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GUM ARABIC
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Market News Service

GUM ARABIC

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The Market News Service of the International Trade Centre UNCTAD/WTO (ITC) provides timely and detailed price and market information on selected primary and semi-processed products of particular interest to developing countries and economies in transition. Regular access to such information is vital to companies deciding when and where they should sell or buy products on international markets. MNS thus aims to serve as a market intelligence tool, to enable developing countries realize their full income potential through global trade expansion. MNS does not act as a broker and is exclusively an information service with the objective of improving market transparency and encouraging price and quality competition for the benefit of all market players.

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The information provided in this report was obtained from several sources and relates to various Gum Arabic characteristics, the supply and demand situation of the product, economic and legislative environment as well as the effects of climate change on its global trade.

The Market News Service is made available free of charge to all Trade Support Institutions and enterprises in Sub-Saharan African countries under a joint programme of the International Trade Centre and CBI, the Dutch Centre for the Promotion of Imports from Developing Countries (www.cbi.nl).

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Overview of Gum Arabic

Among all the types of gums marketed worldwide, Gum Arabic is certainly the most well known and the most in demand both at the levels of the producing regions and internationally. This often leads to a depreciation of offers because some

suppliers mix in other elements into the product in order to fulfill their obligations. It also results in the over-exploitation of resources as producers seek to increase the availability of Gum Arabic.

History and Origins of Gum Arabic

Gum Arabic is certainly the most ancient and the most well known of all gum types. The term 'Gum Arabic' was coined by European merchants who imported it from Arab ports such as Jeddah and Alexandria. Egyptians referred to it as 'kami' and allegedly used it from the third dynasty onwards (around 2650 BC) to secure bandages around mummies. This gum was supposedly also used to fix pigments into hieroglyphic paintings.

According to a Sudanese researcher, the word 'mana' (manna) mentioned in the Koran (Surah Al baqarah) as the best food available to man is, in fact, a direct reference to Gum Arabic. The word 'mana' seemingly also refers to Gum Arabic in the Torah where it is described as an essential food and designated by Moses to the Israelis as God-given bread.

In the 15th century, European navigators discovered Gum Arabic on the coasts of modern-day Senegal and Mauritania. In the 18th century, following a bloody and determined 'gum war' France acquired the monopoly of gum trade along the West African coast¹.

At the beginning of the 20th century, England opened up access to the other primary source of Gum Arabic by building a railroad between Eloubeid, in the heart of the Kordofan region, and the Sudanese port. England and France, aboard their merchant fleet, would transport the gum from the trading post back to Europe to be processed. Consequently, Gum Arabic became a prized commodity given its popularity with these two colonial powers².

There are close to 900 acacia species capable of producing gum. These are primarily located in tropical climates, with about 130 of them located specifically on the African continent. Africa, therefore, quickly became the major site of the production of gum; this is the reason why it is also referred to as 'Senegal Gum'. Gum is essentially the secretion of several acacia (leguminous) trees. Acacia Gum species, of which there are up to seventeen, produce acacia gum of varying quality and quantity.

Interestingly, close to 80% of Gum Arabic is produced by the *Acacia senegal* (in Sudan). The remainder is produced either by the *Acacia laeta* or the *Acacia seyal*, with each species contributing 10% to the total supply of gum. The gum produced by the *Acacia senegal* is commonly referred to as "hard gum" and the gum from *Acacia seyal*, as "flaky gum".

Gum emerges naturally from slits in tree barks; or by creating additional man-made slits, which yields larger quantities. The amount produced varies, however, from 20g to 2000g depending on the tree; on average, a tree yields 250g.

¹ Dandoy, G., 1996

² Didier GAVENS, 1999

Definition of the product

Gums obtained from other acacia species, and occasionally from *Albizia* and *Combretum*, are also traded as "Gum Arabic". Current regulation surrounding Gum Arabic does not distinguish between gum obtained from *Acacia senegal* and *Acacia seyal*. Therefore, although gum from *Acacia seyal* is of inferior quality to gum from *Acacia senegal*, the former is more commonly traded as Gum Arabic.

For Sudanese exports, the distinction is quite clear: gum from *Acacia senegal* is sold under the name "hashab gum" while gum from *Acacia seyal* is sold as "talha gum". In Zimbabwe, the gum traded locally as Gum Arabic comes from *Acacia karo*. However, synthetic substitutes, namely "modified starches" such as xanthan and gellane, are rapidly replacing Gum Arabic as dietary hydro-colloides.

Gum Arabic is traditionally defined as a 'substance, which exudes from *Acacia Senegal* or related species'. This definition encompasses a variety of species, which, from a taxonomy point of view, are not related. To date, though, only the gum from *A. senegal* has been effectively demonstrated as an innocuous food additive.

As a result of growing global pressure demanding trade specifications and stricter labeling regulation regarding the identity and quality of products, a publication of revised specifications was created³. The report describes Gum Arabic as derived from *A. senegal*, or closely linked species, comprising of an optical rotation range of -26° and -34° and a Kjedahl index indicating nitrogen content between 0.27% and 0.30%.

