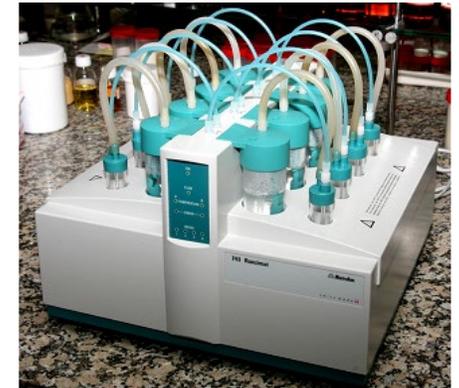
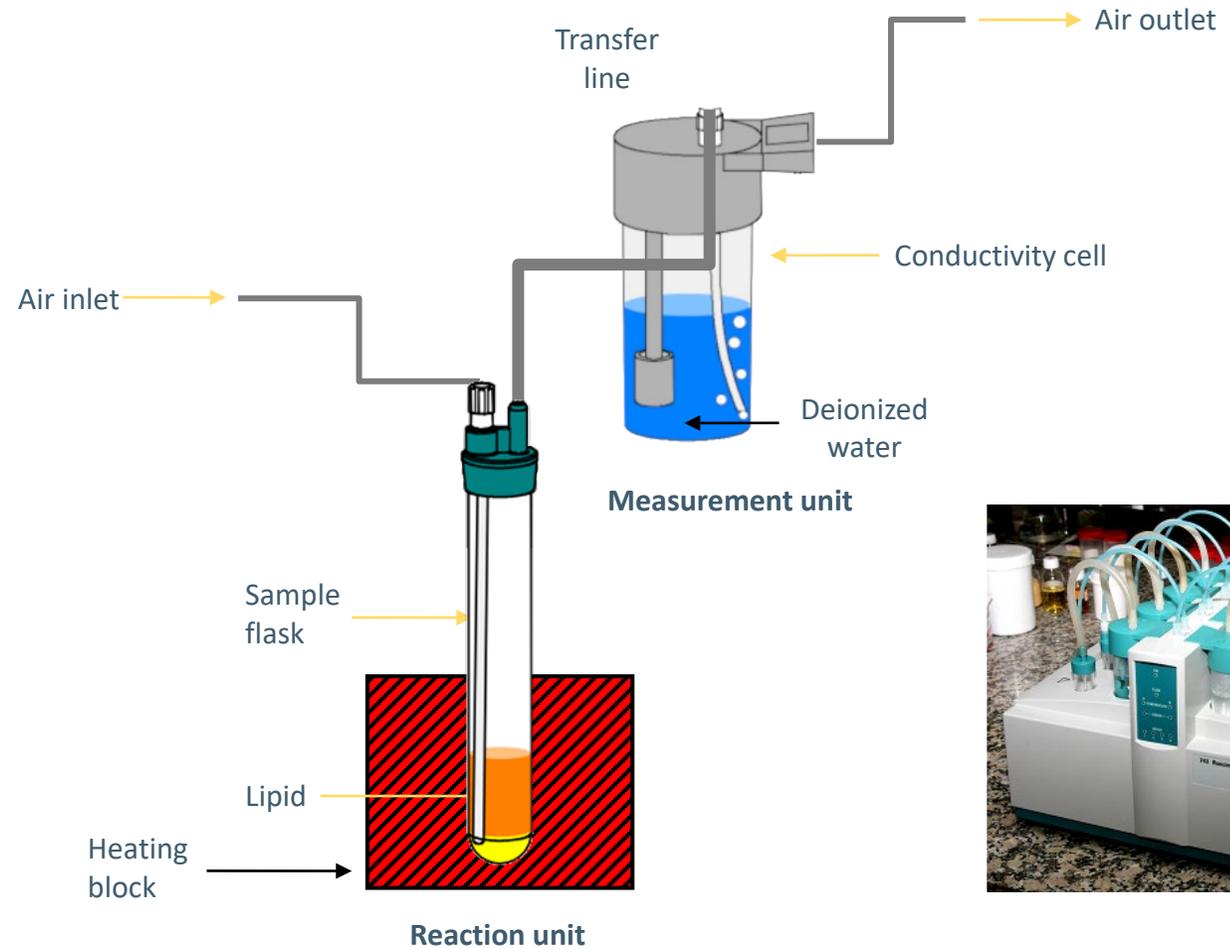


