Coagulanolide, a withanolide from *Withania coagulans* Dunal fruits and antihyperglycemic activity

Scientists at Central Drug Research Institute, CSIR, Lucknow, India isolated a new withanolide, named coagulanolide along with four known withanolides from ***Withania coagulans* Dunal** (Indian Rennet) fruits and their structures were elucidated by spectroscopic techniques. The compounds showed significant inhibition on postprandial rise in hyperglycemia post-sucrose load in normoglycemic rats as well as streptozotocin-induced diabetic rats. The results provide further support to explain the traditional use of ***W. coagulans*** as antihyperglycemic cum antidyslipidemic agent by the traditional medical practitioners [Maurya Rakesh, Akanksha, Jayendra, Singh Amar B and Srivastava Arvind K, Coagulanolide, a withanolide from *Withania coagulans* fruits and antihyperglycemic activity, *Bioorg Med Chem Lett*, 2008, **18** (24), 6534-6537].

Hepatoprotective role and antioxidant capacity of pomegranate flowers

Scientists at Department of Biology, Science and Letters Faculty and Faculty of Arts and Sciences, Yuzuncu Yil University, Van, Turkey designed their study to investigate the protective and antioxidant properties of pomegranate flowers, ***Punica granatum* Linn.** (PG) beverage against trichloroacetic acid (TCA)-exposure in rats. The hepatopreventive and antioxidant potential of the plant's infusion was evaluated by measuring level of serum enzymes, antioxidant defense systems (ADS) and lipid peroxidation content in various organs of rats. Three experimental groups: A (untreated=control), B (only TCA-treated) and C (TCA+PG treated). According to the results, while the levels of AST and ALT increased significantly in B groups' they decreased significantly in the C groups'. LDH and CK did not change significantly in B groups' whereas decreased significantly in the C groups'. Liver, brain, kidney and heart tissues MDA content significantly increased in B groups', whereas no significant changes were observed in the C groups'. On the other hand, SOD decreased significantly in liver of the B group but did not change significantly in the C groups'. GST activity increased significantly in liver, brain and spleen of C group while significant decrease was observed for kidney as compared to those of control. Hence, the study reveals that constituents present in PG impart protection against carcinogenic chemical induced oxidative injury that may result in development of cancer during the period of a 52-day protective exposure [Celik Ismail, Temur Atilla and Isik Ismail, Hepatoprotective role and antioxidant capacity of pomegranate (*Punica granatum*) flowers infusion against trichloroacetic acid-exposed in rats, *Food Chem Toxicol*, 2009, **47** (1), 145-149].

Myo- and hepatotoxic effects of cultivated mushrooms in mice

Mushrooms are currently examined for their potential as functional foods. At the same time, novel types of mushroom intoxications, such as rhabdomyolysis after prolonged consumption, have been described in edible species. The aim of the study done by scientists at Finland was to perform an acute toxicity test to establish if the most commonly cultivated species would have myo- or hepatotoxic effects. Mice (n=6/group) were exposed to 3, 6 or 9g *Agaricus bisporus, Lentinus edodes* or *Pleurotus ostreatus* /kg body mass/d for 5d with 6 controls. Food and water intakes, plasma clinical chemistry and liver and muscle histology were evaluated. While *A. bisporus*

caused significantly increased plasma bilirubin concentrations, *L. edodes* elicited also increased plasma creatine kinase activities at 9g/kg/d. *P. ostreatus* decreased dramatically the food intake but increased the water intake and caused significantly increased plasma alanine aminotransferase activities at 9g/kg/d. While there were no pathological findings in the histological samples, it seems that the doses and time periods required for the potential benefits of mushroom consumption to appear are similar to those causing undesirable effects. This should be taken into consideration if mushrooms are to be used as functional foods [Nieminen Petteri, Kärjä Vesa and Mustonen Anne-Mari, Myo- and hepatotoxic effects of cultivated mushrooms in mice, *Food Chem Toxicol*, 2009, **47** (1), 70-74].