Gum Arabic is a solid of a pale to orange-brown colour which, when ruptured, secretes a vitreous substance. Gum Arabic of excellent quality is tear-shaped, round, with an orange-brown colour and a surface with a matte texture. After it is crushed or shattered, the pieces are paler in colour and have a vitreous appearance. Contrary to other vegetable gums, Gum Arabic dissolves very well in water (up to 50%). The viscosity of *Acacia Senegal* gum, though, is weak (16ml/g on average). The resulting solution is colourless,

tasteless and does not interact easily with other chemical compounds.

Chemically, Gum Arabic is a slightly acidic complex compound, made up of glycoprotein and polysaccharides and their calcium, magnesium and potassium salts. The principal polysaccharide is Arabic acid, a polysaccharide linking a D-galactose (1,3) with branches (1,6) composed of L-arabinose, L-rhamnose and D-glucuronic acids. Essentially, the proteins are classified as arabinogalactanes, rich in hydroxyproline.

Laboratory tests performed on *Acacia senegal* and *Acacia seyal* gum identified the following characteristics, which highlight the differences between the two:

Table 1: Characteristics of Gum Arabic

	Acacia Senegal	Acacia Seyal
Rotation power/degrees	- 30	+ 51
Average molecular mass (Mm)	380 000	850 000
4-O- méthylglycuronic acid	1,5	5,5
Rhamnose (%)	13	4
Nitrogen (%)	0,36	0,15
Glycuronic acid (%)	14,5	6,5
Galactose (%)	44	38
Arabinose (%)	27	46

Source: 3rd series of publications from NGARA, September 2005

It is important to consult official specifications, in order to correctly identify true Gum Arabic especially given the fact that gums, which resemble Gum Arabic, can be obtained from other Acacia species. Yet, these specifications have been confusing in the past; so that the name "Gum Arabic" has been used sometimes exclusively for gum obtained from *Acacia Senegal* and sometimes inclusively for gums obtained from other species of Acacia.

A joint FAO/WHO committee of experts on food additives (JEFCA) indicated in its Compendium on food additives-Addendum 7 (1999) that no distinctions were made between *Acacia senegal* and *Acacia seyal*. Gums obtained from other

³ WHO, 1990a, b; FAO, 1990

Acacia species, though, were not considered equivalent.

"Hashab gum" from Sudan is the gum of highest quality and serves as a reference. Within Sudan, Gum Arabic from the Kordofan region has the best reputation so that merchants and end-users in import countries often cite "Kordofan gum" when stating their preferences.

Nigerian Gum Arabic, on the other hand, is of variable quality. One major explanation is the inconsistent and heterogeneous nature of shipments: gums of varying colours and purity levels are present. This is a reflection of the fact that harvesting and handling methods are less strict than those employed with the Sudanese "hasbab gum". The mixture of gums from different species of *Acacia* has negative effects on the quality.

Officially, Nigerian Grade 1 Gum Arabic is pure gum from *Acacia senegal*; Grade 2 may contain gum obtained from *Acacia seyal* and other *Acacia* species while Grade 3 may contain gum from species other than *Acacia*.

Gums from other *Acacia* species, and sometimes from *Albizia* and *Combretum*, are equally traded as "Gum Arabic". Current regulation surrounding Gum Arabic does not distinguish between gum obtained from *Acacia Senegal* and *Acacia seyal*. Therefore, although gum from *Acacia seyal* is of inferior quality to gum from *Acacia senegal*, the former is more commonly traded as Gum Arabic.

Gum Arabic possesses the following characteristics, among others: 1g of Gum

Arabic dissolves in 2ml of water, forming an acidic mixture as determined by the litmus test, but is insoluble in ethanol. It does not contain Mannose, Xylose and Galacturonic acid. An aqueous solution of gum from *Acacia Senegal* is levorotatory while that of *Acacia seyal* is dextrorotatory. No more than 15% of the product is expected to be lost when drying a granulated form and no more than 10% when dried by pulverization. Gum Arabic must also not contain starch, dextrin, tannin, *Salmonella* and *Escherichia coli*.

In Europe, Gum Arabic is authorized as a food additive named E414; while in the United States it possesses the FDA GRAS (Generally Recognized as Safe) status. The food codex attributes an "E" code to other types of traded gums. Hence, E412 is attributed to Guar gum, E413 for gum from acanthus and tragacanth plants, E415 for Xanthane gum, E416 for Karaya gum, E417 for Tara gum and E418 for Gellane gum.

Consequently, one may only describe as 'Gum Arabic', members of the sub-genus *Aculeiferum* in addition to the following species: *A. senegal*, *A. laeta*, *A. mellifera* and *A. polycantha* ssp. *Campylacantha*. Even though, it is apparent that gums obtained from these related species are not commonly traded.

Gums obtained from species such as *A. senegal*, *A. xanthophloea*, *A. karroo* and *A. nolotica* which contain tannin and generate a positive optical rotation are not authorized for food products and are therefore sold at cheaper prices (Anderson, 1993). Tannin is now considered a carcinogenic substance.

Description of Acacia species which produce Gum Arabic

Acacia Senegal (L) Wild.

Family: Mimosaceous Legumes (Leguminosae – Mimosoideae)

Synonyms : *Acacia vérek* Guill et Perrott; *Mimosa senegal* L. (1753), *Acacia rupestris* Stokes.

