**Princípio Ativo:** nas folhas encontram-se a cinarina, sais minerais como cálcio, potássio, sódio, magnésio, inulina, princípio amargo e tanino.

**Partes Usadas:** folhas

**Uso Popular:**
- **sistema gastro intestinal:** aumenta a secreção gástrica e sua acidez, laxativo;
- **rim:** diurético, usado nas nefrites agudas e nas uremias (aumenta a excreção de amônia);
- **vasos sanguíneos:** hemorroidas, varizes e reumatismo;
- **obesidade:** auxiliar nos regimes de emagrecimento;
- **diabetes:** hipoglicemiante, auxiliar nos regimes de emagrecimento;
- **combate a anemia, raquitismo;**
- **diminuição do colesterol.**

**Uso Cientificamente Comprovados ou em Estudo:**
- ação antiinflamatória e analgésica (27)
- fígado: cálculos biliares e distúrbios hepáticos - aumenta a secreção biliar (colerético) prevenindo a formação de cálculos, e embora não dissolva os já existentes, diminui a cólica biliar. ação anti hepatotóxica (cinarina), protetora e regeneradora dos hepatócitos; colerético e hapatoprotetor (8, 12, 14, 17, 21, 29)
- tratamento da dispepsia (2)
- rico em vitamina C (3)
- anti oxidante (3, 4, 10, 11, 16, 21)
- reduz o colesterol e triglicérides (6, 9) - diminui as taxas de colesterol devido à ação nas enzimas hepáticas (20 mg de cinarina reduzem em 30% o colesterol)
- ação preventiva no câncer (22)

**Biblioteca:**

1. *Effectiveness of artichoke extract in preventing alcohol-induced hangovers: a randomized controlled trial.*
   CMAJ. 2003 Dec 9;169(12):1269-73.
   Pittler MH, White AR, Stevinson C, Ernst E.
   Complementary Medicine, Peninsula Medical School, Universities of Exeter and Plymouth, United Kingdom. m.h.pittler@ex.ac.uk

   BACKGROUND: Extract of globe artichoke (Cynara scolymus) is promoted as a possible preventive or cure for alcohol-induced hangover symptoms. However, few rigorous clinical trials have assessed the effects of artichoke extract, and none has examined the effects in relation to hangovers. We undertook this study to test whether artichoke extract is effective in preventing the signs and symptoms of alcohol-induced hangover. METHODS: We recruited healthy adult volunteers between 18 and 65 years of age to participate in a randomized double-blind crossover trial. Participants received either 3 capsules of commercially available standardized artichoke extract or indistinguishable, inert placebo capsules immediately before and after alcohol exposure. After a
1-week washout period the volunteers received the opposite treatment. Participants predefined the type and amount of alcoholic beverage that would give them a hangover and ate the same meal before commencing alcohol consumption on the 2 study days. The primary outcome measure was the difference in hangover severity scores between the artichoke extract and placebo interventions. Secondary outcome measures were differences between the interventions in scores using a mood profile questionnaire and cognitive performance tests administered 1 hour before and 10 hours after alcohol exposure. RESULTS: Fifteen volunteers participated in the study. The mean number (and standard deviation) of alcohol units (each unit being 7.9 g, or 10 mL, of ethanol) consumed during treatment with artichoke extract and placebo was 10.7 (3.1) and 10.5 (2.4) respectively, equivalent to 1.2 (0.3) and 1.2 (0.2) g of alcohol per kilogram body weight. The volume of nonalcoholic drink consumed and the duration of sleep were similar during the artichoke extract and placebo interventions. None of the outcome measures differed significantly between interventions. Adverse events were rare and were mild and transient. INTERPRETATION: Our results suggest that artichoke extract is not effective in preventing the signs and symptoms of alcohol-induced hangover. Larger studies are required to confirm these findings.

Aliment Pharmacol Ther. 2003 Dec;18(11-12):1099-105
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BACKGROUND: This study aimed to assess the efficacy of artichoke leaf extract (ALE) in the treatment of patients with functional dyspepsia (FD).
METHODS: In a double-blind, randomized controlled trial (RCT), 247 patients with functional dyspepsia were recruited and treated with either a commercial ALE preparation (2 x 320 mg plant extract t.d.s.) or a placebo. The primary efficacy variable was the sum score of the patient's weekly rating of the overall change in dyspeptic symptoms (four-point scale). Secondary variables were the scores of each dyspeptic symptom and the quality of life (QOL) as assessed by the Nepean Dyspepsia Index (NDI).
RESULTS: Two hundred and forty-seven patients were enrolled, and data from 244 patients (129 active treatment, 115 placebo) were suitable for inclusion in the statistical analysis (intention-to-treat). The overall symptom improvement over the 6 weeks of treatment was significantly greater with ALE than with the placebo (8.3 +/- 4.6, vs. 6.7 +/- 4.8, P < 0.01). Similarly, patients treated with ALE showed significantly greater improvement in the global quality-of-life scores (NDI) compared with the placebo-treated patients (- 41.1 +/- 47.6 vs. - 24.8 +/- 35.6, P < 0.01).
CONCLUSION: The ALE preparation tested was significantly better than the placebo in alleviating symptoms and improving the disease-specific quality of life in patients with functional dyspepsia.