Antidiabetic effect of *Punica granatum* Linn. flowers

Researchers at Faculty of Pharmacy, Jamia Hamdard (Hamdard University), New Delhi, India investigated the effects of ***Punica granatum* Linn.** (Pomegranate) flowers aqueous extract (PgAq) on streptozotocin (STZ) induced diabetic rats by measuring fasting blood glucose, lipid profiles (atherogenic index), lipid peroxidation (LPO) and activities of both non-enzymatic and enzymatic antioxidants. Diabetes was induced by single intraperitoneal injection of STZ (60mg/kg) to albino Wistar rats. The increase in blood glucose level, total cholesterol (TC), triglycerides (TG), low-density lipoprotein cholesterol (LDL-C), very low density lipoprotein (VLDL), LPO level with decrease in high density lipoprotein cholesterol (HDL-C), reduced glutathione (GSH) content and antioxidant enzymes namely, glutathione peroxidase (GPx), glutathione reductase (GR), glutathione-*S*-transferase (GST), superoxide dismutase (SOD) and catalase (CAT) were the salient features observed in diabetic rats. On the other hand, oral administration of PgAq at doses of 250mg/kg and 500mg/kg for 21 days resulted in a significant reduction in fasting blood glucose, TC, TG, LDL-C, VLDL-C and tissue LPO levels coupled with elevation of HDL-C, GSH content and antioxidant enzymes in comparison with diabetic control group. The results suggest that pomegranate could be used, as a dietary supplement, in the treatment of chronic diseases characterized by atherogenous lipoprotein profile, aggravated antioxidant status and impaired glucose metabolism and also in their prevention [Bagri Priyanka, Ali Mohd, Aeri Vidhu, Bhowmik Malay and Sultana Shahnaz, Antidiabetic effect of *Punica granatum* flowers: Effect on hyperlipidemia, pancreatic cells lipid peroxidation and antioxidant enzymes in experimental diabetes, *Food Chem Toxicol*, 2009, **47** (1), 50-54].

Inhibition of 11β-hydroxysteroid dehydrogenase type 1 by plant extracts used as traditional antidiabetic medicines

The use of medicinal plants in the treatment of diabetes is an old practice. Recently, herbal remedies gained much attraction for the treatment of various metabolic diseases, including diabetes, adiposity and cardiovascular complications, due to the limitations of chemotherapeutic agents because of side effects and high rates of secondary failure. Elevated glucocorticoids are a key risk factor for metabolic diseases, and the glucocorticoid-activating enzyme 11β-hydroxysteroid dehydrogenase 1 (11β-HSD1) represents a promising therapeutic target. Scientists at Switzerland and Austria measured the potential of six traditional antidiabetic medicinal plants extracts to inhibit 11β-HSD1 activity and glucocorticoid receptor (GR) activation in transfected HEK-293 cells. The aim of their study was to test whether some of the selected plant extracts, which are endowed with beneficial effects on diabetes, including a reduction of blood glucose and improved insulin sensitivity, exhibit anti-glucocorticoid effects. Leaf extracts of ***Eriobotrya japonica* Lindl.**

(Loquat) preferentially inhibited 11β-HSD1 over 11β-HSD2. Extracts of roasted but not native coffee beans preferentially inhibited 11β-HSD1 over 11β-HSD2, emphasizing the importance of sample preparation. Thus, natural compounds inhibiting 11β-HSD1 may contribute to the antidiabetic effect of the

Eriobotrya japonica

investigated plant extracts [Gumy Christel, Thurnbichler Carmen, Aubry Evelyne M, Balazs Zoltan, Pfisterer Petra, Baumgartner Lisa, Stuppner Hermann, Odermatt Alex and Rollinger Judith M, Inhibition of 11β-hydroxysteroid dehydrogenase type 1 by plant extracts used as traditional antidiabetic medicines, *Fitoterapia*, 2009, **80** (3), 200-205].

Anti-tumour promoters phenolics and triterpenoid from *Hippophae rhamnoides* Linn.

The chemoprevention of cancer is an urgent priority in the field of public health. Previous studies have confirmed that constituents from natural sources inhibit tumour promotion by 12-*O*-tetradecanoylphorbol-13-acetate (TPA) in two-stage carcinogenesis in mouse skin. Seabuckthorn, ***Hippophae rhamnoides*** **Linn.** (Family—Elaeagnaceae) is used in different parts of the world for its nutritional properties, and has been used as a traditional medicine for the treatment of cough, indigestion and blood stasis in China. Thus, scientists at College of Pharmacy, Nihon University, Chiba, Japan conducted a study on this plant and found that 70%

ethanol extract of the branches of ***H. rhamnoides*** exhibited remarkable antitumour activity in an *in vivo* two-stage carcinogenesis test in mice using 7,12-dimethylbenz[*a*]anthracene as an initiator and 12-*O* tetradecanoylphorbol-13-acetate as a promoter. From the active fraction of the 70% ethanol extract, three phenolic compounds, (+)-catechin (1), (+)-gallocatechin (2), and (−)-epigallocatechin (3) and a triterpenoid, ursolic acid (4) were isolated and identified. These compounds were evaluated for their inhibitory effects on TPA-induced inflammation (1µg/ear) in mice. Within the tested compounds, 3 and 4 showed marked anti-inflammatory effects, with a 50% inhibitory dose of 1.7 and 0.2µmol/ear [Yasukawa Ken, Kitanaka Susumu, Kawata Kenji and Goto Kumiko, Anti-tumor promoters phenolics and triterpenoid from *Hippophae rhamnoides*, *Fitoterapia*, 2009, **80** (3), 164-167].

