# APPLICATIONS OF GUM ARBIC IN FOOD AND NON-FOOD INDUSTRES

**Eqbal M. A. Dauqanand, Aminah Abdullah**
School of Chemical Sciences and Food Technology, Faculty of Science and Technology,
UniversitiKebangsaan Malaysia, 43600 Bangi Selangor, Malaysia

## ABSTRACT
Gum Arabic (GA) is edible, dried, gummy exudates from the stems and branches of *Acacia senegal* and *Acacia seyal* that is rich in non-viscous soluble fiber. Gum arabic is commonly used in the pharmaceutical industry as emulsifying agent, as suspending agent and also it is used as a food additive. In this paper we give a short overview of the structure and applications of Gum Arabic.
*Key words: Gum Arabic, Acacia Senegal. Acasiaseyal, emulsifying agent.*

## INTRODUCTION
Gum Arabic (GA) is edible, dried, gummy exudates from the stems and branches of *Acacia senegal* and *Acaciaseyal* that is rich in non-viscous soluble fiber (Azeez 2005 and Abdul-Hadi et al. 2010). These trees are abundant in the central Sudan, central Africa and in West Africa. Gum arabic is commonly used in the pharmaceutical industry as emulsifying agent and as suspending agent for insoluble drugs also it is used as food additive (Abdul-Hadi et al. 2010). Gum Arabic is used as an emulsifier and stabilizer in the food and pharmaceutical industries (Lelon et al. 2010). Figure 1 shows the collecting gum Arabic from low branches of acacia tree.

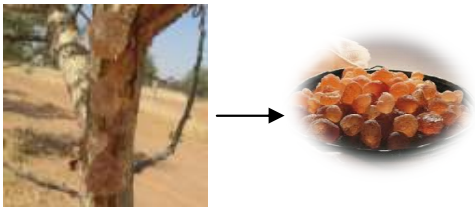

**Figure 1** Collecting gum Arabic from low branches of acacia tree

## STRUCTURE OF GUM ARABIC
Gum Arabic, a natural composite polysaccharide derived from exudates of *acacia Senegal* and *acacia seyal* trees, is one of the most commonly used food hydrocolloids. Gum Arabic serves as a very efficient emulsifier and a long-term stabilizer in food and cosmetic products containing oil–water interfaces (Yaelet et al. 2006). Gum Arabic is recognized by many researchers that GA consists of mainly three fractions :

(1) The major one is a highly branched polysaccharide consisting of galactose backbone with linked branches of arabinose and rhamnose, which terminate in glucuronic acid (found in nature as magnesium, potassium, and calcium salt).
(2) A smaller fraction is a higher molecular weight arabinogalactan–protein complex in which arabinogalactan chains are covalently linked to a protein chain through serine and hydroxyproline groups.
(3) The smallest fraction having the highest protein content is a glycoprotein which differs in its amino acids composition

## APPLICATIONS OF GUM ARABIC
Exudate gums are used in an overwhelming number of applications, mainly situated in the food area. However, there are also considerable non-food applications. Gum Arabic is being widely used for industrial purposes such as a stabilizer, a thickener, an emulsifier and an encapsulating in the food industry, and to a lesser extent in textiles, ceramics, lithography, cosmetic, and pharmaceutical industry. In the food industry, GA is primarily used in confectionery, bakery, dairy, beverage, and as a microencapsulating agent (Mariana, 2012). Gum arabic readily dissolves in cold and hot water in concentrations up to 50%. Because of the compact, branched structure and therefore small hydrodynamic volume, gum arabic solutions are characterized by a

low viscosity, allowing the use of high gum concentrations in various applications. Solutions exhibit Newtonian behavior at concentrations up to 40% and become pseudoplastic at higher concentrations (Verbeken et al 2003).The pH of the solutions is normally around 4.5–5.5, but maximal viscosity is found at pH 6.0. Gum arabic has excellent emulsifying properties. The hydrophobic polypeptide backbone strongly adsorbs at the oil–water interface, while the attached carbohydrate units stabilize the emulsion by steric and electrostatic repulsion. Fractionation studies show that, although emulsifying properties generally improve with increasing molecular weight and protein content, the best results are obtained with mixtures of different fractions. Seemingly, the heterogeneous nature of the gum makes it an excellent emulsifier (Verbeken et al 2003).

## REFERENCES

Azeez O. S. 2005. *Leonardo Journal of Sciences* ,7, 23-32

Abdul-Hadi A. H. ,Mahmoud A. E., Abdel-Wahab H. M. 2010. *International Journal of Pharm.Tech. Research,* 2,1762-1766

Lelon, J. K., Jumba I. O., Keter J. K., Wekesa C. and Oduor F. D. O. 2010. *African Journal of Plant Science*, 4, 95-98

Mariana A. M., María L. B., Lorena V. and Claudio D. B. 2012. *Gum Arabic: More Than an Edible Emulsifier.* *Products and Applications of Biopolymers, ISBN: 978-953-51-0226-7*

Verbeken D., Dierckx S., Dewettinck K. 2003.*ApplMicrobiolBiotechnol.,* 63,10–21