3. In vitro antioxidant activities of edible artichoke (Cynara scolymus L.) and effect on biomarkers of antioxidants in rats.
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Artichoke (Cynara scolymus L.), an edible vegetable from the Mediterranean area, is a good source of natural antioxidants such as vitamin C, hydroxycinnamic acids, and flavones. The antioxidant activity of aqueous-organic extracts of artichoke were determined using three methods: (a) free radical 2,2-diphenyl-1-picrylhydrazyl (DPPH(·)) scavenging, (b) ferric-reducing
antioxidant power (FRAP), and (c) inhibition of copper(II)-catalyzed in vitro human low-density lipoprotein (LDL) oxidation. In addition, the present study was performed to investigate the ability of the edible portion of artichoke to alter in vivo antioxidative defense in male rats using selected biomarkers of antioxidant status. One gram (dry matter) had a DPPH(*) activity and a FRAP value in vitro equivalent to those of 29.2 and 62.6 mg of vitamin C and to those of 77.9 and 159 mg of vitamin E, respectively. Artichoke extracts showed good efficiency in the inhibition in vitro of LDL oxidation. Neither ferric-reducing ability nor 2,2'-azinobis(3-ethylbenzothiazolin-6-sulfonate) radical scavenging activity was modified in the plasma of the artichoke group with respect to the control group. Among different antioxidant enzymes measured (superoxide dismutase, glutathione peroxidase, glutathione reductase, and catalase) in erythrocytes, only glutathione peroxidase activity was elevated in the artichoke group compared to the control group. 2-Aminoadipic semialdehyde, a protein oxidation biomarker, was decreased in plasma proteins and hemoglobin in the artichoke-fed group versus the control group. In conclusion, the in vitro protective activity of artichoke was confirmed in a rat model.

4. Screening pharmaceutical preparations containing extracts of turmeric rhizome, artichoke leaf, devil's claw root and garlic or salmon oil for antioxidant capacity.
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Pharmaceutical preparations derived from natural sources such as vegetables often contain compounds that contribute to the antioxidant defence system and apparently play a role in the protection against degenerative diseases. In the present study, commercial preparations containing extracts of turmeric, artichoke, devil's claw and garlic or salmon oil were investigated. The products were divided into fractions of different polarity, and their antioxidant activity was determined using the Trolox equivalent antioxidant capacity (TEAC) assay. This test is based on the efficacy of the test material to scavenge 2,2'-azino-bis(3-ethylbenzthiazoline-6-sulfonic acid) (ABTS) derived radicals. Total phenols were determined in all fractions as well as specific carotenoids in the most lipophilic fraction to assess their contribution to the antioxidant activity. For comparison, the radical scavenging effect of selected constituents of the extracts such as curcumin, luteolin, kaempferol, chlorogenic acid, harpagoside, beta-carotene and alpha-tocopherol was investigated and compared with that of Trolox. Curcumin, luteolin, kaempferol, chlorogenic acid and harpagoside, beta-carotene and alpha-tocopherol was investigated and compared with that of Trolox. C

5. Occupational rhinitis and bronchial asthma due to artichoke (Cynara scolymus).
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BACKGROUND: The artichoke is a perennial horticultural plant that belongs to
the Compositae family. OBJECTIVE: To present case studies of 2 vegetable warehouse workers who developed occupational rhinitis and bronchial asthma by sensitization to artichoke. METHODS: Skin prick tests with common inhalants and foods were performed. Specific IgE to artichoke, Parietaria judaica pollen, and Olea europaea pollen extracts was measured by a specific IgE enzyme immunosorbent assay kit. Molecular mass of the allergens was studied by the sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE) immunoblotting technique. Patients underwent a nasal challenge test, and one patient provided peak expiratory flow rate (PEFR) measurements in her workplace. RESULTS: In both patients, results of skin prick tests to artichoke were positive. Levels of specific IgE for artichoke were 0.68 kU/L in patient 1 and 2.14 kU/L in patient 2. The protein composition of the artichoke extract, studied by SDS-PAGE, showed that most bands ranged from 30 to 14 kDa. The IgE-binding bands with the serum samples of patient 1 showed apparent molecular masses of 56, 48, 38, 31, 27, 25, 16, and 15 kDa; however, the serum samples of patient 2 showed IgE bands of 21 and 19 kDa. Western blotting of artichoke extract showed a complete inhibition of IgE-binding bands when serum samples were preincubated with P. judaica pollen extract. Nasal challenge with artichoke extract triggered a peak nasal inspiratory flow decrease of 81% and 85% in patient 1 and patient 2, respectively. Finally, patient 1 recorded a PEFR decrease of up to 36% after exposure to artichoke in her workplace. CONCLUSIONS: SDS-PAGE immunoblotting inhibition performed for the artichoke extract showed a total disappearance of the specific IgE binding bands when serum samples were previously incubated with P. judaica pollen extract, thus establishing the existence of a serologic cross-reactivity between artichoke and P. judaica pollen.