Vernacular names: White gum tree, Vérek (French); Gum Arabic tree, gum tree, three-thorned acacia (English); Kittir (Arab).

Distribution

A tree typical of Sahel climates, *Acacia senegal* is widespread in the dry regions of tropical Africa, from Senegal and Mauritania, in the west, up to Eritrea and Ethiopia in the north-east and down to South Africa, in the south. It is primarily located in between 11° and 16° North latitude.

Of the four renowned varieties, var. *senegal* is the most widespread and is found in all the regions where *Acacia senegal* trees are located, except along the West coast of central and southern Africa. Outside Africa, it is also found in Oman, Pakistan and India and has also been introduced in Egypt, Australia, Puerto Rico and the Virgin Islands. This variety is the main source of Gum Arabic. Other varieties, such as var. *kerensis* Schweinf may be found in Ethiopia, Somalia, Uganda, Kenya and Tanzania; var. *leiorhachis* Brenan in all of East Africa, from Ethiopia to South Africa; var. *rostrata* (Sim) Brenan is also found in the same region as well as in Namibia and Angola and potentially Oman, as well.

Characteristics

It is a shrub or tree of small to medium size measuring up to 15m in height, prickly, and deciduous. The bark may be yellowish brown to crimson black in colour, rough or smooth, have a papyrus consistency and may be peeled apart in strips or heavily cracked and black in older trees.

The treetop may be slightly rounded, flat and somewhat spread out or even spindly and frayed with branches of irregular sizes. The tree may have small, smooth branches or be 'hairy' in texture with small goads appearing in sets of three, right under the knots, where the central goad points downwards and the lateral ones

towards the top; at times there are no lateral goads and the immature goads change colour from a reddish colour to a black colour.

The tree has alternate, bipinnately compound leaves with very small to non-existent stipules. They have a petiole, a middle vein (rachis) that is, lightly to densely, covered with laid hair—rarely smooth. Pinnules are arranged in pairs of (2-) 3-8-(12); the leaflets, linear or oval oblongs, are positioned in 7-25 pairs of 1-5(-9) mm x 0,5-2(-3) mm and slightly pubescent on both surfaces or completely glabrous (non-hairy).

The inflorescence is an auxiliary spike, 12cm in length, with a densely pubescent axis or glabrous (non-hairy). The following characteristics also apply: the flowers are bisexual, white or cream in color, a calyx 2-3(3.5) mm long which is glabrous or slightly pubescent, a corolla 3-4mm long, several stamens up to 7mm long, and an ovary on a glabrous gynophores.

The fruit is an oblong pod, of (2-) 4-19 cm x 1-3.5cm, rounded or pointy at the apex, has veins, may be slightly or heavily pubescent, yellowish-brown to grayish brown in colour, dehiscent, with up to 7 seeds. The seeds are sub-circular and lenticular, 8 to 12 mm in diameter, with a 2.5-6mm x 2.5- 5mm horseshoe shaped areola.

Acacia senegal is classified under the sub-genus *Aculeiferum*, because of the characteristics of its seeds and plantlets, the absence of stipular thorns (although some goads are present) and the characteristics of its pollen. The sub-genus *Aculeiferum* groups together all African acacia species that do not have thorny stipules.

There are 4 distinct varieties of *Acacia senegal*: var. *Senegal*, var. *kerensis* Schweinf., var. *leiorhachis* Brenan and var. *rostrata* (Sim) Brenan. It is unclear

whether var. *kerensis* is a good taxonomy because it only represents the tree forms of *Acacia Senegal*. All the tree specimens of North East Africa are reported as being var. *kerensis*.

Var. *senegal* can be distinguished from the other three varieties because of the existence of the following characteristics: a tree with a central trunk with a generally flat and flat tree-top, a rough bark with no papyrus-like flakes, pubescent peduncle (very rarely smooth), with either rounded or slightly pointed pods but never pointy at the apex. None of the *kerensis*, *leiorhachis* or *rostrata* varieties apparently produces much gum in their regions of origin.

Topography

Acacia senegal is a species that can sustain very dry conditions, can grow with anything from 100 to 800mm of rain but preferring 300 to 400mm of rain and a dry period of 8 to 11 months. It can survive very high daily temperatures but not frost. The species may grow on a range of topographic conditions but grows well in sandy soils (red-brown sub-arid soils and ferruginous tropical soils). It also grows well in fossil dunes, slightly silty soils, brown clay soils, clay sandstone and even in litho soils although a good drainage is required. *Acacia Senegal* grows exceptionally well in the regions of Kayes in Mali and South Cordofan in Oriental Sudan, in heavy clay soils with 800mm of rain per year.

Proliferation and cultivation

Depending on the region, maturity occurs over the period between the end of November and the beginning of February. The species is most often cultivated in polyethylene bags in tree nursery but utilizing seedbeds has also yielded great results and curbed expenses immensely. *Acacia senegal* var. *senegal* can be propagated using seeds or via the cultivation of species tissues, where one kg contains between 7000 and 19000 seeds. Seeds with hard teguments are the most common and may remain viable for about 7 years when they are stored in fresh and dry conditions.

