

# Scientific Literature behind the Concept

**Tonicum**



# Literature sources and main results supporting the active components of incona Tonicum

Article title	Authors (year)	Publication	Trial design	Main results
Hepatoprotective and Antioxidant Effects of Artichoke against Carbon Tetrachloride-Toxicity in Rats	Osama <i>et al.</i> (2013)	Life Science Journal, 2013;10 (2)	Hepatoprotective and antioxidant effects of <b>Artichoke</b> ( <i>Cynara scolymus</i> ) against carbon tetrachloride (CCl <sub>4</sub> ) induced hepatocellular damage in 60 rats divided into 6 treatments (T). T I: control; T II: treated orally with CCl <sub>4</sub> / 1 ml/kg BW 2x weekly for 4 weeks; T III & IV: orally treated with doses 100 & 200 mg/ kg BW/ day of artichoke powder respectively; T V& VI: treated orally with artichoke powder 100 & 200 mg/kg BW/day respectively + CCl <sub>4</sub> 1ml/kg BW 2x a week for 4 weeks.	<ul style="list-style-type: none"> <li>Significantly increased red blood cell count, packed cell volume, and hemoglobin in artichoke groups (T V&amp;VI) vs. group with CCl<sub>4</sub> (T BII).</li> <li>Significantly decreased alanine transaminase (ALT), aspartate aminotransferase (AST) &amp; alkaline phosphatase (ALP).</li> <li>Improved the reduced levels of total protein and total serum antioxidant capacity.</li> <li>Increased markedly the reduced levels of Superoxide dismutase, glutathione and GPx.</li> <li>Significantly inhibited malondialdehyde and nitrogen oxide formation in liver tissue.</li> </ul>
Hepatoprotective Role of Milk Thistle ( <i>Silybum marianum</i> ) in Meat Type Chicken Fed Aflatoxin B1 Contaminated Feed	Muhammad <i>et al.</i> (2012)	Pakistan Veterinary Journal	<b>Milk thistle</b> (MT) was added in Afl B1 contaminated poultry feed to investigate and compare its hepatoprotective effects with a commercial toxin binder. 240 day-old broilers randomly allocated into 4 treatments (T): A, control (aflatoxin free feed); B, Afl contaminated feed; C, Afl contaminated feed with a toxin binder [...] (3g/kg of feed); D, Afl contaminated feed along with milk thistle (10g/kg of feed).	<ul style="list-style-type: none"> <li>Serum total protein is significantly (P&lt;0.05) higher in D &gt; A &gt; C &gt; B.</li> <li>Serum enzymes (ALP, AST, ALT), significantly (P&lt;0.05) lower in group D &gt; C &gt; A &gt; B (hepatoprotection).</li> <li>BWG and FI decreased by aflatoxin contaminated feed (B) vs. A and D.</li> <li>MT improved BWG and FI, similar to binder treated.</li> <li>Average FCR significantly (P&lt;0.05) higher (poor) in B and the same in all other T.</li> </ul>