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OBJECTIVES: To systematically review the clinical evidence for herbal medicinal products in the treatment of hypercholesterolemia. STUDY DESIGN: A systematic review of randomized clinical trials of herbal medicinal products used to lower serum cholesterol. Systematic literature searches were conducted in 6 electronic data-bases. The reference lists of all papers and our files were searched for more relevant publications. Experts in the field and manufacturers of identified herbal medicinal products were contacted for published and unpublished data. No language restrictions were imposed. OUTCOMES MEASURED: All randomized clinical trials of serum cholesterol reduction, in which mono-preparations of herbal medicinal products were administered as supplements to human subjects, were included. RESULTS: Twenty-five randomized clinical trials involving 11 herbal medicinal products were identified. Guggul (Commiphora mukul), fenugreek (Trigonella foenum-graecum), red yeast rice, and artichoke (Cynara scolymus) have been most extensively studied and have demonstrated reductions in total serum cholesterol levels of between10% and 33%. The methodological quality as assessed by the Jadad score was less than 3 (maximum, 5) for 13 of the 25 trials. CONCLUSIONS: Many herbal medicinal products have potential hypocholesterolemic activity and encouraging safety profiles. However, only a limited amount of clinical research exists to support their efficacy. Further research is warranted to establish the value of these extracts in the treatment of hypercholesterolemia.

7. Efficacy of different Cynara scolymus preparations on liver complaints.
Speroni E, Cervellati R, Govoni P, Guizzardi S, Renzulli C, Guerra MC.
Cynara scolymus leaves extracts have long been used in folk medicine for their choleretic and hepatoprotective activities, that are often related to the cynarin content. These therapeutic properties are also attributed to mono- and di-caffeoylquinic acids and since commercial C. scolymus preparations can differ for their activities, we studied four extracts to evaluate, if present, a relationship between the hepatobiliary properties of the different preparations and their content in phenolics. The antioxidant activity of the commercial preparations examined was also considered in an in vitro system. The results showed that the extract with the highest content in phenolic derivatives (GAE) exerted the major effect on bile flow and liver protection. Also the results of the antioxidant capacity (BR) of the different preparations are in good agreement with the results obtained in vivo. On the contrary, administering rats with doses of chlorogenic acid, equivalent to those present in this extract, we did not observe any choleretic or protective action. An histopathological analysis of liver sections confirmed the biochemical results. Perhaps caffeoyl derivatives have a role in the therapeutic properties of C. scolymus extracts, as reported in literature for “in vitro” studies, but when administered alone, they are not so effective in exerting this action.


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The therapeutic properties of artichoke (Cynara scolymus L.) preparations have been known since ancient times. The traditional use of artichoke leaf extract (ALE) in gastroenterology is mainly based upon its strong antidyspeptic actions which are mediated by its choleretic activity. The aim of this study was to investigate the effects of ALE on bile flow and the formation of bile compounds in anaesthetised Wistar rats after acute and repeated (twice a day for 7 consecutive days) oral administration. A significant increase in bile flow was observed after acute treatment with ALE as well as after repeated administration. The choleretic effects of ALE were similar to those of the reference compound dehydrocholic acid (DHCA). Total bile acids, cholesterol and phospholipid were determined by enzymatic assays. There was a strong ALE-induced increase in total bile acid concentration over the entire experiment. With the highest dose (400 mg/kg), a significant increase was obtained after single and repeated administration. The bile acids-increased effects of ALE were much more pronounced than those of reference (DHCA). No significant differences in cholesterol and phospholipid content could be found.


