Robust and biodegradable polymer of cassava starch and modified natural rubber

The application of starch based materials for packaging purposes has attracted significant interest because they are both cheap and renewable resources. The study investigated the preparation and properties of a novel biopolymer sheet produced from a blend of maleated epoxidized natural rubber (MENR) and natural rubber-g-cassava starch (NR-g-CSt). The water resistance, toluene resistance and elongation at break of the polymer blend were enhanced after the addition of the MENR compared to pristine NR-g-CSt. The maximum tensile strength and thermal stability of the NR-g-CSt/MENR blend were found in the 100:50 NR-g-CSt:MENR blend. The novel films demonstrated good biodegradability in soil [Riyajan, S.-A. (Department of Materials Science and Technology, Faculty of Science and Technology, Thammasat University, 99 Moo 18 Paholyothin Road, Klong-Luang, Pathumthani, Thailand), Carbohydrate Polymers, 2015, 134, 267-277].

Acid-induced aggregation and gelation of natural rubber latex particles

Coagulation of natural rubber latex suspensions into an elastic gel is the first step of their processing into rubber. Authors studied this transition under controlled acidification conditions with the aim of identifying the main parameters controlling gel formation. The onset of aggregation and the percolation events observed during continuous acidification were monitored on a large range of volume fractions by a combination of light-scattering techniques adapted to the different degrees of suspension opacity (namely, diffusing wave spectroscopy, static light scattering and turbidimetry) and by rheology. Consequently, authors established the state diagram of NRL particles in the pH-\phi_v space during acidification. Within this diagram, three states: a suspension, a two-phase macroscopically separated system in between a gel and a suspension, and a gel was identified. The rheological properties of the gels were characterized as a function of the volume fraction \phi_v. The elastic modulus scale with \phi_v^{3.35}, it shows remarkable consistency independently of the acidification kinetics and final pH [de Oliveira Reis, G*, Menut, P., Bonfils, F., Vaysse, L., Hemar, Y. and Sanchez, C., (UMR IATE, Université de Montpellier, Montpellier SupAgro, INRA, CIRAD, 2 Place Viala, Montpellier, France), Colloids and Surfaces A: Physicochemical and Engineering Aspects, 2015, 482, 9-17].

Investigation of swelling and dissolution process of natural rubber in aromatic oil

Aromatic oil has been used to promote the properties of crumb rubber modified asphalt which is an ideal method to deal with the resource utilization of waste rubber tires and by-product of refinery. Furfural extract oil (FEO) was separated into the light fraction and the heavy fraction. Swelling and dissolution process of natural rubber sheet in these three oil samples was investigated to shed light on the interaction mechanism. Crumb rubber also interacted on FEO and asphalt respectively. Energy dispersive spectrometer (EDS), thermo-gravimetric analysis (TGA) and scanning electron microscope (SEM) were used to characterize the chemical and structural properties of processed rubber. The chemical composition of processed oils and asphalt was investigated by using the hydrocarbon group analysis (SARA) and gel permeation chromatography. The results revealed that the swelling rate and mass loss of rubber in oils were much higher than those in asphalt and rose with an increasing processing temperature. The heavy fraction of FEO had more diffusion and dissolving capability than the light fraction, whilst compatibility was observed between the heavy fraction and the light fraction. Selective absorption was not observed in the study.
and detachment of dissolved rubber was disseminated from the outside to the inside. The cross-linking degree of the residue rubber was unchanged with the processing time, and sulfur predominantly remained in the undissolved rubber. Dissolution of crumbled rubber in oils was attributed to devulcanization, while that in the asphalt was mainly attributed to depolymerization [Wang, F., Kuang, M., Li, G., Zhou, X. and Li, C. (Department of Petroleum Processing, East China University of Science and Technology, Shanghai, China), China Petroleum Processing and Petrochemical Technology, 2015, 17( 3), 76-86].