# Literature sources and main results supporting the active components of incona Tonicum

Article title	Authors (year)	Publication	Trial design	Main results
Antioxidants in liver health (review)	Casas-Grajales and Muriel (2015)	World Journal of Gastrointestinal Pharmacology and Therapeutics	[...] the liver is the principal detoxifying organ and maintains metabolic homeostasis [...] When the liver oxidative/antioxidative balance is disrupted, the state is termed oxidative stress. Oxidative stress leads to deleterious processes in the liver and causes liver diseases.	<ul style="list-style-type: none"> <li>[...] antioxidants [...] improve the antioxidant system in the body, especially when the disease involves oxidative stress.</li> <li>Curcumin, quercetin, and naringenin are effective in the treatment of experimental liver injury.</li> <li>Green tea protects against different kinds of cancer in clinical trials, except in hepatocellular carcinoma.</li> </ul>
The role of nutrition and metabolism in preventing fatty liver	Lera (2018)	International Poultry Production, Volume 26 Number 5	<p><b>Fatty liver</b> is the accumulation of lipids in the liver. The negative effects of fatty liver include low production, mortality, poor egg shell quality, and high feed conversion rates.</p> <p>Predisposing factors for fatty liver are: High temperatures/ High energy intake/ Energy source/ Fat birds/ Mycotoxins/ Cage housing systems.</p>	<ul style="list-style-type: none"> <li>Feed should also include suitable levels of lipotropic factors like choline, vit B12, B1, folic acid, and vit E.</li> <li>Choline is highly effective and present in a several raw materials (soybean meal and rapeseed meal), but supplementary choline is always beneficial.</li> <li>The rule of thumb for added choline is to provide a minimum of 250 ppm in rearing, and between 500 and 1.000 ppm in production.</li> </ul>
Silymarin as a Natural Antioxidant: An Overview of the Current Evidence and Perspectives (review)	Surai (2015)	Antioxidants 2015, 4, 204-247; doi:10.3390/antiox4010204	<b>Silymarin</b> (SM) is an extract from the Silybum marianum (milk thistle) plant containing various flavonolignans (with silybin being the major one). In many cases, the antioxidant properties of SM are considered to be responsible for its protective actions. Possible antioxidant mechanisms of SM are evaluated in this review.	<p>It has been shown that SM:</p> <ul style="list-style-type: none"> <li>Scavenging free radicals, chelating free Fe and Cu.</li> <li>Preventing free radical formation by inhibiting specific ROS-producing enzymes.</li> <li>Maintaining an optimal redox balance in the cell.</li> <li>Decreasing inflammatory responses.</li> </ul> <p>Affecting the microenvironment of the gut in combination with other hepato-active compounds (carnitine, betaine, vitamin B12, etc.), might have similar hepatoprotective effects.</p>

# Literature sources and main results supporting the active components of incona Tonicum

Article title	Authors (year)	Publication	Trial design	Main results
Effect of <i>Cynara scolymus</i> and <i>Silybum marianum</i> extracts on bile production in pigs	Martínez <i>et al.</i> (2018)	Journal of Applied Animal Research	Choleretic and cholagogue effect of a <i>Cynara scolymus</i> extract formulation and of <i>silymarin</i> in pigs: Pigs cannulated with a T-tube catheter in the bile duct. Bile continuously measured hourly, for each animal 24 h. Treatments (n = 6 each): T A, commercial feed; T B, C. <i>scolymus</i> extract (300 g/ t) and T C, <i>silymarin</i> (300 g/ t). Total bile acids in bile, before and 1 hour after meals evaluated.	<ul style="list-style-type: none"> <li>Average daily bile production for pigs in T B was 66% higher than for pigs in groups A or C (P &lt; 0.05).</li> <li>When bile acids' concentrations before and after meals were compared, only pigs from group B exhibited an increase (P = 0.0023).</li> </ul> <p><b>Conclusion:</b> <i>C. scolymus</i> extract increases bile production and secretion in pigs.</p>
Polyphenol Composition, Antioxidant, Antimicrobial and Quorum Quenching Activity of the "Carciofo di Montoro" ( <i>Cynara cardunculus var. scolymus</i> ) Global Artichoke of the Campania Region, Southern Italy	Fратиanni <i>et al.</i> (2014)	Food and Nutrition Sciences, 2014, 5, 2053-2062	Biochemical characteristics, antimicrobial and quorum quenching activity of the extract of the "Carciofo di Montoro" (CM), a typical ecotype of <i>Cynara cardunculus var. scolymus</i> of the Campania region (Southern Italy) were studied, to consider it as potential reserve of bioactive constituents useful for food industry and beneficial for managing and preventing several chronic illnesses in humans.	<ul style="list-style-type: none"> <li>A good polyphenol content and antioxidant activity.</li> <li>UPLC revealed high amount of chlorogenic acid, cynarin and epicatechin.</li> <li>Antimicrobial activity against <i>Escherichia coli</i>, <i>Staphylococcus aureus</i>, <i>Pseudomonas aeruginosa</i>, <i>Enterococcus faecalis</i> and <i>Bacillus cereus</i> pathogen strains could be demonstrated.</li> <li>Quorum quenching activity was proven.</li> </ul> <p>CM could represent a good source of health-promoting polyphenols, encouraging a nutraceutical use of such ecotype, for several phyto-pharmaceutical applications.</p>