The methanolic extract from the leaves of artichoke (Cynara scolymus L.) was found to suppress serum triglyceride elevation in olive oil-loaded mice. Through bioassay-guided separation, sesquiterpenes (cyanaropicrin, aguerin B, and grosheimin) were isolated as the active components together with new sesquiterpene glycosides (cynarascolosides A, B, and C). The oxygen functional groups at the 3- and 8-positions and exo-methylene moiety in alpha-
methylene-gamma-butyrolactone ring were found to be essential for the anti-hyperlipidemic activity of guaiane-type sesquiterpene. In addition, inhibition of gastric emptying was shown to be partly involved in anti-hyperlipidemic activity.

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A new method based on the inhibitory effects of antioxidants on the oscillations of the hydrogen peroxide, acidic iodate, malonic acid, and Mn(II)-catalyzed system (known as the Briggs-Rauscher reaction), was used for the evaluation of antioxidative capacity. With this method, which works near the pH of the fluids in the stomach (pH approximately 2), a group of natural compounds present in fruits and vegetables or in medicinal plants assumed to have antioxidant capacity, was tested successfully. The aim of the present study is to evaluate the antioxidative properties of some active principles contained in vegetables and aromatic plants, namely, cynarin (from Cynara scolymus), rosmarinic acid (from Rosmarinus officinalis), echinacoside (from Echinacea species), puerarin (from Pueraria lobata), and oleuropein (from Olea europea). Also studied with the Briggs-Rauscher reaction method was the antioxidant activity of cyanidin 3-O-beta-glucopyranoside (from Citrus aurantium) in order to compare the results with those obtained by other methods. The conclusions on the dependency of the antioxidative activity on the pH of the testing system are given.

11. Protective properties of artichoke (Cynara scolymus) against oxidative stress induced in cultured endothelial cells and monocytes.
Zapolska-Downar D, Zapolski-Downar A, Naruszewicz M, Siennicka A, Krasnodebska B, Koldziej B.
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It is currently believed that oxidative stress and inflammation play a significant role in atherogenesis. Artichoke extract exhibits hypolipemic properties and contains numerous active substances with antioxidant properties in vitro. We have studied the influence of aqueous and ethanolic extracts from artichoke on intracellular oxidative stress stimulated by inflammatory mediators (TNFalpha and LPS) and ox-LDL in endothelial cells and monocytes. Oxidative stress which reflects the intracellular production of reactive oxygen species (ROS) was followed by measuring the oxidation of 2',7'-dichlorofluorescin (DCFH) to 2',7'-dichlorofluorescein (DCF). Aqueous and ethanolic extracts from artichoke were found to inhibit basal and stimulated ROS production in endothelial cells and monocytes in dose dependent manner. In endothelial cells, the ethanolic extract (50 microg/ml) reduced ox-LDL-induced intracellular ROS production by 60% (p<0,001) while aqueous extract (50 microg/ml) by 43% (p<0,01). The ethanolic extract (50 microg/ml) reduced ox-LDL-induced intracellular ROS production in monocytes by 76% (p<0,01). Effective concentrations (25-100 microg/ml) were well below the cytotoxic levels of the extracts which started at 1 mg/ml as assessed by LDH leakage and trypan blue exclusion. Penetration of some active substances into the cells was necessary for inhibition to take place as judged from the effect of preincubation time. These results demonstrate that artichoke extracts have marked protective properties against oxidative stress induced by inflammatory mediators and ox-LDL in cultured endothelial cells and monocytes.
12. Prevention of tauroliothocholate-induced hepatic bile canalicular distortions by HPLC-characterized extracts of artichoke (Cynara scolymus) leaves.
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The effects of water-soluble extracts of artichoke (Cynara scolymus L.) leaves on tauroliothocholate-induced cholestatic bile canalicular membrane distortions were studied in primary cultured rat hepatocytes using electron microscopy. Artichoke extracts at concentrations between 0.08 and 0.5 mg/ml were able to prevent the formation of bizarre canalicular membrane transformations in a dose-dependent manner when added simultaneously with the bile acid. However, prevention also occurred when the hepatocytes were preincubated with the extracts, indicating that absorption of the bile acid to components of the extracts was not involved. These results demonstrate that artichoke leaf extracts exert a potent anticholestatic action at least in the case of tauroliothocholate. This effect may contribute to the overall hepatoprotective influence of this herbal formulation.

13. [The status of herbal antilipemic agents]
[Article in German]
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A favourable effect on serum lipids may be achieved with herbal medicinal products, if they are administered at sufficient high dosages and sufficient long term use. Their efficacy is not so strong than that documented for chemically defined products, however their tolerability is superior. Maximal effects are more than that of a strong lipid lowering diet, however, lipid lowering herbal drugs are Allium sativum L., Cynara scolymus L., Curcumae longa L. All of them exert some more beneficial effects, which suggest to be an advantageous alternative for patients. This contribution gives a brief review and an assessment of the suitability of herbal medicinal preparations for the prophylactic or therapeutic treatment of hyperlipidemia and atherosclerosis.