Fresh seeds with soft teguments may be sowed immediately without pre-treatment but pre-treatment is necessary for seeds which have been stored for several

months. Treatment with concentrated sulphuric acid for 3-15 minutes or immersion in boiling water for 5 seconds is adequate treatment. Older seeds may be treated using concentrated sulphuric acid for 40 minutes or steeped in water for about 12 to 24 hours.

In the first 2 years, one has to carefully eliminate the presence of weeds in afforestations and protect the growing tree from forest fires and cattle. When the plantation is spread out (10 x 10m), an interlayer cultivation technique is possible which is the case for millet, beans, groundnuts etc... Interlayer cultivation and the growing tree both benefit from the toiling of the soil.

In vitro propagation of *Acacia senegal* has been successfully performed on a small scale. Yet, this method is probably not economical unless the multiplication is performed using trees with high yield. Natural regeneration is very unpredictable because of irregularities in rainfall and frequent attacks of the seeds by insects and rodents. Trimming also occurs after tillage.

Uses

Acacia senegal is a polyvalent tree; the foliage and pods constitute a primary source of fodder for camels and goats. The seeds may be dried and stored for human consumption during periods of famine.

Its wood is used for small-scale carpentry and for making agricultural tools. It also produces a high quality fire when burned, yielding superior coal. The thorny branches are often used to make hedges to enclose cattle or to protect agricultural farms. Resistant to drought, this tree is planted to set the sand from dunes, to serve as a windbreaker or to provide shelter in arid regions.

The bark, the leaves and the gum are utilized as an astringent to treat colds, eye diseases, diarrhea and hemorrhages. The flowers produce honey while the roots may be used to make ropes. They may be used directly or after threshing to extract the fibers; they are used in making ropes for wells and fishnets because of their solidity. The seed contains a fatty material, which is utilized in medicine as well as in manufacturing soap.

Acacia seyal Del.

Family: Mimosaceous Legumes (Leguminosae – Mimosoideae)

Synonyms: Acacia stenocarpa Hochst; Acacia hockii De Wild.

Vernacular names: Mimosa épineux (French); Talha (Arabe)

Characteristics

It is a small to medium tree (up to 17m high and 60cm in diameter) with a distinct sunshade shape for the treetop in adult trees. The bark is a pale green-gray colour or a rusty red for the seyal variety due to an underlying layer of a brightly coloured green powder. On old trees, the bark is grey-black in colour and made up of corrugated layers. The bark of the fistula variety is white or greenish-yellow in colour.

The branches are bright red in colour and secrete a yellowish gum, as do cracks and slits in the bark resulting from dryness. The small branches also have numerous reddish small glands and auxiliary thorns organized in pairs. The latter are 7cm long, slender, straight, pointy and light gray in colour.

The leaves are dark green in colour, possess 4-12 pairs of pinnules, each of which have about 10 to 22 pairs of leaflets, and a rachis (main stem) of up to 8cm. The flowers emerge as bright yellow balls, of about 1.5cm in diameter, on auxiliary 3cm stems grouped together in twos or threes. The pods are slightly bent, light brown when mature, slender, 10 to 15cm long with a base 1cm wide and contain about 6 to 10 seeds.

Distribution

A tree typical of semi-arid African regions, the seyal variety is the most widespread stretching throughout the Sahel from Senegal, through Sudan, Egypt, Ethiopia and down through East Africa, up to Tanzania. The fistula variety is confined in the horn of Africa, central and east Africa.

Topography

Acacia seyal needs between 250 to 1000mm of rainfall per year. This species thrives well in clayey soils and survives equally well in periods of flooding and drought, where the soil is cracked. It also flourishes in rocky soils, plain fields, at the bottom of slopes, by riversides, in alluvial or humid soils in valleys and near ponds or in shallow waters. Generally, it grows poorly on the mountainside and on mountaintops.

Propagation and cultivation

Apart from a few sporadic cultivation trials, *Acacia seyal* plantations are rare. In general, propagation occurs naturally although the process is heavily slowed down by cattle grazing, fires, flooding and herbaceous vegetables. The harvest of seeds is straightforward, one may obtain 20, 000 and 22, 000 seeds per kg harvested. Seeds are harvested in the same manner as with other acacia species. In ideal conditions, the tree grows fastest when young at a rate of 1m per year and eventually achieves its adult and final height after 8 to 10 years.

Uses

The leaves, the fresh shoots and the fruits are valuable fodder, the latter of which is often grazed upon after having been harvested by shepherds. The tree bark is also central fodder for several wild animals. The wood is an excellent combustible, used by the locals to make coal but also because its smoke distances insects. The branches are also used in communities to create fences.

Acacia seyal is also used locally for medicinal purposes. Infusions made from the bark and brews made from the roots are utilized against dysentery, leprosy, gastro-intestinal pains and syphilis.

Uses of Gum Arabic

Gum Arabic has several domestic uses namely in manufacturing ink, making adhesives, crafts making, in cosmetic products, in confectionary and in foodstuff. It is also utilized locally in special meals and as chewing gum. Focusing specifically on human consumption, Gum Arabic is an excellent dietary product because it contains less than 1cal for every gram.