Catechins and gallic acid



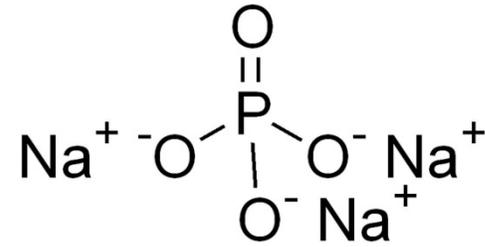
Rancimat Operating Principle

- Determination of induction time
 - The time that a lipid under certain aggressive conditions resists before experiencing any alterations
- Analytical conditions
 - Temperature: 120°C
 - Aeration: air bubbled through the sample
- Analyses
 - Secondary oxidation by-products: carboxylic acids
- Determination
 - By conductivity change

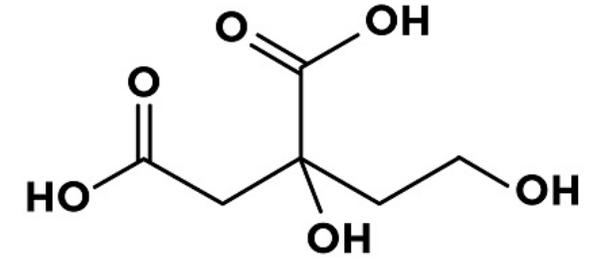


Chelating Agents

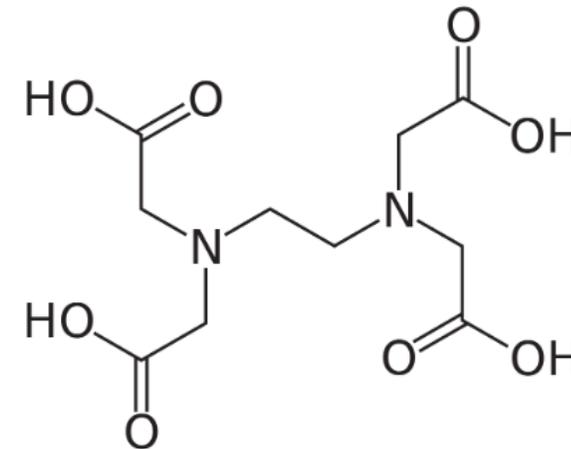
- Block metals and avoid their activity upon the antioxidant
- Reversible: release metal ions in the gut
 - Citric acid
 - Ascorbic acid
 - Tartaric acid
 - Phosphates
- Irreversible: do not release metal ions
 - EDTA