14. Anticholestatic activity of flavonoids from artichoke (Cynara scolymus L.) and of their metabolites.
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It is well known that water-soluble extracts of artichoke (Cynara scolymus L.) leaves exert choleresis. When studying this effect in vitro using primary cultured rat hepatocytes and cholephilic fluorescent compounds, it was noticed that the artichoke leaf extracts not only stimulated biliary secretion, but that they also reestablished it when secretion was inhibited by addition of tauroliothocholate to the culture medium. Furthermore, tauroliothocholate-induced bizarre bile canalicular membrane distortions detectable by electron microscopy could be prevented by artichoke leaf extracts in a dose-dependent manner when added simultaneously with the bile acid. These effects were exerted by the flavonol luteolin and, to a lesser extent, by luteolin-7-O-glucoside, while chlorogenic acid and 1.5-dicaffeoyl quinic acid were almost ineffective. Surprisingly, metabolites produced by the cultured hepatocytes were able to stimulate biliary secretion substantially as well as prevent canalicular membrane deformation. These results demonstrate that artichoke leaf extracts exert a potent anticholestatic action at least in the case of tauroliothocholate-induced cholestasis. Flavonoids and their metabolites may contribute significantly to this effect.
15. Analysis and stability of the constituents of artichoke and St. John's wort tinctures by HPLC-DAD and HPLC-MS.
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In continuing our investigations on tinctures, which represent both herbal drug preparations and herbal medicinal products, 40% and 60% v/v tinctures of artichoke and St. John's wort were investigated. Artichoke is largely used in hepatic disorders, while St. John's wort is an anti-inflammatory, antidepressant, and healing agent. Both herbal drugs contain various constituents, although the compounds responsible for the main effects have not yet been completely identified. However, caffeoylquinic acids and flavones seem to be of crucial importance for the activity of artichoke, as well as flavonoids, naphthodianthrones, and phloroglucinol derivatives for St. John's wort, and they are used as marker constituents. Thus, quantification of all these constituents was performed using high-performance liquid chromatography-diode array detection (HPLC-DAD) and HPLC--mass spectrometry (MS) analyses with rutin as external standard. In addition the stability of the constituents of these tinctures from accelerated and long-term testing was also evaluated. From the results it was evidenced that constituent content depends on the solvent used for the extraction. The stability was also shown to be very different and seems to be related to the water content of the tinctures.

16. Artichoke (Cynara scolymus L.) byproducts as a potential source of health-promoting antioxidant phenolics.
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The present study reports a fast, economical, and feasible way to extract antioxidant phenolics from artichoke byproducts: raw artichoke (RA), blanched (thermally treated) artichoke (BA), and artichoke blanching waters (ABW). These byproducts represent a huge amount of discarded material in some industries. Two protocols, with possible industrial applicability, based on both methanol and water extractions were used. Phenolic contents (expressed as caffeic acid derivatives) (grams per 100 g of dry extract) were 15.4 and 9.9 for RA when extracted with methanol and water, respectively; 24.3 and 10.3 for BA when extracted with methanol and water, respectively; and finally, 11.3 g of phenolics/100 mL of ABW. Therefore, methanol extracts yielded more phenolics than water extracts, especially when BA byproducts were used. The higher amount of phenolics in BA could be due to the inactivation of polyphenol oxidase (PPO) at the industrial scale (due to blanching process), avoiding PPO-catalyzed oxidation of these phenolics, a phenomenon that could occur in RA byproducts. Artichoke extracts from industrial byproducts showed a high free radical scavenging activity (versus both DPPH* and ABTS*+ radicals) as well as capacity to inhibit lipid peroxidation (ferric thiocyanate method). According to these results, the use of artichoke extracts from industrial byproducts as possible ingredients to functionalize foodstuffs (to decrease lipid peroxidation and to increase health-promoting properties) is suggested.

17. Hepatoprotective effects of Turkish folk remedies on experimental liver injury.
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Seven plants which are used in Turkish folk medicine were studied for possible hepatoprotective effects. These plants are Carduus acanthoides and C. nutans (Asteraceae), Cichorium intybus (Asteraceae), Fumaria asepalae and F. vailantii (Fumariaceae), Gentiana olivieri (Gentianaceae) and Plantago lanceolata (Plantaginaceae). Stems, bracts and receptaculum of Cynara scolymus were used as natural reference drugs. Effects of the ethanolic extracts were studied using the carbon tetrachloride-induced hepatotoxicity model in rats. The extracts of F. vailantii and G. olivieri significantly prevented the elevation of plasma and hepatic malondialdehyde formation (evidence of lipid peroxidation) as well as enzyme levels (AST and ALT) in acute liver injury, which might be ascribed to their potent hepatoprotective activity. Liver sections were also studied histopathologically to confirm the biochemical results.