The Hottentots in southern Africa can survive for several days on nothing but gums, while Moorish populations in northern Africa sustain a daily portion of 170g of gum (Grieve, 1931). Fagg and Stewart (1994) report that *A. gerrardii* is consumed in Oman whereas, according to Story (1958), bushmen in the Kalahari consume *A. mellifera* subsp. *detiens*, *A. erioloba*, *A. erubescens*, *A. fleckii* and *A. tortilis* subsp. *heteracantha*.

Ever since the pharaonic era, gum has been utilized in traditional medicine as a calming and softening agent. It is equally included in (traditional) medicine concoctions to address internal ailments such as cough, diarrhea, dysentery and hemorrhage and applied externally, to daub inflammations. It is also used in veterinary medicine, to treat skin diseases and inflammations for example.

The Ebers manuscript (a medical document on papyrus written around 1550 BC) describes acacia gum or Gum Arabic as a means of contraception when utilized with dates.

Nevertheless, Gum Arabic is most famous and prized by producing and exporting countries for its industrial uses, among others, in the nutrition, pharmaceutical and cosmetic branches.

Gum Arabic is utilized in the food industry to set flavours, as an emulsifying agent, to prevent the crystallization of sugar in confectionary and as a stabilizing agent in frozen dairy products. It is also useful in the baking industry because of its viscous and adhesive properties, which are used to stabilize mousses, and as a turbidity agent in beer.

Gum Arabic is a soluble alimentary fiber, a property that allows it to be functional in the body, as have been demonstrated by several studies. In fact, alimentary fibers are described as the remains of vegetable

cells which the intestine does not digest and are capable of diffusing into the large intestine and fermenting when it contact of micro flora therein.

Most compounds, which fit the above description, are polysaccharides of the (plant cells) inner membrane (such as cellulose, hemicelluloses and pectin) as well as those found in the cytoplasm (gum, resistant starch, insulin, etc.)

Gum Arabic is composed primarily of highly branched galactane polymers with side chains of galactose and/or arabinose, ending eventually in residues of rhamnose or glucoronic acid. The human digestive system does not secrete nor create enzymes capable of hydrolyzing this polysaccharide.

Therefore, Gum Arabic travels through the stomach and small intestine without getting digested and only when in the large intestine does it undergo fermentation induced by surrounding bacteria.

Gum Arabic is completely fermented because no detectable amounts are excreted with the faeces. It is broken down and excreted as gas during respiration or absorbed by the mucus layer in the form of short fatty acids.

Other soluble alimentary fibers, such as guar gum or pectin, undergo the same fate in the digestive system.

In the pharmaceutical industry, Gum Arabic is utilized to stabilize emulsions, as a binding agent and for coating medications. It is also included in the mixtures for eye drops and cough syrups.

In the cosmetic field, it is used as an adhesive when making face powders and masks but also used in making lotions creamy and smooth. In the chemical industry, Gum Arabic is utilized as glue, as a colloid protector and as a preserving agent for inks.

It is also used to sensitize lithographic plates, to stiffen cloth, coat certain paper types and for coating metals to prevent corrosion. It is equally utilized in manufacturing matchsticks and ceramics⁴.

⁴ Cossalter, 1991

International Market

On the international market, Gum Arabic is subject to various trends and fluctuations. This is the result of several factors: a growing demand, a varying ability for African countries to stabilize supply, variability of quality and price and, finally, the threat posed by the emergence of substitute products in importing countries—a factor may

negatively affect the demand for Gum Arabic.

The international market remains currently polarized with the European Union and the United States of America on the one hand and the principal producing and exporting countries located in Africa, namely Sudan, Chad and Nigeria.

Global production

The majority of Gum Arabic is produced from 17 African countries (14 of which were members of the NGARA network in 2007) in varying quantity and quality. These countries include: Sudan, Chad, Nigeria, Cameroon, Niger, Senegal, Mali, Mauritania, Burkina Faso, Kenya, Ethiopia, Tanzania, Eritrea, Somalia, Zimbabwe, Uganda and Ghana.

Sudan currently dominates the world market, producing about 80% of the available product. In 1970, the global annual trade involved about 70 000 tons but 2 serious seasons of drought reduced the amount commercially available to between 20000 and 24000 tons in 1992. During periods of shortage, several companies invested in equipment to produce alternatives using other hydrocolloids, a factor which negatively and irreversibly affected Gum Arabic trade.

Statistical information on production and exportation are difficult, virtually impossible, to obtain because few producing countries release customs information. It is common knowledge that there is a flow of Gum Arabic at the borders of producer countries but without publications from the custom stations concerned, it is impossible to determine each country's real contribution to the export market.

In the past few years, there has been an apparent reduction in the flow of Gum Arabic, namely in the Lake Chad basin where it is being exported directly by each country, especially Chad. Chad is the second largest producer in the world and as the majority of Gum Arabic in the area now leaves from FOB N'djamena, it

reduces the flow for the neighboring countries.

Based on data available in 2006, Table 2 gives an overview of the major producing and/or exporting countries. It is arranged in order of value (percentage), from the largest to the smallest.

