GUM/RUBBER (incl. Latex, Resin, Pectin, Tannin, Mucilage, Starch, Cellulose, etc.)

NPARR 2(4), 2011-0416, Production, recovery and applications of xanthan gum by *Xanthomonas campestris*

Xanthan gum is a water-soluble exo-polysaccharide. It is produced industrially from carbon sources by fermentation using the gram-negative bacterium *Xanthomonas campestris*. There have been various attempts to produce xanthan gum by fermentation method using bacteria and yeast by using various cheap raw materials. This review explains the recent methods of production, recovery and applications of various industries such as food, agriculture, oil, paint and cosmetics [Aarthy Palaniraj* and Vijayakumar Jayaraman(Immunology Laboratory, Dept. of Biotechnology, Vel Tech High Tech Dr. Rangarajan Dr. Sakunthala Engineering College, Chennai, Tamilnadu, India), *Journal of Food Engineering*, 2011, 106, 1-12].

NPARR 2(4), 2011-0417, Extraction and characterization of tamarind seed polysaccharide as a pharmaceutical excipient

The objective of the present work was extraction of polysaccharide from tamarind seed and further characterization as pharmaceutical excipient. Study includes phytochemical screening, micromeritic properties. Work also emphasize to study gelling properties of seed polysaccharide. Water based extraction procedure was used to extract polysaccharide from tamarind seed. Pharmacopoeial procedures were used to study the micromeretic properties, solubility, organoleptic properties and pH. Different concentration based solution were prepared to evaluate gelling properties of seed polysaccharide. Results obtained from the study showed that used procedure was efficient to extract gum from tamarind seed. Obtained results easily predict the fact that extracted polymer can be used as pharmaceutical excipient in terms of micromeretic properties and flow behavior. It was also found that obtained gum showed gelling behavior at 8% w/v solution of water. It can be concluded from whole study that tamarind seed polysaccharide can be an important pharmaceutical excipient for solid. Obtained results also showed that extracted seed polysaccharide may be used as natural gelling agents in different pharmaceutical formulations. [Singh, R. *, Malviya, R. and Sharma, P.K. (Department of Pharmaceutical Technology, Meerut Institute of Engineering and Technology Baghpat Crossing, Delhi Roorkee Highway, NH-58, Meerut-250005, U.P., India), *Pharmacognosy Journal*, 2011, 3(20), 17-19].

NPARR 2(4), 2011-0418, Recent investigations of plant based natural gums, mucilages and resins in novel drug delivery systems

All pharmaceutical dosage forms contain many additives besides the active ingredients to assist manufacturing and to obtain the desired effect of the pharmaceutical active ingredients. The advances in drug delivery have simultaneously urged the discovery of novel excipients which are safe and fulfill specific functions and directly or indirectly influence the rate and extent of release and/or absorption. The plant derived gums and mucilages comply with many requirements of pharmaceutical excipients as they are non-toxic, stable, easily available, associated with less regulatory issues as compared to their synthetic counterpart and inexpensive; also these can be easily modified to meet the specific need. Most of these plant derived gums and mucilages are hydrophilic and gel-forming in nature. Recent trend towards the use of plant based and natural products demands the replacement of synthetic additives with natural ones. Many plant derived natural materials are studied for use in novel drug delivery systems, out of which polysaccharides, resins and tannins are most extensively studied and used. This review discusses about the majority of these plant-derived polymeric compounds, their sources, extraction procedure, chemical constituents, uses and some recent investigations as excipients in novel drug delivery systems [Avachat, A.M. *, Dash, R.R. and Shrotriya, S.N. (Sinhgad College of Pharmacy, 44/1, Vadgaon (Bk.), Pune-411041, Maharashtra, India), *Indian Journal of Pharmaceutical Education and Research*, 2011, 45(1), 86-99].

NPARR 2(4), 2011-0419, *In vitro* retardation of glucose diffusion with gum extracted from malva
nut seeds produced in Thailand

Mucilage of malva nut fruit has been used as traditional medicine in Thailand. Our laboratory has succeeded in extracting malva nut gum (MNG) from malva nut seeds by using alkaline-extraction method. The extract had higher gelling properties compared to water-extracted MNG. This research was aimed to investigate the effect of MNG on the retardation of glucose diffusion in in vitro dialysis processes. The results showed that alkaline-extracted MNG significantly (p < 0.05) reduced glucose content in dialysate compared to control containing no dietary fibre. MNG at 1% (w/w) concentration was more effective than that of 0.5% (w/w) concentration. The mixture of MNG and guar gum significantly (p < 0.05) reduced glucose in dialysate by 50-82% compared to that of control. In starch digestion process, the mixture of MNG and guar gum showed greater reduction of glucose (3-7 folds) in dialysate at 15-30 min [Srichamroen, A.* and Chavasit, V. (Department of Agro-Industry, Faculty of Agriculture, Natural Resources and Environment, Naresuan University, 65000, Thailand), Food Chemistry, 2011, 127(2), 455-460].