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Extracts of selected medicinal plants were examined by electrospray mass spectrometry (ESI-MS). This technique allowed identification of the main components of each extract, thereby providing a typical finger-print of the examined plants. More specifically, anthocyanins (Vaccinium myrtillus), isoflavones (Glycine max, soybean), flavonol-glycosides and terpenes (Ginkgo biloba), triterpenes (Centella asiatica), caffeoyl-quinic acids (Cynara scolymus, artichoke), ginsenosides (Panax ginseng), catechins (Camellia sinensis, green tea) and flavones and flavanones (Propolis) were detected rapidly at levels in the range of 0.1-1 microg/ml, using 0.2-1 mg/ml of each medicinal plant extract.

19. [Pharmacological properties and therapeutic profile of artichoke (Cynara scolymus L.)]
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The results of several clinical investigations showed the efficacy and safety of artichoke extracts (Cynara scolymus L.) in the treatment of hepato-biliary dysfunction and digestive complaints, such as sensation of fullness, loss of appetite, nausea and abdominal pain. Moreover earlier findings on a lipidlowering and hepatoprotective effect may be confirmed. In-vitro and in-vivo it has been possible to evaluate the underlying pharmacological mechanisms. Flavonoids and caffeoylquinic acids are mainly responsible for the observed actions.

20. Inhibition of cholesterol biosynthesis in primary cultured rat hepatocytes by artichoke (Cynara scolymus L.) extracts.
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High-dose aqueous extracts from artichoke leaves were found to inhibit cholesterol biosynthesis from 14C-acetate in primary cultured rat hepatocytes in a concentration-dependent biphasic manner with moderate inhibition (approximately 20%) between 0.007 and 0.1 mg/ml and more strong inhibition at 1 mg/ml. Cytotoxic effects detected by lactate dehydrogenase leakage and the 3-[4, 5-dimethylthiazol-2-yl]-2,5-dphenyl tetrazolium bromide-assay were restricted to higher concentrations. Replacement of 14C-acetate by 14C-mevalonate largely omitted the inhibiting effect of artichoke extracts indicating an inhibition at the level of hydroxymethylglutaryl-CoA-reductase. However, no direct inhibition of this enzyme could be detected and no other
enzymic steps later in the biosynthetic pathway for cholesterol seemed to be affected. Instead, inhibition was found to occur in a time-dependent manner, to last for several hours even after washing out the extracts by fresh medium and to be fully reversible within 20 hr after removal of the extracts. In addition, the stimulation of HMGCoA-reductase activity by insulin was efficiently blocked by the extracts, although other insulin-dependent phenomena, such as increased lactate production, were not influenced. These results suggest an indirect modulation of hydroxymethylglutaryl-CoA-reductase activity as the most likely inhibitory mechanism of the artichoke extracts. Screening of several known constituents of artichoke extracts revealed that cynaroside and particularly its aglycone luteolin were mainly responsible for inhibition, whereas chlorogenic acid was much less effective and caffeic acid, cyanarin and other dicaffeoylquinic acids were without significant influence. Indeed, luteolin also efficiently blocked the insulin effect on cholesterol biosynthesis. In conclusion, these results demonstrate that artichoke extracts may inhibit hepatic cholesterol biosynthesis in an indirect but efficient manner and, thus, may contribute via this action to the recently confirmed hypolipidemic influence of this phytopharmacon in man.

21. Antioxidative and protective properties of extracts from leaves of the artichoke (Cynara scolymus L.) against hydroperoxide-induced oxidative stress in cultured rat hepatocytes.
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Primary rat hepatocyte cultures exposed to tert-butylhydroperoxide (t-BHP) or cumene hydroperoxide were used to assess the antioxidative and protective potential of water-soluble extracts of artichoke leaves. Both hydroperoxides stimulated the production of malondialdehyde (MDA), particularly when the cells were pretreated with diethylmaleate (DEM) in order to diminish the level of cellular glutathione (GSH). Addition of artichoke extracts did not affect basal MDA production, but prevented the hydroperoxide-induced increase of MDA formation in a concentration-dependent manner when presented simultaneously or prior to the peroxides. The effective concentrations (down to 0.001 mg/ml) were well below the cytotoxic levels of the extracts which started above 1 mg/ml. The protective potential assessed by the LDH leakage assay and the MTT assay closely paralleled the reduction in MDA production and largely prevented hepatocyte necrosis induced by the hydroperoxides. The artichoke extracts did not affect the cellular level of glutathione (GSH), but diminished the loss of total GSH and the cellular leakage of GSSG resulting from exposure to t-BHP. Chlorogenic acid and cyanarin accounted for only part of the antioxidative principle of the extracts which was resistant against tryptic digestion, boiling, acidification, and other treatments, but was slightly sensitive to alkalinization. These results demonstrate that artichoke extracts have a marked antioxidative and protective potential. Primary hepatocyte cultures seem suitable for identifying the constituents responsible for these effects and for elucidating their possible mode of action.