Trisodium phosphate

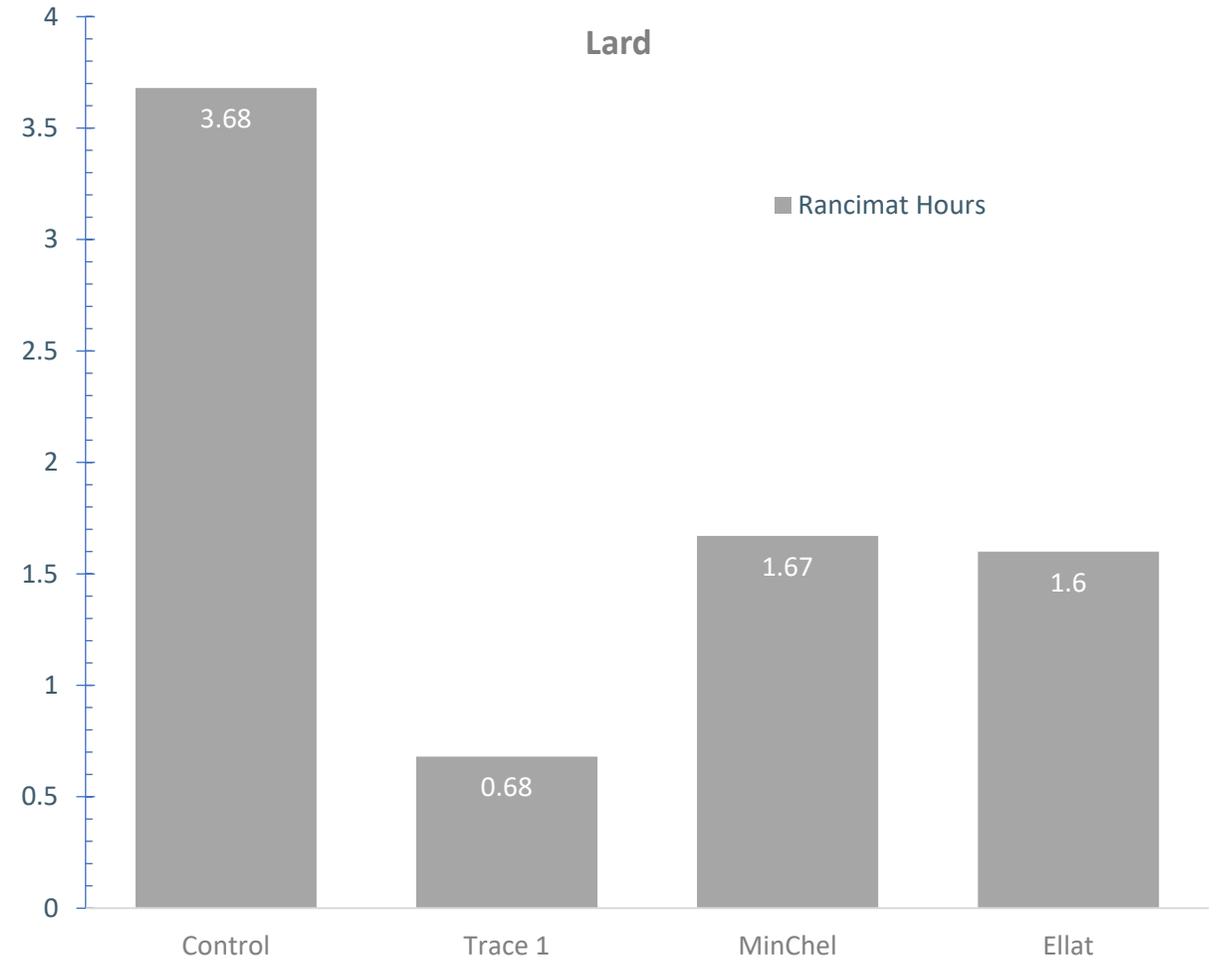