## Literature sources and main results supporting the active components of incona Tonicum

Article title	Authors (year)	Publication	Trial design	Main results
Effects of artichoke ( <i>Cynara scolymus L.</i> ) extract on antioxidant status in chicken thigh meat	Mirderikvandi <i>et al.</i> (2016)	Iranian Journal of Veterinary Medicine. IJVM (2016), 10 (1): 73 - 81	Artichoke extract (AE) is a good source of antioxidant potential. Different aspects have been evaluated in this study. 200 Ross chicken broilers divided into 5 treatment groups received 100, 200, 300, and 500 mg/liter of AE in drinking water and pure water in the T control, respectively. Antiradical activity and phenolic content of AE were determined and gallic acid was measured before adding the extract to drinking water.	<ul style="list-style-type: none"> <li>Antiradical activity of AE was 35% and phenolic content was 3.3 g/100g of dry extract.</li> <li>AE with dosage of 200 mg/l indicated maximum antioxidant ability compared to the other Ts (<math>p &lt; 0.05</math>).</li> <li>AE200 mg/l also demonstrated the lowest GPx and CAT activities vs. control and AE 300 mg/l T.</li> </ul> <p>This study showed that administration of 200 mg/l AE in drinking water during growing phase decreased GPx and CAT activities in chicken meat presumably due to down-regulation of gene expression for antioxidant enzymes.</p>
Effects of L-carnitine supplementation in drinking water on layer-type chick juvenile performance	Nouboukpo <i>et al.</i> (2009)	Arch. Geflügelk., 74 (2). S. 116–120, 2010, ISSN 0003-9098	684 Hisex Brown layer chicks were divided into 3 treatment groups of 228 chicks each (2 replications of 114 each), namely 1) control (CON), 2) supplementation of 30 mg of L-carnitine per liter of drinking water (LC30) and 3) supplementation of 60 mg of L-carnitine per liter of drinking water (LC60). Chicks reared up to 14 d of age. Blood collection and weighing of yolk sac at 1, 7 and 14 d of age.	<ul style="list-style-type: none"> <li>Yolk sac utilization, morbidity and serum concentration of triglyceride decreased significantly with increasing dose of L-carnitine (<math>P &lt; 0.05</math>).</li> <li>The decrease in triglyceride lasted up to 14 d of age despite a supplementation for the first 7 d only.</li> <li>Serum total protein levels or chick body weights, respectively, were lower or higher in L-carnitine supplemented chicks compared to CON (<math>P &lt; 0.05</math>) only during the period of administration.</li> </ul> <p><b>Conclusions:</b> L-carnitine supplementation in drinking water influences chick juvenile performance parameters and this is in relationship to yolk sac consumption and blood biochemical parameters.</p>