Table 2: Major African producing and exporting countries

	Country	%	
Major Producing countries	Sudan	43	96
	Chad	35	
	Nigeria	18	
Minor Producing countries	Senegal	1,05	3,46
	Mali	0,83	
	Tanzania	0,52	
	Ethiopia	0,40	
	Mauritania	0,38	
	Cameroon	0,28	
Others	Ten African countries	0,1	0,66

Source: ITC (TradeMap) based on COMTRADE statistical data

In 2006, three countries represented 96% of the offer whereby the remaining 4% involved the other producer countries, basically the least advanced countries. In the latter category, six countries contribute 3.46% to overall African production, which the rest, a mere 0.66%, reflects the production of countries contributing very little to the exports of raw gum from Africa. The greatest change over the last few years is the growing production of Gum Arabic from Chad, making it the second largest global producer with 35% of production in Africa—right behind Sudan with 43%.

Trade

Exports

From 1988 to 1994, Sudan exported 20,000 tons of "hashab" Gum Arabic annually, on average, while Nigeria exported 4,800 tons of Gum Arabic in that same period. A portion of the gum produced in Sudan is exported illegally to other countries.

The information available on gum imports and exports on the global market come from sources in the countries and international organizations. The numbers reported are a mixture of aggregate data, of "mirrored data" and calculations made to compensate for missing data.

Table 3 illustrates the quantities of raw Gum Arabic sold on the global market, in metric tons, by producer countries in Africa and Asia. The quantities of raw Gum Arabic exported, as indicated in the table, is not a completely accurate representation of the actual amount of Gum Arabic produced because it does not account for Gum Arabic consumed locally or exported unofficially or illegally. Therefore, the quantities listed do not reflect the accurate total global production of Gum Arabic.

Table 3: Raw Gum Arabic exports (tons) 1992 - 2006

Year	Sudan	Chad	Nigeria	Africa/others	Sub-total / Africa	Asia	Total
1992	17 061	2 450	8 358	3 073	30 942	726	31 668
1993	13 475	3 701	7 042	2 243	26 461	756	27 217
1994	23 341	4 558	9 822	3 751	41 472	684	42 156
1995	18 143	7 001	9 914	2 821	37 879	814	38 693
1996	17 671	7 365	12 164	3 349	40 549	435	40 984
1997	17 342	8 527	10 199	5 301	41 369	696	42 065
1998	25 053	12 584	8 166	2 296	48 099	384	48 483
1999	19 305	11 312	8 598	3 399	42 614	912	43 526
2000	21 916	11 682	8 239	4 009	45 846	2 251	48 097
2001	26 105	12 881	8 747	2 137	49 870	471	50 341
2002	34 162	10 664	6 556	2 724	54 106	258	54 364
2003	13 217	9 672	50	3 097	26 036	835	26 871
2004	27 444	12 044	15 407	2 393	57 288	762	58 050
2005	33 078	14 186	19 313	3 930	70 507	1 879	72 386
2006	23 149	17 812	21 231	3 474	65 666	709	66 375

Source: ITC (TradeMap) based on COMTRADE statistical data

In the last 15 years, the amount of crude Gum Arabic exported from Africa rose 117%, that is, from 30,000 to 65,000 tons.

Table 3 reveals that the three major producer countries are Sudan, Chad and Nigeria. The combined quantity of Gum Arabic from these three countries was up to 94% of the global market, in 2006. Asian countries represent only 1% of the market. Other African countries, then, represent the remaining 5%.

The quantity for Sudan alone constituted 35% in 2006, whereas it has been more than 50% in 2002. In 2006, still, Nigeria contributed up to 32% to the global market of Gum Arabic while Chad contributed

27%. In terms of absolute amounts produced, Sudan comes first and is, this time, followed by Chad and then Nigeria. Chad has shown the great progress in terms of crude gum exports. In fifteen years (1992-2006), Chad's exports rose from 2000 tons to 17,000 tons, an astounding 750% rise.

Monetarily, Chad's exports between 2003 and 2007 amounted to more than USD 40 million, behind Sudan's USD 50 million and vastly ahead of Nigeria's USD 21 million. A sizable amount of Chad's production is exported to other countries.

The trend for 2005-2006 is an apparent reduction in the amount of Gum Arabic exported by Sudan but an increase for Nigeria and Chad.

Re-exports

Majority of re-exported Gum Arabic leaves from a few countries, mostly European countries with a colonial history. In fact, the key Gum Arabic merchants and manufacturing companies are located in France, the United Kingdom and Germany. These three countries re-exported, between 2003 and 2007, more than 139, 273 tons of Gum Arabic, about 83% of the total. France, to date, remains the leading importer and re-exporter worldwide of Gum Arabic in spite of economic stagnation in recent years.

Table 4 shows that France's re-exports constitute more than 58% of global re-exports, followed by the United Kingdom with 15%, Germany with 10% and USA with 8%.

Other European countries represent 8% of the global market while Asian countries, namely Japan, Singapore and Thailand, represent less than 1% of the global market.

Between 2003 and 2007, re-exports from the European Union countries amounted to more than USD 556 million.