22. Inhibitory effect of taraxastane-type triterpenes on tumor promotion by 12-O-tetradecanoylphorbol-13-acetate in two-stage carcinogenesis in mouse skin.
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Two taraxastane-type hydroxy triterpenes, taraxasterol and faradiol, isolated from the flowers of Compositae plants Cynara scolymus (artichoke) and Chrysanthemum morifolium (chrysanthemum), respectively, showed strong inhibitory activity against 12-O-tetradecanoylphorbol-13-acetate (TPA)-induced inflammation in mice. At 2.0 mumol/mouse, these compounds inhibited
markedly the tumor-promoting effect of TPA (1 microgram/mouse) on skin tumor formation following initiation with 7,12-dimethylbenz[a]anthracene (50 micrograms/mouse).

23. Occupational contact urticaria syndrome caused by globe artichoke (Cynara scolymus).
Quirce S, Tabar AI, Olaguibel JM, Cuevas M.

24. [An experimental study of the effect of an artichoke preparation on the activity of the sympathetic-adrenal system in carbon disulfide exposure]
[Article in Bulgarian]
Khalkova Zh, Vangelova K, Zaikov Kh.

Artichoke, a new Bulgarian preparation based on the plant Cynara scolymus, was tested for influence on sympatho-adrenal system (SAS) activity in experimental inhalation exposure to carbon disulfide. This chronic (six-month) inhalation experiment was done on Wistar albino rats of either sex. Activity of SAS was assessed through excretion of noradrenalin and adrenalin. Findings indicated a phasic SAS response depending on concentration and duration of carbon disulfide exposure. With exposure to 30 mg.m³, SAS activity was observed to decrease in the second month, followed by increase in the fourth and sixth months. With exposure to 300 mg.m³, SAS activity was elevated over the whole period of study. Under the influence of the preparation artichoke at dosage 200 mg.kg⁻¹, catecholamines, increased by carbon disulfide exposure, returned to normal. This trend was more marked for noradrenalin.

25. [The action of the artichoke (Cynara scolymus) on the male gonads in an experiment]
[Article in Bulgarian]
Ilieva P, Khalkova Zh, Zaikov Kh, Kapurdov V, Ivanova-Chemishanska L.

The gonadotropic effect of the Bulgarian preparation artichoke, developed on the basis of Cynara scolymus is studied. The preparation is used under the form of 50% aque emulsion, stabilized by emulgent Twin-80, in doses 35.70 and 150 mg/kg⁻¹, 5 times weekly for 75 days. The evaluation is made on sexually mature white male rats Wistar, distributed into groups of 10. The results are compared with a control group. A complex of functional, quantitative morphological, classic histological tests are used, in compliance with the Bulgarian State Standards 15378-81. An electron microscopic study is performed. The 75-day introduction of artichoke [Cynara scolymus] in doses 35.70 and 150 mg/kg⁻¹ leads to no significant changes in the structure of the semen of white rats, established on cellular and subcellular level. The single deviations in the function of the spermatozoid and the morphology of the spermatogenic epithelium give no grounds for conclusion concerning an injury or stimulating effect of the preparation in the conditions of the experiment.

Hammouda FM, Seif el-Nasr MM, Shahat AA.
Pharmaceutical Sciences Division, National Research Centre, Dokki, Cairo, Egypt.

27. Pharmacological screening of plants recommended by folk medicine as anti-snake venom--I. Analgesic and anti-inflammatory activities.
We have observed that several plants used popularly as anti-snake venom show anti-inflammatory activity. From the list prepared by Rizzini, Mors and Pereira some species have been selected and tested for analgesic activity (number of contortions) and anti-inflammatory activity (Evans blue dye diffusion--1% solution) according to Whittle's technique (intraperitoneal administration of 0.1 N-acetic acid 0.1 ml/10 g) in mice. Previous oral administration of a 10% infusion (dry plant) or 20% (fresh plant) corresponding to 1 or 2 g/kg of Apuleia leioarpa, Casearia sylvestris, Brunfelsia uniflora, Chiococca brachiata, Cynara scolymus, Dorstenia brasiliensis, Elephantopus scaber, Marsypianthes chamaedrys, Mikania glomerata and Triasosperma tayuya demonstrated analgesic and/or anti-inflammatory activities of varied intensity.