## Literature sources and main results supporting the active components of incona Tonicum

Article title	Authors (year)	Publication	Trial design	Main results
Chlorogenic Acid: Recent Advances on Its Dual Role as a Food Additive and a Nutraceutical against Metabolic Syndrome (review)	Santana-Gálvez <i>et al.</i> (2017)	Molecules 2017, 22, 358; doi: 10.3390/Molecules 22030358	<b>Chlorogenic acid</b> is a polyphenol with many health-promoting properties, most of them related to the treatment of metabolic syndrome, including antioxidant, anti-inflammatory, antilipidemic, antidiabetic, and antihypertensive activities. It can be used as a nutraceutical (metabolic syndrome).	<ul style="list-style-type: none"> <li>Chlorogenic acid has shown antimicrobial activity against a wide range of organisms, including bacteria, yeasts, molds, viruses, and amoebas.</li> <li>Chlorogenic acid has antioxidant activity, particularly against lipid oxidation as well as protective properties against degradation of other bioactive compounds present in food, and prebiotic activity.</li> </ul>
Nutritional Dietary Supplements to Reduce the Incidence of Fatty Liver Syndrome in Laying Hens and the Use of Spectrophotometry to Predict Liver Fat Content	Navarro-Villa <i>et al.</i> (2019)	2019 J. Appl. Poult. Res. 28:435–446	Use of B vitamins via the feed (FLS-MIX) or the drinking water (FLS-LIQ) to reduce Fat Liver Syndrome (FLS) and the use of spectrophotometry to estimate liver fat content. Individually caged Hy-line brown hens (n = 288) underwent a pre-experimental period (weeks 66 to 67) receiving a standard diet (StD) or a challenge diet (ChD) (high energy–low protein) to nutritionally induce the FLS. Subsequently, hens followed a 2 diets (Standard; Challenge) × 3 dietary supplements (NONE; FLS-MIX; and FLS-LIQ) factorial arrangement of treatments from 68 to 73 wk old.	<ul style="list-style-type: none"> <li>Compared to the StD, the ChD increased liver fat (188 vs. 270 g/kg DM) and reduced feed consumption, number of eggs, and egg mass production (P &lt; 0.05).</li> <li>No differences in lay performance or eggshell quality were observed among dietary supplements; however, FLS-MIX significantly increased (P &lt; 0.05) feed intake relative to NONE.</li> <li>On birds subjected to the ChD, the use of FLS-MIX and FLS-LIQ led to lower (P &lt; 0.05) liver fat relative to NONE.</li> </ul> <p>Results suggest that B vitamin supplements could be an effective means to reduce liver fat deposition when hens are susceptible of suffering FLS, and that spectrometry could be a reliable tool to estimate liver fat content.</p>

# Literature sources and main results supporting the active components of incona Tonicum

Article title	Authors (year)	Publication	Trial design	Main results
Silymarin: A potent hepatoprotective agent in poultry industry	Saeed <i>et al.</i> (2017)	World's Poultry Science Journal, Vol. 73, September 2017	<b>Silymarin</b> contains flavonolignans and is derived from the dry seed of milk thistle ( <i>Silybum marianum</i> ) herb. It is used as a hepatoprotective for cirrhosis and jaundice, growth promotant, and in cases of alcoholic liver disease, chronic hepatitis C, chronic liver diseases and hepatocellular carcinoma.	<p>Medicinal properties of Silmarin are anti-inflammatory, immunomodulating, anti-diabetic, antioxidant, with low toxicity, promising as pharmacokinetics, protective, preventive, regenerative, with antifibrotic effects and extremely safe.</p> <p>Mode of action:</p> <ul style="list-style-type: none"> <li>Stabilisation of membranes, free radical scavenging, stimulation of hepatocyte protein synthesis and modulation of the immune response.</li> <li>Amelioration of levels of various hepatic enzymes such as AST, ALT and ALP.</li> <li>Moderation of the immune system.</li> </ul>



**Gesellschaft für Tierernährung mbH**

D-27793 Wildeshausen - Düngruper Str. 10

Tel- +49 (0)4431 9905-0

Fax- +49 (0)4431 9905-55

D-87700 Memmingen - Alpenstraße 46

Tel- +49 (0)8331 9481-0

Fax- +49 (0)8331 9481-40

[www.mineralfutter.de](http://www.mineralfutter.de)

[info@mineralfutter.de](mailto:info@mineralfutter.de)