NPARR 2(4), 2011-0420, Cocoa husk waste mucilage as new flow improver in pipelines

Liquid transportation through pipelines for very long distances is one of the most power consuming sectors in the industry. Synthetic polymers were used as flow improvers for many years to solve the power dissipation problem. These polymers are toxic and expensive. An environmentally friendly and more natural product that can replace the usage of polymers as flow improvers is needed. The present study focused on a new, cheap, natural and environmentally friendly flow improver that was extracted from the cocoa husk wastes. Mucilage was prepared from the cocoa husk waste and tested in aqueous media at concentrations between 100 ppm and 400 ppm using pipes with an internal diameter of 0.0125, 0.0254 and 0.0381 m and five different fluid velocities represented by the corresponding Reynolds Numbers (Re). It was found that the cocoa husk mucilage was an effective drag reducing agent. A maximum drag reduction percentage of 44% could be achieved by adding as little as 400 ppm of mucilage. Drag reduction was found to increase by increasing Reynolds Numbers, additive concentrations and pipe lengths. It also increased with decreasing pipe diameters [Abdul Bari, H.A., Hamad, K.H. and Mohd Yunus, R.B. *(Faculty of Chemical and Natural Resources Engineering, University Malaysia Pahang, Gambang, Kuantan, Pahang, 26300, Malaysia), Defect and Diffusion Forum, 2011, 312-315, 1063-1067].

NPARR 2(4), 2011-0421, Studies on Vigna mungo mucilage as a pharmaceutical excipient

The present work was aimed to isolate the mucilage using microwave assisted extraction technique and to evaluate its excipient properties. The yield was found to be 22.56g/kg. The drugs and the isolated mucilage powder were found to be compatible as confirmed by the IR spectral studies. The sedimentation rates of the prepared suspensions using a model drug metronidazole were similar to that of the marketed sample and they were easily redispersible and do not form a hard cake. The drug content of all the prepared suspension formulations was found to be in the range of 94.2-96.1%. The isolated mucilage was also studied for its binding nature using ibuprofen as a model drug. The prepared granules were free flowing and the compressed tablets showed good hardness and friability as compared with the starch and marketed product, thereby confirming the mechanical resistance of the tablets. The drug content of all the prepared tablet formulations was found to be between 93.0-99.45%. The rate of drug release from tablet formulations using mucilage as binder was fast when compared to formulations containing starch and marketed product. Formulation F4 (1:2 ratio) of the prepared ibuprofen tablets showed similar release profile in comparison with the marketed product. The drug release mechanism for the formulation F4 was predicted as first order model with the r2 value of 0.9632 [Sravani, B., Deveswaran, R., Bharath, S., Basavaraj, B.V. and Madhavan, V. *[M. S. Ramaiah College of Pharmacy, Bangalore, India). Journal of Chemical and Pharmaceutical Research, 2011, 3(2), 118-125].

NPARR 2(4), 2011-0422, Influence of isolated flaxseed mucilage as a non-starch polysaccharide on noodle quality

Physicochemical, cooking quality and sensory
characteristics of noodles enriched by extracted flaxseed mucilage were evaluated. Noodles were prepared with replacement wheat flour with different mucilage concentrations and drying at different temperatures. Generally, physicochemical and noodle quality characteristics improved with adding flaxseed mucilage compared to control sample. The correlation between optimum cooking time with mucilage concentrations and drying temperatures established by nonlinear regression. The obtained data of cooking yield, swelling index, cooking loss and nitrogen loss were analysed using the two-dimension response surface method. The mucilage concentration of 3% and drying temperature ranging between 68.2 and 70°C were the best condition to prepare the noodle with high cooking quality compared to the control sample. The received scores from sensory evaluation showed that replacement of wheat flour by flaxseed mucilage improved the texture and overall acceptability of prepared noodle [Kishk, Y.F.M.*, Elsheshetawy, H.E. and Mahmoud, E.A.M. (Department of Food Science, Faculty of Agriculture, Ain Shams University, Cairo, Egypt), International Journal of Food Science and Technology, 2011, 46(3), 661-668].

NPARR 2(4), 2011-0423, Extraction and characterization of mucilage in Ziziphus mauritiana Lam.

The aim of this study was to characterize the mucilage from jujube. Extraction conditions of the highest mucilage yield can derive from the following process: incubating jujube for 9 days, mixing jujube pulp with water in ratio of 1:7 at water temperature of 60°C, and precipitating the mucilage solution with ethanol in ratio of 1:3. Functional properties analysis of mucilage powder showed that it had brightness in similar value with xanthan gum but higher than guar gum. Water holding capacity was 11.77 g dry weight. The values of oil absorption were 9 and 6 times higher than guar gum and xanthan gum, respectively. Emulsion capacity was analogous to that of guar gum but less than xanthan gum. Rheological properties of mucilage solution exhibited pseudoplastic as same as guar gum. This research also examined that higher concentration of mucilage solution caused larger values of viscosity, but increasing the pH and temperature led to the decrease of viscosity [Thanatcha, R. and Pranee, A. * (Department of Food Technology, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand), International Food Research Journal, 2011, 18(1), 201-212].