Table 4: Re-exports of Gum Arabic for key countries, in tons. (2003-2007)

Countries	2003	2004	2005	2006	2007	Total
France	17663	18887	17745	19689	22764	96748
United Kingdom	5212	4078	5193	5962	5625	26070
Germany	3480	3253	3033	3450	3239	16455
USA	1876	2013	2812	3332	3115	13148
Belgium	1761	1972	2301	563	611	7208
Italy	419	926	778	677	749	3549
Netherlands	465	693	239	624	519	2540
Austria	5	1	5	52	82	145
Switzerland	87	123	43	19	67	339
Japan	10	13	13	23	58	117
Singapore	49	34	144	29	38	294
Thailand	196	102	54	31	36	419
Ireland	463	81	20	30	30	624

Source: ITC (TradeMap) based on COMTRADE statistical data

As illustrated in the table, Europe still dominates the global market of Gum Arabic, marketing 83% of the total amount (in tons) and representing close to 89% of the business affairs between 2003 and 2007. The value-added achieved is more than 125% of the imported value for the European Union while it is 66% for the USA. France, which achieves slightly more than 107% of crude value-added, makes the greatest profits on its re-exports. This crude value-added includes the industrial costs of processing gum-using humidity and ultimately through atomization. In fact, almost all the 2007 Gum Arabic re-exported underwent this industrial processing.

The industrial crushing process has become obsolete given the fact that it no longer fulfills phytosanitary security

standards established for industrialized countries. This "dry route" process has slowly been making way for the "humid route" process. The latter requires a much more complex industrial production system: dissolving, mixing, multiple filtering, pasteurization and finally atomization using a similar atomization apparatus to the one used to make powdered milk.

The Sudanese Gum Arabic Company (GAC) was the first exporter to invest in semi-mechanized sorting machines and crushing apparatus in order to achieve clean Gum Arabic, with a standardized grade. Following its example, more and more private exporters in the producing countries invested in similar equipment. These investments allowed for a 10% of the value-added to return back to the producer country and to limit the transport

of waste (bark, wood, sand, etc) and potential rejection of the merchandise for not meeting the standards.

A significant portion of the crude value-added obtained is used to fund these equipment and their functioning. This, consequently, reduces the net value-added obtained by the manufacturing companies concerned. The available data does not allow for the net value-added to be calculated accurately.

Imports

An analysis of the global import data, between 1993 and 2007, reveals that the European Union is by far the largest market for Gum Arabic. Between 2003 and 2007, it imported about 200 000 tons, amounting to close to USD 432 million.

The USA is the leading partner of European countries and mostly imports processed Gum Arabic. Between 2003 and 2007, the United States imported close to 83, 000 tons of Gum Arabic, or 96% of European Union exports, a quantity equal to USD 213, 336, 414.

Table 5 displays imported quantities (in tons) for various countries and also ranks countries according to their contribution to the global imports market. This table also reveals a clear increase in Gum Arabic imports, on the global level.

Global Gum Arabic imports rose significantly in 2004, 2005 and 2006, exceeding 100,000 tons for the first time in 2005. Imports eventually dropped in 2006. Paradoxically, this rise coincided with the 2004-2005 Gum Arabic crisis where a decrease in the production of "hard gum" saw an increase in the demand of other gums, flaky gum in particular. In fact, these conditions propelled *Acacia seyal* on the market and because stocks were cheap, highlighted the role of Gum Arabic in the nutritional additives market. According to Table 5, France remains the leading importer of Gum Arabic. In fact, in

Yet, the gains achieved by the French industry (52% of crude value-added) are lower than those achieved in 2002. This followed an increase in manufacturing of flaky Gum Arabic, which effectively decreased the cost of acquiring raw material and, consequently, resulted in a greater net margin.

Monetarily, France is the country, apart from India, which buys its Gum Arabic, the cheapest. It follows, then, that flaky gum obtained from *Acacia seyal*, constitutes a large proportion of its imports.

the past fifteen years, France's imports of crude gum were more than 30% of the global market, followed in Europe by Great-Britain, with about 10% of the market. The USA represents 17% of the market while Germany and Italy combined, represent another 10%.

India and Japan import 13%, on average. The combination of other countries, such as the emerging countries in Eastern Europe, countries in South America and Asia, are importing more and more Gum Arabic representing a total of 20% of the import market.

Table 5 reveals that, for 4-5 countries or for the European Union, the majority of Gum Arabic imports took place in 2007.

The USA and India have dramatically increased their Gum Arabic imports over the last few years, with the USA increasing its imports by 674% between 1993 and 2007.

In order to meet demands of the import market, other African producer countries increased significantly their Gum Arabic supply. Such was the case of Chad, which in 2006, initiated trade relations with about 20 countries and exported more and more crude gum to the USA.

Sudan has acquired trade relations with close to 30 countries and Nigeria has trade relations with about 15 countries.