Thyroid inhibitory, antiperoxidative and hypoglycemic effects of stigmasterol isolated from *Butea monosperma* (Lam.) Kuntze

Butea monosperma **(Lam.) Kuntze** (Flame of the forest) of family Fabaceae is a native to tropical South Asia. Its reported pharmacological properties include anticonvulsive, fertility inhibiting, hepatoprotective, free radical scavenging, wound healing, antimicrobial, antidiabetic and antiinflammatory activities. Stigmasterol, isolated from the

bark of ***B. monosperma*** was evaluated for its thyroid hormone and glucose regulatory efficacy in mice by scientists at India. Its administration at 2.6mg/kg/d for 20 days reduced serum triiodothyronine (T_3), thyroxin (T_4) and glucose concentrations as well as the activity of hepatic glucose-6-phophatase (G-6-Pase) with a concomitant increase in insulin indicating its thyroid inhibiting and hypoglycemic properties. A decrease in the hepatic lipid peroxidation (LPO) and an

increase in the activities of catalase (CAT), superoxide dismutase (SOD) and glutathione (GSH) suggested its antioxidative potential. The highest concentration tested (5.2mg/kg) evoked pro-oxidative activity. In conclusion the findings reveal the hitherto unknown thyroid inhibitory and insulin stimulatory nature of stigmasterol, isolated from ***B. monosperma*** and suggest its anti-diabetic and antiperoxidative properties [Panda S, Jafri M, Kar A and Meheta BK, Thyroid inhibitory, antiperoxidative and hypoglycemic effects of stigmasterol isolated from *Butea monosperma*, *Fitoterapia*, 2009, **80** (2), 123-126].

Modulation of human neutrophil functions by Tamarind pulp extract

The tamarind (***Tamarindus indica* Linn.**) is indigenous to Asian countries and widely cultivated in the American continents. The tamarind fruit pulp extract (ExT), traditionally used in spices, food components and juices, is rich in polyphenols that have demonstrated anti-atherosclerotic, antioxidant and immunomodulatory activities. Scientists at Brazil evaluated the modulator effect of a crude hydroalcoholic ExT on some peripheral human neutrophil functions. The neutrophil reactive oxygen species generation, triggered by opsonized zymosan (OZ), *n*-formyl-methionyl-leucyl-phenylalanine (fMLP) or phorbol myristate acetate (PMA), and assessed by luminol- and lucigenin-enhanced chemiluminescence

(LumCL and LucCL, respectively), was inhibited by ExT in a concentration-dependent manner. ExT was a more effective inhibitor of the PMA-stimulated neutrophil function [IC_{50} (in µg/10^6cells) = 115.7±9.7 (LumCL) and 174.5±25.9 (LucCL)], than the OZ-[IC_{50} = 248.5±23.1 (LumCL) and 324.1±34.6 (LucCL)] or fMLP-stimulated cells [IC_{50} = 178.5±12.2 (LumCL)]. The ExT also inhibited neutrophil NADPH oxidase activity (evaluated by O_2 consumption), degranulation and elastase activity (evaluated by spectrophotometric methods) at concentrations higher than 200µg/10^6 cells, without being toxic to the cells, under the conditions assessed. Together, these results indicate the potential of ExT as a source of compounds that can modulate the neutrophil-mediated inflammatory diseases [Paula Fabiana S, Kabeya Luciana M, Kanashiro Alexandre, de Figueiredo Andréa SG, Azzolini Ana Elisa CS, Uyemura Sérgio A and Lucisano-Valim Yara Maria, Modulation of human neutrophil oxidative metabolism and degranulation by extract of *Tamarindus indica* L. fruit pulp, *Food Chem Toxicol*, 2009, **47** (1), 163-170].

Feeding trial of instant food containing lyophilised yam powder in hypertensive subjects

The yam tuber storage protein dioscorin has shown antihypertensive effects on spontaneously hypertensive rats. In view of this report the scientists at Taipei Medical University, Taipei, Taiwan evaluated and compared the effects of packets of instant food (30g) with (treated meal) and without (placebo) lyophilised yam powder on hypertensive subjects. A placebo-controlled feeding trial was conducted daily for 5 weeks (stage 1), followed by a 1 week washout and then a 5 week crossover (stage 2). Twenty-one subjects finished the trial. One packet of treated meal contained 140 ± 2.54mg of dioscorin according to enzyme-linked immunosorbent assay. The blood pressure results of the treated meal and placebo groups at stage 1 end *versus* originals, but not at stage 2 end *versus* stage 2 beginning, were significantly different by the paired *t* test. Systolic (SBP) and diastolic (DBP) blood pressure readings after treated meal intervention, but not after placebo intervention, differed significantly from the original values based on one-way analysis of variance followed by the *post hoc* Tukey test; the reductions in SBP and DBP were 6.52 and 4.76 mmHg, respectively. The feeding trial did not appear to affect serum lipid profiles or other biochemical measurements of cardiovascular risk. Intake of an instant food containing 140mg of dioscorin over 5 weeks had a regulating effect on human blood pressure [Liu Der-Zen, Liang Hong-Jen , Han Chuan-Hsiao, Lin Shyr-Yi, Chen Ching-Tan, Fan Mike and Hou Wen-Chi , Feeding trial of instant food containing lyophilised yam powder in hypertensive subjects, *J Sci Food Agric*, 2009, **89**(1), 138-143].