28. [Polyphenolic substances of Cynara scolymus L. leaves]
[Article in French]
Hinou J, Harvala C, Philianos S.

From the leaves of Cynara scolymus the following substances where isolated: apigenin, luteolin, luteolin-4'-glucoside, cynaroside, scolimoside, cosmoside, quercetin, rutin, chlorogenic acid, caffeic acid, isochlorogenic acid, luteolin-7-gentiobioside, along with the more uncommon scopoletin, hesperitin, hesperidoside, esculetin-6-O-beta-glucoside; more over maritimein was for the first time isolated and identified in the genus.

29. Hepatoprotective activity of polyphenolic compounds from Cynara scolymus against CCl4 toxicity in isolated rat hepatocytes.
Adzet T, Camarasa J, Laguna JC.

Departamento de Farmacognosia y Farmacodinamia, Facultad de Farmacia, Nucleo Universitario de Pedralbes, Barcelona, Spain.

The hepatoprotective activity against CCl4 toxicity in isolated rat hepatocytes of some polyphenolic compounds, such as cyanarin, isochlorogenic acid, chlorogenic acid, luteolin-7-glucoside, and two organic acids, caffeic and quinic, from Cynara scolymus, is tested. Only cyanarin and, to a lesser extent, caffeic acid showed cytoprotective action. The possible relationship between the molecular structure and the protective effect found is discussed.

30. Allergic contact dermatitis from artichoke, Cynara scolymus.
Meding B.

31. Inefficiency of cynarin as therapeutic regimen in familial type II hyperlipoproteinaemia.
Heckers H, Dittmar K, Schmahal FW, Huth K.

Seventeen ambulant outpatients with familial Type IIa or Type IIb hyperlipoproteinaemia were treated with Cynarin, the 1,5-dicaffeyl ester of quinic acid, the constituent of the artichoke (Cynara scolymus). The dose tested was 250 mg and 750 mg daily. The mean serum cholesterol and triglyceride concentrations were not significantly changed within 3 months. Cynarin, administered per os, has no hypolipidaemic effect in familial Type II hyperlipoproteinaemia.
32. [Organic acids, principally acid-alcohols, in Cynara scolymus L. (Compositae)]
[Article in French]
Bogaert JP, Mortier F, Jouany JM, Pelt JM, Delaveau P.

33. [Effect of Cynara scolymus-extracts on the regeneration of rat liver. 2]
[Article in German]
Maros T, Seres-Sturm L, Racz G, Rettegi C, Kovacs VV, Hints M.

34. [Effects of Cynara Scolymus extracts on the regeneration of rat liver. 1.]
[Article in German]
Maros T, Racz G, Katonai B, Kovacs VV.

35. [Quantitative analysis of cynarin in the leaves of the artichoke (Cynara scolymus L.)]
[Article in Ukrainian]
Dranik LI.

36. [ON POLYPHENOL COMPOUNDS OF ARTICHOKE (CYNARA SCOLYMUS L.)]
[Article in Russian]
DRANIK LI, CHERNOBAI VT, KOLESNIKOV DG.

37. [Effect of the atherogenic diet and Cynara scolymus L, and Cynara cardunculus L. on the histopathological picture of the coronary vessels and myocardium in rats]
[Article in Polish]
SAMOCHOWIEC L, HABCZYNSKA D, WAZNA-BOGUNSKA C.

38. [Further studies on anti-arteriosclerotic properties of Cynara scolymus L and Cynara cardunculus L.]
[Article in Polish]
SAMOCHOWIEC L.

39. The artichoke (Cynara scolymus) from antiquity to the present day.
ROCCHIETTA S.

40. [Pharmaceutical and therapeutic history of the artichoke (Cynara scolymus L.) from antiquity to the present time.]
[Article in Italian]
ROCCHIETTA S.
41. [Note on the bacteriostatic action of "Cynara scolymus L."]
[Article in Spanish]
BURGUENO CELA A.

42. [Action of an extract of artichoke (Cynara scolymus) on cholesterolesterase in vitro]
[Article in Undetermined Language]
DEL VECCHIO A.

43. Traditional medicine in health care.
Sayed MD.

The state of research on plants used in traditional medicine and its development in Egypt is indicated by the number of scientific institutions devoted to this problem: Universities, the National Research Centre, the Desert Institute and the Horticulture Department of the Ministry of Agriculture. Moreover, the use of certain medicinal plants has been "industrialised", e.g., Ammi visnaga, Cymbopogon proximus, Nigella sativa and Aloe vera. Other plants are under investigation: Urginea maritima, Phytolacca americana and Euphorbia sp. (known for its claimed antitumour properties), Glycyrrhiza glabra, Cynara scolymus and Solanum laciniatum.