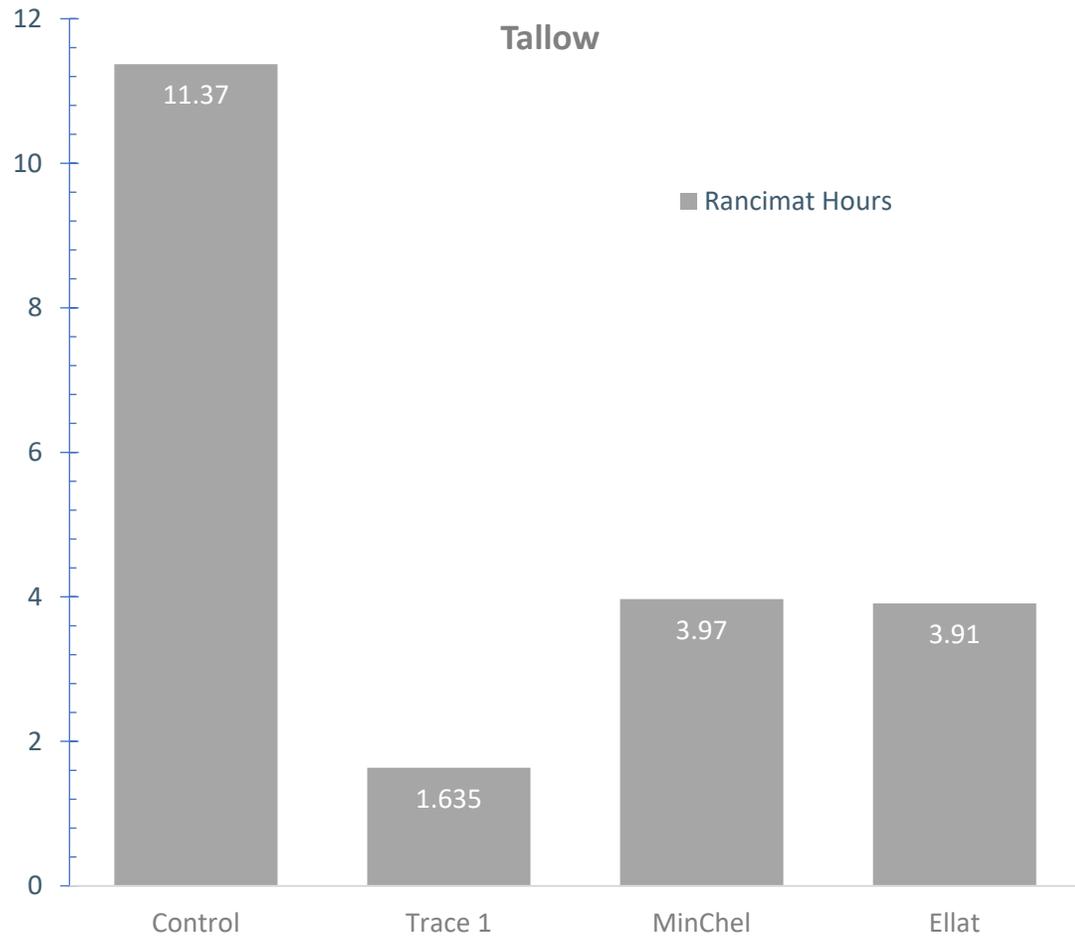