Protective role of *Andrographis paniculata* Nees and vitamin E

Mitochondria are the crossroads of several crucial cellular activities; they produce considerable quantities of superoxide radical and hydrogen peroxide, which can damage important macromolecules. Nicotine affects a variety of cellular processes, from induction of gene expression to modulation of enzymatic activities. The scientists at Kolkata elucidated the protective effects of andrographolide (ANDRO) aqueous extract (AE-Ap) of ***Andrographis paniculata*** **Nees** and vitamin E on nicotine-induced brain mitochondria. In this investigation, nicotine (1mg/kg body mass/day) was treated, for the period of 7days, simultaneously with 2 ***A. paniculata*** products, ANDRO and AE-Ap (250mg/kg body mass/day) and vitamin E (50mg/·kg body mass/day) was supplemented in different group of male Wistar rats. The activities of mitochondrial electron transport chain (Mito-ETC) complexes (I, II, III), nitric oxide production, superoxide anion, catalase, glutathione reductase, glutathione peroxidase, glutathione-*S*-transferase and concentrations of reduced glutathione and oxidized glutathione were measured in discrete regions of brain (the cerebral hemisphere, cerebellum, diencephalons, and brain stem). The study revealed that nicotine inhibits the Mito-ETC complexes and produces nitric oxide, which suppressed the mitochondrial oxidative stress scavenger system in different brain regions. In these circumstances, lipid peroxidation and protein oxidation were noted in different discrete regions of brain mitochondria. ANDRO, AE-Ap, and vitamin E showed the protective potentiality against nicotine toxicity. The analysis of such alterations is important in determining the basis of normal dysfunction in the brain associated with nicotine toxicity, which could be ameliorated by ***A. paniculata*** and vitamin E, and may help to develop therapeutic means against nicotine-induced disorders [Das Subhasis, Gautam N, Sankar Kumar Dey, Tarasankar Maiti and Somenath Roy, Oxidative stress in the brain of nicotine-induced toxicity: protective role of *Andrographis paniculata* Nees and vitamin E, *Appl Physiol Nutr Metab*, 2009, **34**(2), 124-135].

Efficacy of an aqueous *Pelargonium sidoides* DC. extract against herpes virus

The scientists at Germany analysed the compounds of an aqueous root extract of the African medicinal plant ***Pelargonium sidoides* DC.** by LC-MS spectroscopy and examined the antiviral effect of this extract against herpes simplex virus in cell culture. Besides predominant coumarins, simple phenolic structures as well as flavonoid and catechin derivatives were identified as major constituents in the Pelargonium extract. The inhibitory activity of this extract against herpes simplex virus type 1 (HSV-1) and herpes simplex virus type 2 (HSV-2) was tested *in vitro* on RC-37 cells using a plaque reduction assay and exhibited high antiviral activity against both herpes viruses in viral suspension tests. The 50% inhibitory concentration (IC_{50}) of the aqueous ***P. sidoides*** extract for herpes simplex virus plaque formation was determined at 0.00006% and 0.000005% for HSV-1 and HSV-2, respectively. At maximum non-cytotoxic concentrations of the extract, plaque formation was significantly reduced by more than 99.9% for HSV-1 and HSV-2 and a clear concentration-dependent antiviral activity against HSV could be demonstrated for this extract. In order to determine the mode of antiviral action, the extract was added at different times to the cells or viruses during the infection cycle. Both herpes viruses were significantly inhibited when pretreated with the plant extract or when the extract was added during the adsorption phase, whereas acyclovir demonstrated antiviral activity only intracellularly during replication of HSV. These results indicate that ***P. sidoides*** extract affected the virus before penetration into the host cell and reveals a different mode of action when compared to the classical drug acyclovir. Hence, this extract is capable of exerting an antiviral effect on herpes simplex virus and might be suitable for topical therapeutic use as antiviral drug both in labial and genital herpes infection [Schnitzler P, Schneider S, Stintzing FC, Carle R and Reichling J, Efficacy of an aqueous *Pelargonium sidoides* extract against herpes virus, *Phytomedicine*, 2008, **15**(12), 1108-1116].