NPARR, 7(1), 2016-91 Studies on the emulsifying properties of gum resin of Shorea robusta

In recent years, the importance of natural emulsifiers has increased considerably due to the safety concerns associated with synthetic emulsifiers. In this study, gum resin of Shorea robusta was evaluated for its emulsifying property. An emulsion was prepared using S. robusta semi-purified gum resin (HGRS) as an emulsifier (2.0, 3.0 and 4.0% w/w), and a standard emulsion was prepared with the known emulsifier, Glyceryl monostearate (GMS SE). The prepared emulsions were evaluated for rheological properties, especially flow behavior, and they were stored at room temperature for stability studies at various time intervals for three months. Results of the study suggested that the semi-purified gum resin of S. robusta possesses good emulsifying properties. The emulsion formulated from the natural emulsifier was less sensitive to centrifugation, pH and shear stress. Thus, gum resin of S. robusta can be used as a natural emulsifying agent in topical preparations [Sarathchandraprakash, N.K.*, Vijayakumar, M., Manral, K., Babu, U.V., and Vishakante Gowda, D., (Research and Development Department, The Himalaya Drug Company, Bangalore, India), International Journal of Pharma and Bio Sciences, 2015, 6 (1), P544-P549].

NPARR, 7(1), 2016-92 The acute toxicity of Commiphora molmol oleo-gum-resin methanol extract

The study aimed to investigate the safety of the most biological active extract of C. molmol oleo-gum-resin in terms of blood vessel growth inhibition. The active extract was subjected to the toxicity studies; The dose that consider lethal to the 50% of the animal exposed to the extract (LD50) study of the extract was evaluated in Swiss albino mice by feeding the animals with serial doses of the extract between 1.0 to 20.0 g/kg body weight orally. Acute toxicity study in rats administered with 5000 mg/kg extract, the toxicity in the animals was carried out by assessing the effects on body weight, relative organ weight, biochemical parameters and histopathological study for heart, lung, liver, kidneys, spleen, stomach and sex organs for both male and female, following oral administration of methanol extract. The LD50 value of C. molmol methanol extract was calculated from the linear regression equation and equaled to 15.504 g/kg. Serum biochemical findings show no significant differences in comparison to control. No significant body weight or relative organ weight changes occurred throughout the study, histopathology of selected organs showed no remarkable pathology. Commiphora molmol methanol extract showed no signs of toxicity were observed during the acute toxicity study and the LD50 value indicates that the extract is to be safe [Jasim, G.A., Al-Zubaidy, A.A., Hussein, S.M., Sahib, H.B. and Ahmed, B.S. ( University of Mustansiriyah, College of Pharmacy, Department of Pharmacology and Toxicology, Baghdad, Iraq), International Journal of Pharmaceutical Sciences Review and Research, 2015, 33 (1), 109-114].

NPARR, 7(1), 2016-93 Boswellia serrata oleo-gum resin: A natural remedy for retrogradation of liver fibrosis in rats

This study aimed to investigate the role of Boswellia serrata oleo-gum resin in ameliorating
liver fibrosis induced by thioacetamide (TAA) in rats. Serum liver enzymes bilirubin, plasma fibrinogen, serum hepatocyte growth factor levels, hepatic reduced glutathione content were estimated. Also, hepatic NQO1 and BCL-2 gene expression levels were detected by semiquantitative RT-PCR. Moreover, histopathological investigation of liver tissue sections was carried out. TAA-challenged group showed significant elevation in the activity of serum liver enzymes, bilirubin and hepatocyte growth factor levels accompanied with significant reduction in plasma fibrinogen level and hepatic reduced glutathione content. Significant downregulation in hepatic NQO1 and BCL-2 gene expression levels were detected in TAA-challenged group relative to the negative control group. Histopathological investigation of liver tissue sections of rats in TAA-challenged group revealed many fibrotic features. Boswellia serrata-treated group showed significant depletion in serum liver enzymes activity, bilirubin and hepatocyte growth factor levels associated with significant elevation in plasma fibrinogen level and hepatic reduced glutathione content. This study provides a clear evidence for the promising role of Boswellia serrata gum extract in the retrogradation of liver fibrosis in the experimental model. The effect afforded by Boswellia serrata was likely attributable to its hepatoprotective activity, antioxidant capacity and antiapoptotic potential [Ahmed, H.H.\(^a\), El-Alfy, N.Z.\(^b\), Mahmoud, M.F.\(^b\), and Yahya, S.M.M.\(^b\) (Hormones Department, Medical Research Division, National Research Centre, Cairo, Egypt), Der Pharmacia Lettre, 2015, 7(1), 134-144].