Citric acid



EDTA

Lipid Stability Increase with Metal Chelators



TruGro® AOX+ Antioxidant Activity. Fish and Chicken Oils

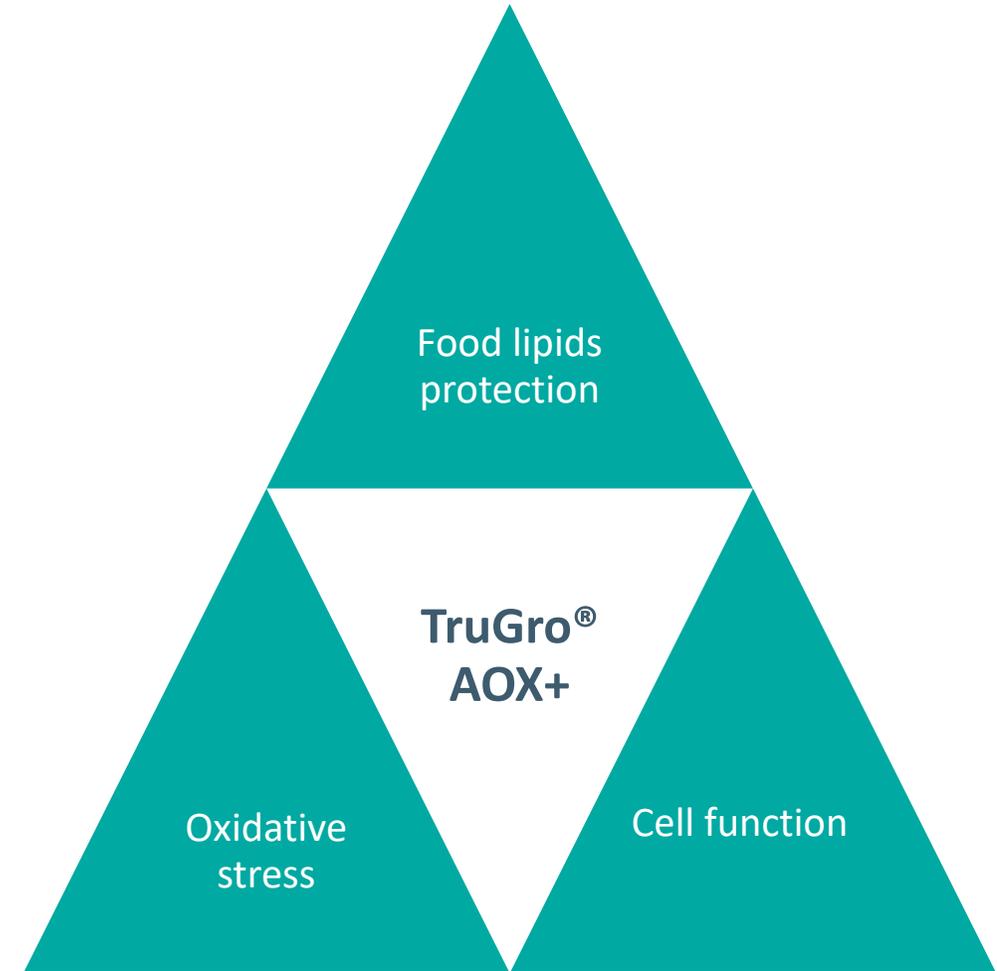
Fatty acid	Fish	Chicken	Fatty acid	Fish	Chicken
Myristic C14:0	4,35	1,20	Eicosadienoic C20:2	0,29	0,04
Palmitic C16:0	10,42	23,20	Arachidonic C20:4	0,80	0,03
Stearic C18:0	2,45	7,79	Eicosatetraenoic C20:4	0,02	0,00
Arachic C20:0	0,23	0,53	Eicosapentaenoic (EPA) C20:5	4,60	0,02
Behenic C22:0	10,72	0,19	Erucic C22:1	0,06	0,02
Lignoceric C24:0	0,05	0,26	Docosapentaenoic (DPA) C22:5	0,29	0,00
Margaroleic C17:1	1,12	0,32	Docosahexaenoic (DHA) C22:6	10,54	0,00
Palmitoleic+Oleic C16:1+C18:1	26,77	41,42	Other C13:3, C16:2	1,83	0,00
Linoleic C18:2	8,45	22,78	Nervonic C24:2	10,37	0,00
Linolenic C18:3	0,95	0,82	Saturated	28,22	33,17
Octadecatetraenoic C18:4	2,58	0,10	Unsaturated	77,72	66,00
Gadoleic C20:1	9,05	0,45	U/S ratio	2,75	1,99

Reference	Dose, ppm	#1	#2	Mean	Extra time, h	Δ stability, %
Blank fish	-	10,85	11,38	11,12		
TruGro® AOX+	1000	17,53	17,2	17,37	6.25	56,23
TruGro® AOX+	1500	19,11	19,80	19,46	8.34	75,03
Blank chicken	-	5,54	5,45	5,50		
TruGro® AOX+	1000	12,79	13,32	13,06	7.56	137,58
TruGro® AOX+	1500	16,51	16,09	16,30	10.8	196,63

Fish oil processed at 90°C. Chicken oil processed at 120°C

Messages to Take Home

- TruGro[®] AOX+ is a functional supplement that controls free radicals both in food and within the body.
- Reduces the oxidative stress, supporting a host of processes that improve the wellbeing of pets.
- Additionally, it controls free radicals and oxidative process in foods, keeping them fresh and allowing very long shelf-life.



Call Us for a Free Consultation with our Polyphenol Experts

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