Antiradical potential of *Calluna vulgaris* (Linn.) Hull

Antioxidant capacity of the chloroform, ethyl acetate, *n*-butanol and water fractions of the aerial parts of ***Calluna vulgaris* (Linn.) Hull** (Family-Ericaceae) was assessed by the scientists at Turkey. Antioxidant capacity of the plant was screened by assays of 2, 2-diphenyl-β-picrylhydrazyl, superoxide anion and hydrogen peroxide scavenging, metal-chelating activity and reducing power. Butylated hydroxyanisole and ethylene diamine tetraacetic acid were used as reference in the assay of metal-chelating activity. Total phenolic contents of the fractions were determined by the Folin-Ciocalteu method. Liquid chromatography/diode array detection/ mass spectrometry was used for phytochemical identification of the fractions. Kaempferol-3-*O*-β-D-galactoside was found to be the major constituent in the ethyl acetate fraction (37.1 ± 0.9%), followed by the *n*-butanol fraction (4.6 ± 0.1%). High occurrence of antioxidant capacity, with the exception of metal-chelating activity, was observed in the ethyl acetate and chloroform fractions as well as in kaempferol-3-*O*-β-D-galactoside of ***C. vulgaris*.** The major flavonoid, kaempferol-3-*O*-β-D-galactoside of this species shown high antioxidant capacity in various assays. As far as is known, this is the first report on antioxidant capacity of ***C. vulgaris*** and its major flavonoid [Deliorman-orhan Didem Senol Sezer, Kartal Murat and Orhan Ilkay, Assessment of antiradical potential of *Calluna vulgaris* (Linn.) Hull and its major flavonoid, *J Sci Food Agric*, 2009, **89** (5), 809-814].

Effects of the active constituents of saffron, crocins, in an animal model of anxiety

Saffron, ***Crocus sativus* Linn.** is a plant cultivated in various parts of the world and crocins, obtained from this plant is among its active components. The scientists at Greece investigated its effects in the rat whether or not crocins possess anxiolytic properties. During experiment the light/dark test was selected. Either crocins, at a dose which did not influence animals' motor activity (50mg/kg) or diazepam (1.5mg/kg), significantly increased the latency to enter the dark compartment and prolonged the time spent in the lit chamber in the rats. Conversely, lower doses of crocins (15-30mg/kg) did not substantially modify animals' behaviour. The present results indicate that treatment with these active constituents of saffron induce anxiolytic-like effects in the rat [Pitsikas N, Boultadakis A, Georgiadou G, Tarantilis PA and Sakellaridis N, Effects of the active constituents of *Crocus sativus* L., crocins, in an animal model of anxiety, *Phytomedicine*, 2008, **15**(12), 1135-1139].

Safety evaluation of saffron tablets in healthy volunteers

Saffron (***Crocus sativus* Linn.**) stigma tablets were evaluated for short-term safety and tolerability in healthy adult volunteers. The study was a double-blind, placebo-controlled design consisting of a 1 week treatment of saffron tablets. Volunteers were divided into 3 groups of 10 each (5 males and 5 females). Group I received placebo; groups 2 and 3 received 200 and 400mg saffron tablets, respectively, for 7 days. General measures of health were recorded during the study such as haematological, biochemical and electrocardiographic parameters done in pre- and post-treatment periods. Clinical examination showed no gross changes in all volunteers after intervention. Saffron with higher dose (400mg) decreased standing systolic blood pressure and mean arterial pressures significantly. Saffron decreased slightly some haematological parameters such as red blood cells, hemoglobin, hematocrit and platelets. Saffron increased sodium, blood urea nitrogen and creatinine. The study conclude that saffron tablets may change some haematological and biochemical parameters. However, these alterations were in normal ranges and they were not important clinically [Modaghegh Mohammad-Hadi, Shahabian Masoud, Esmaeili Habib-Allah, Rajbai Omid and Hosseinzadeh Hossein, Safety evaluation of saffron (*Crocus sativus*) tablets in healthy volunteers, *Phytomedicine*, 2008, **15**(12), 1032-1037].

Evaluation of hepatoprotective activity of *Cleome viscosa* Linn. extract

The scientists at Dr. H. S. Gour Vishwavidyalaya, Sagar, MP, India evaluated the hepatoprotective activity of ethanolic extract of ***Cleome viscosa* Linn.** against carbon tetrachloride (CCI_4) induced hepatotoxicity in experimental animal models (rats). Leaf powder of the plant was extracted with ethanol. Various biochemical parameters were estimated and histopathological studies were also performed on rat liver. The hepatoprotective activity was also supported by determining a functional parameter, i.e. thiopental-induced sleep of mice poisoned with CCl_4. The test material was found effective as hepatoprotective, through *in vivo* and histopathological studies. The extract was found to be effective in shortening the thiopental induced sleep in mice poisoned with CCl_4. The effect of ethanolic extract was comparable to that of silymarin, a standard hepatoprotective agent [Gupta Nishant Kumar and Dixit Vinod Kumar, Evaluation of hepatoprotective activity of *Cleome viscosa* Linn. extract, *Indian J Pharmacol,* 2009, **41**(1), 36-40].