Metabolic profiling of Commiphora wightii (guggul) reveals a potential source for pharmaceuticals and nutraceuticals

Guggul gum resin from Commiphora wightii (syn. Commiphora mukul) has been used for centuries in Ayurveda to treat a variety of ailments. The NMR and GC-MS based non-targeted metabolite profiling identified 118 chemically diverse metabolites including amino acids, fatty acids, organic acids, phenolic acids, pregnane-derivatives, steroids, sterols, sugars, sugar alcohol, terpenoids, and tocopherol from aqueous and non-aqueous extracts of leaves, stem, roots, latex and fruits of C. wightii. Out of 118, 51 structurally diverse aqueous metabolites were characterized by NMR spectroscopy. For the first time quinic acid and myo-inositol were identified as the major metabolites in C. wightii. Very high concentration of quinic acid was found in fruits (553.5 ± 39.38 mg g \(^{-1}\) dry wt.) and leaves (212.9 ± 10.37 mg g \(^{-1}\) dry wt.). Similarly, high concentration of myo-inositol (168.8 ± 13.84 mg g \(^{-1}\) dry wt.) was observed from fruits. The other metabolites of cosmeceutical, medicinal, nutraceutical and industrial significance such as \(\alpha\)-tocopherol, n-methylpyrrolidone (NMP), trans-farnesol, prostaglandin F2, protocatechuic, gallic and cinnamic acids were identified from non-aqueous extracts using GC-MS. These important metabolites have thus far not been reported from this plant. Isolation of a fungal endophyte, Nigrospora sps.) from this plant is the first report. The fungal endophyte produced a substantial quantity of bostrycin and deoxybostrycin known for their antitumor properties. Very high concentrations of quinic acid and myo-inositol in leaves and fruits; a substantial quantity of \(\alpha\)-tocopherol and NMP in leaves, trans-farnesol in fruits, bostrycin and deoxybostrycin from its endophyte makes the taxa distinct, since these metabolites with medicinal properties find immense applications as dietary supplements and nutraceuticals [Bhatia, A.*, Bharti, S.K., Tripathi, T., Mishra, A., Sidhu, O.P., Roy, R. and Nautiyal, C.S. (CSIR-National Botanical Research Institute, Rana Pratap Marg,
Pistacia resins are a complex mixture comprising of different bioactive compounds, with the presence of triterpenes and essential oils being characteristic for these resins. Since ancient times, Pistacia resins have been used in traditional medicine of Mediterranean and Middle Eastern countries as herbal remedies. There is accumulating evidence that suggests that Pistacia resins may contribute to the reduction of many chronic diseases, such as gastrointestinal disorders, cardiovascular diseases, and some forms of cancer, while in parallel promoting oral health and other physiological functions such as antimicrobial and antioxidant activities. This review aims at presenting and critically reviewing the health effects from the consumption of Pistacia resins whilst revealing future challenges and potential applications in the food industry [Hadjimbei, E., Botsaris, G., Goulas, V. , and Gekas, V. (Department of Agricultural Sciences, Biotechnology and Food Science, Cyprus University of Technology, Lemesos, Cyprus), Food Reviews International , 2015, 31(1), 1-12].