Hypoglycaemic activity of a novel anthocyanin-rich formulation from lowbush Blueberry

Blueberry (***Vaccinium angustifolium* Aiton**) fruits are known as a rich source of anthocyanin components. The scientists at USA demonstrated that anthocyanins from blueberry have the potency to alleviate symptoms of hyperglycemia in diabetic C57b1/6J mice. The anti-diabetic activity of different anthocyanin-related extracts was evaluated using the pharmaceutically acceptable self-microemulsifying drug delivery system: Labrasol. Treatment by gavage (500mg/kg body wt.) with a phenolic-rich extract and an anthocyanin-enriched fraction formulated with Labrasol lowered elevated blood glucose levels by 33 and 51%, respectively. The hypoglycaemic activities of these formulae were comparable to that of the known anti-diabetic drug metformin (27% at 300mg/kg). The extracts were not significantly hypoglycaemic when administered without Labrasol, demonstrating its bio-enhancing effect, most likely due to increasing the bioavailability of the administered preparations. The phenolic-rich extract contained 287.0±9.7mg/g anthocyanins, while the anthocyanin-enriched fraction contained 595±20.0mg/g (cyanidin-3-glucoside equivalents), as measured by HPLC and *p*H differential analysis methods. The greater hypoglycaemic activity of the anthocyanin-enriched fraction compared to the initial phenolic-rich extract suggested that the activity was due to the anthocyanin components. Treatment by gavage (300mg/kg) with the pure anthocyanins, delphinidin-3-*O*-glucoside and malvidin-3-*O*-glucoside, formulated with Labrasol, showed that malvidin-3-*O*-glucoside was significantly hypoglycaemic while delphinidin-3-*O*-glucoside was not [Grace Mary H, Ribnicky David M, Kuhn Peter, Poulev Alexander, Logendra Sithes, Yousef Gad G, Raskin Ilya and Lila Mary Ann, Hypoglycemic activity of a novel anthocyanin-rich formulation from lowbush blueberry, *Vaccinium angustifolium* Aiton, *Phytomedicine*, 2009, **16**(5), 406-415].

Novel hypoglycaemic effects of *Ganoderma lucidum* (Curtis) P. Karst water-extract

The scientists at Hong Kong, China evaluated pharmacological effects of ***Ganoderma lucidum* (Curtis) P. Karst** (water-extract) (0.003, 0.03 and 0.3g/kg, 4-weeks, oral gavage) consumption using the lean (+*db*/+*m*) and the obese/diabetic (+*db*/+*db*) mice. Different physiological parameters (plasma glucose and insulin levels, lipoproteins-cholesterol levels, phosphoenolpyruvate carboxykinase (PEPCK), 3-hydroxy-3-methylglutaryl coenzyme A reductase (HMG CoA reductase) and isolated aorta relaxation of both species were measured and compared. ***G. lucidum*** (0.03 and 0.3g/kg) lowered the serum glucose level in +*db*/+*db* mice after the first week of treatment whereas a reduction was observed in +*db*/+*m* mice only fed with 0.3g/kg of this mushroom at the fourth week. A higher hepatic PEPCK gene expression was found in +*db*/+*db* mice. ***G. lucidum*** (0.03 and 0.3g/kg) markedly reduced the PEPCK expression in +*db*/+*db* mice whereas the expression of PEPCK was attenuated in +*db*/+*m* mice (0.3g/kg ***G. lucidum***). HMG CoA reductase protein expression (in both hepatic and extra-hepatic organs) and the serum insulin level were not altered by ***G. lucidum***. These data demonstrate that consumption of this mushroom can provide beneficial effects in treating type 2 diabetes mellitus (T2DM) by lowering the serum glucose levels through the suppression of the hepatic PEPCK gene expression [Seto SW, Lam TY, Tam HL, Au ALS, Chan SW, Wu JH, Yu PHF, Leung GPH, Ngai SM, Yeung JHK, Leung PS, Lee SMY and Kwan YW, Novel hypoglycaemic effects of *Ganoderma lucidum* water-extract in obese/diabetic (+*db*/+*db*) mice, *Phytomedicine*, 2009, **16**(5), 426-436].

Effects of cocoa extract containing polyphenols and methylxanthines on biochemical parameters of obese-diabetic rats

It is known that cocoa extract possesses hypoglycaemic and hypocholesterolaemic properties in streptozotocin-induced diabetic rats. However, there has been limited research on the effects of cocoa extract on obese-diabetic (Ob-db) rats that mimic human diabetes syndrome. Hence, the scientists at Malaysia initiated a study to determine the effect of cocoa extract containing polyphenols and methylxanthines on several biochemical parameters, namely glucose level, insulin sensitivity and lipid profiles of Ob-db rats.

Intake of cocoa extract supplemented with polyphenols (2.17 mg epicatechin, 1.52 mg catechin, 0.25 mg dimer and 0.13 mg trimer/g cocoa extract) and methylxanthines (3.55 mg caffeine and 2.22 mg theobromine/g cocoa extract) for 4 weeks significantly ($P < 0.05$) reduced the plasma total cholesterol, triglycerides and low-density lipoprotein cholesterol of obese-diabetic rats (Ob-db + cocoa) compared with non-supplemented animals (Ob-db). Short-term (acute) supplementation of cocoa extract significantly ($P < 0.05$) reduced the plasma glucose level at 60 and 90 min compared with untreated rats as assessed by the oral glucose tolerance test. However, no significant differences were observed in plasma glucose level, insulin level and insulin sensitivity after chronic (4 weeks) cocoa extract supplementation. The results of this study suggest that cocoa extract possesses hypocholesterolaemic properties and can exert a transient glucose-lowering effect but not long-term glucose control [Jalil Abbe Maleyki Mhd, Ismail Amin, Chong Pei Pei, Hamid Muhajir and Kamaruddin Syed Hasbullah Syed, Effects of cocoa extract containing polyphenols and methylxanthines on biochemical parameters of obese-diabetic rats, *J Sci Food Agric,* 2009, **89**(1),130-137].

Serum lipid responses to psyllium fibre

Cardiovascular disease is the leading cause of death in women and men. Psyllium, a soluble fibre has been known to reduce serum lipids. The scientists at USA evaluated (pilot study) whether menopausal status would affect the serum lipid responses to psyllium fibre in women. Eleven post-menopausal and eight pre-menopausal women with serum total cholesterol >200 mg/dl were included in the study. Subjects consumed their habitual diet and 15 g psyllium/d for 6 weeks. Psyllium was incorporated into cookies. Each cookie contained ≈5 g of psyllium fibre. Subjects ate one cookie in each meal. With psyllium fibre, total cholesterol concentration was significantly lower (≈5.2%, $P < 0.05$) in post-menopausal women but not in pre-menopausal women (≈1.3%). Also, there was a significant decrease in HDL-cholesterol in post-menopausal women (≈10.2%, $P < 0.05$). There were no significant changes observed in concentrations of LDL-cholesterol, triglycerides, apolipoprotein A1, and apolipoprotein B in both pre- and post-menopausal women with psyllium. Thus, post- and pre-menopausal, hypercholesterolemic women responded differently to psyllium fibre supplementation. Post-menopausal women would benefit from addition of psyllium to their diets in reducing the risk for heart diseases [Ganji Vijay and Kuo Jennifer, Serum lipid responses to psyllium fibre: differences between pre- and post-menopausal, hypercholesterolemic women, *Nutr J,* 2008, **7**, 1-5].

Effects of extracts and neferine from the embryo of *Nelumbo nucifera* seeds on the central nervous system

The effects of embryos of the seeds of ***Nelumbo nucifera* Gaertn.** on the central nervous system of mice were studied by the researchers at Japan. MeOH extracts of embryos of seeds significantly inhibited locomotor activity in mice. The MeOH extract was successively partitioned between H_2O and *n*-hexane, between H_2O and $CHCl_3$ and between H_2O and *n*-BuOH. $CHCl_3$ extracts strongly inhibited locomotor activity in mice, although other extracts had no effect

on locomotor activity. The main alkaloid of $CHCl_3$ extracts, neferine, dose-dependently inhibited locomotor activity in mice. Neferine induced hypothermia in mice and apparently potentiated thiopental-induced sleeping time. An anxiolytic, diazepam, decreased locomotor activity, rectal temperature and enhanced sleep elicited by thiopental, similar to neferine. In addition, neferine and diazepam showed anti-anxiety effects in the elevated plus maze test. Neferine did not affect muscle coordination by the rota-rod test. Neferine did not affect strychnine- nor picrotoxin-induced seizure. In contrast, diazepam had apparent muscle relaxant and anti-convulsant effects. These results suggest that neferine has several central effects and that neferine may participate in the efficacy of the sedative effects of embryos of the seeds. The mechanisms of the sedative effects of neferine are not similar to those of diazepam [Sugimoto Yumi, Furutani Sachiko, Itoh Atsuko, Tanahashi Takao, Nakajima Hiroshi, Oshiro Hideo, Sun Shujian and Yamada Jun, Effects of extracts and neferine from the embryo of *Nelumbo nucifera* seeds on the central nervous system, *Phytomedicine*, 2008, **15**(12), 1117-1124].

Hepatoprotective activity of *Eugenia jambolana* Lam. in carbon tetrachloride treated rats

The researchers at Udaipur Rajasthan, India estimated the hepatoprotective effects of the methanolic seed extract of ***Eugenia jambolana* Lam.** in Wistar albino rats treated with carbon tetrachloride (CCl_4). Liver damage in rats treated with CCl_4 (1ml/kg/Bw, administered subcutaneously, on alternate days for one week) was studied by assessing parameters such as serum glutamate oxaloacetate transaminase (SGOT), serum glutamate pyruvate transaminase (SGPT), alkaline phosphatase (ALP), acid phosphatase (ACP) and bilirubin (total and direct). The effect of co-administration of ***E. jambolana*** (doses 100, 200 and 400 mg/kg p. o.) on the above parameters was investigated. These biochemical observations were supplemented by weight and histological examination of liver sections. Liv.52® was used as positive control. Data were analyzed by one way ANOVA, followed by Scheff's/Dunnett's test. Administration of doses, 100, 200 and 400 mg/kg p. o. significantly prevented carbon tetrachloride induced elevation of serum SGOT, SGPT, ALP, ACP and bilirubin (total and direct) level. Histological examination of the liver section revealed hepatic regeneration, after administration of various doses. The results were comparable to that of Liv.52®. The study suggests preventive action of these seeds in carbon tetrachloride induced liver toxicity. Hepatic cell regeneration process was dose dependent [Sisodia SS and Bhatnagar M, Hepatoprotective activity of *Eugenia jambolana* Lam. in carbon tetrachloride treated rats, *Indian J Pharmacol*, 2009, **41**(1), 23-27].

Antiproliferative, antifungal and HIV-1 reverse transcriptase inhibitory activities of *Capparis spinosa* Linn. seeds

From fresh Caper (***Capparis spinosa* Linn.**) seeds, the scientists at The Chinese University of Hong Kong, Shatin, New Territories, Hong Kong, China purified a protein exhibiting an N-terminal amino acids sequence with some similarity to imidazoleglycerol phosphate synthase. The purification protocol entailed anion exchange chromatography on DEAE-cellulose, cation exchange chromatography on SP-Sepharose and finally gel filtration by fast protein liquid chromatography on Superdex 75. The protein was adsorbed using 20mM Tris-HCl buffer (*p*H 7.4) and desorbed using 1M NaCl in the starting buffer from the DEAE-cellulose column and SP-Sepharose column. The protein demonstrated a molecular mass of 38kDa in gel filtration and sodium dodecyl sulfate–polyacrylamide gel electrophoresis, indicating that it was monomeric. The protein inhibited proliferation of hepatoma HepG2 cells, colon cancer HT29 cells and breast cancer MCF-7 cells with an IC_{50} of about 1, 40 and 60μM, respectively. It inhibited HIV-1 reverse

transcriptase with IC_{50} of 0.23µM. It inhibited mycelial growth in the fungus, *Valsa mali* but did not exhibit haemagglutinating, ribonuclease, mitogenic or protease inhibitory activities [Lam Sze-Kwan and Ng Tzi-Bun, A protein with antiproliferative, antifungal and HIV-1 reverse transcriptase inhibitory activities from caper (*Capparis spinosa*) seeds, *Phytomedicine,* 2009, **16**(5), 444-450].

Analgesic and anti-inflammatory activities of liver oils of four shark species from Indian EEZ

The analgesic and anti-inflammatory properties of liver oils of four different sharks, namely *Neohariotta raleighana, Centrosymnus crepidater, Apristurus indicus* and *Centrophorus scalpratus*, captured from the Arabian Sea and the Indian Ocean were evaluated by researchers at Cochin, India. While the analgesic property was determined using the acetic acid-induced mouse writhings and hot-plate reaction time, the anti-inflammatory activity was evaluated using the formalin-induced rat-paw edema. The oils examined were found to possess significant ($P<0.05$) analgesic activity against acetic acid-induced writhings and hot-plate reaction in mice. In the formalin-induced edema, a significant ($P<0.05$) inhibition of inflammation was observed between the 2nd and 4th hour showing 58–65% inhibition. These results suggest that liver oils of sharks from Indian waters are effective as analgesic and anti-inflammatory agents. The role of lipid components (squalene, alkylglycerols and polyunsaturated fatty acids) on anti-inflammatory and antinociceptive properties is highlighted. Inhibition of the synthesis of prostaglandins and other inflammatory mediators which probably account for the properties is discussed. Studies on the pharmacological properties of liver oils from sharks, inhabiting the waters beyond 600m depth of the Indian Exclusive Economic Zone are scanty. Shark liver oils contain high fractions of health-boosting unsaponifiable matter and unsaturated fatty acids that could render beneficial effects. Results suggest that these oils possess excellent anti-inflammatory and peripheral antinociceptive effects that may contribute to its use in the treatment of arthritis and other inflammatory disorders [Mathew Mathen, Mathew Suseela, Nair Kesavan Kumar Ashok and Anandan Rangasamy, Analgesic and anti-inflammatory activities of liver oils of four shark species from Indian EEZ, *J Food Lipids*, 2008, **15**(4), 470-487].

New packaging strategies to preserve fresh-cut Artichoke quality during refrigerated storage

The Artichoke [***Cynara cardunculus* Linn.** subsp. ***scolymus* (Linn.) Hayek**] is a perennial rosette plant grown throughout the world for its large, fleshy heads. The edible portions are the fleshy bases of the bracts, the thick, fleshy receptacle on which the bracts are borne and the flower primordia. It is reputed that this vegetable has a marked anti-oxidative and health protective potential. Fresh-cut vegetables market has grown rapidly in recent years as a result of changes in consumer attitudes. There is a real need to find methods for preservation of minimally processed food products that can gain widespread acceptance by the industry.

Thus, influence of both post-harvest treatments and film permeability on the quality loss kinetic of minimally processed artichokes is assessed in a study