Table 5: Crude Gum Arabic imports (1993 – 2007)

Tons	France	U.K.	U.S.A.	India	Germany	Italy	Japan	Others	Total
1993	10 560	4 724	2 035	2 573	2 957	2 058	782	1 746	27 435
%	38	17	7	9	11	8	3	6	
1994	12 009	4 653	6 916	3 763	4 371	5 201	1 447	3 362	41 722
%	29	11	17	9	10	12	3	8	
1995	10 675	4 247	5 364	7 547	4 518	2 169	1 072	2 740	38 332
%	28	11	14	20	12	6	3	7	
1996	12 450	4 079	6 454	8 344	2 528	1 735	1 220	3 987	40 787
%	31	10	16	20	6	4	3	10	
1997	15 931	4 836	6 078	6 095	3 252	699	1 379	3 371	41 641
%	38	12	15	15	8	1	3	8	
1998	20 075	5 137	9 028	5 621	3 058	644	1 599	4 081	49 243
%	41	11	18	12	6	1	3	8	
1999	15 631	1 829	6 563	6 574	3 672	2 096	1 265	5 730	43 360
%	36	4	15	15	9	5	3	13	
2000	19 202	3 744	6 835	5 638	4 405	1 147	1 717	5 307	47 995
%	40	8	14	12	9	2	4	11	
2001	20 738	3 310	7 780	4 777	5 398	2 040	1 724	3 810	49 577
%	42	7	16	10	11	3	3	8	
2002	22 182	4 807	7 444	4 710	4 521	2 365	1 080	6 891	54 000
%	41	9	14	9	8	4	2	13	
2003	24 514	8 685	15 964	8 172	4 433	5 749	2 535	23 846	93 698
%	26	9	17	9	6	5	3	25	
2004	23 677	7 599	15 050	12 731	7 291	3 819	2 571	22 544	95 282
%	25	8	16	13	8	4	3	23	
2005	25,293	9 983	18 335	14 826	8 092	4 167	2 322	26 622	109640
%	23	9	17	14	7	4	2	24	
2006	18 567	5 127	17 866	18 840	6 262	3 408	1 780	27 513	99 363
%	19	5	18	19	6	3	2	28	
2007	29 661	9 622	15 956	-	6 195	4 165	2 635	20 578	88 812
%	33	11	18	-	7	5	3	23	

Source: ITC (TradeMap) based on COMTRADE statistical data

Consumption figures by country

Overall, Gum Arabic is consumed on all continents and more and more countries are importing it to satisfy internal demand.

According to 2006 data, between the 2003 and 2007, 13 countries consumed 80% of the global Gum Arabic supply, which is equivalent to 5000 tons annually. Following them are 23 countries, mostly emerging countries, which consume another 17% or close to 200 tons of Gum Arabic.

The remaining 3% represents 70 countries whose annual consumption of Gum Arabic is less than or equal to 175 tons of Gum Arabic. This group encompasses a range of countries: emerging economies, low-income economies and industrial economies (Luxembourg, Malta, etc...)

Table 6 provides an overview of annual internal consumption for various countries.

The countries are listed in descending order of consumption, as reported in 2007. Based on this table, the average annual consumption of Gum Arabic amounted to 65,000 tons in the 2003-2006 period. This figure, however, is 22 000 tons lower than the average exports and re-exports—for producer countries—calculated for that same period.

This difference can be partly explained by the fact that exports by producer countries are not correctly reported. It may also be explained by the fact that a proportion of Gum Arabic gets re-exported under a modified identity, such as toiletries, vitamins or nutritional additives. Actually, the quantity of Gum Arabic consumed in this manner corresponds approximately to the difference between imported quantities and re-exported quantities, between 2003 and 2006.

Table 6: Consumption of Gum Arabic by major importing countries (2003 – 2007)

Country	2003	2004	2005	2006	2007	Total
USA	14088	13037	15523	14534	12841	70023
India	8070	12562	14768	18744	0	54144
France	6851	4790	7548	-1122	6897	24964
Germany	2269	4038	5059	2812	2956	17134
Italy	4014	2893	3389	2731	3416	16443
United-Kingdom	3473	3521	4790	-835	3997	14946
Japan	2525	2558	2309	1757	2577	11726
China	1077	1088	1550	1600	2366	7681
Switzerland	1242	1183	1244	1864	2107	7640
Mexico	1457	1323	1350	1327	1358	6815
Sweden	770	674	1496	1850	1693	6483
Ireland	420	130	1890	1101	2939	6480
Brazil	1023	993	886	1151	1199	5252
Denmark	1363	1002	840	1602	0	4807
Netherlands	499	1200	1075	839	562	4175
Republic of Korea	984	803	790	761	704	4042
Russia	465	526	724	890	1086	3691
Poland	627	748	888	861	0	3124
Swaziland	1416	224	816	235	0	2691
Indonesia	186	918	545	873	0	2522
Spain	714	596	574	602	0	2486
Algeria	919	719	313	167	0	2118
Pakistan	380	474	490	302	384	2030
Argentina	512	542	434	459	0	1947
Finland	407	278	320	502	388	1895
Hungary	272	344	424	840	0	1880
United Arab Emirates	0	0	528	1313	0	1841
Norway	621	434	178	308	283	1824
Austria	323	354	233	220	521	1651
Australia	348	296	347	357	294	1642
Canada	146	255	396	373	414	1584
Philippines	436	439	330	290	0	1495
Turkey	345	321	387	253	104	1410
Thailand	269	176	265	321	283	1314
Belgium	374	156	-962	1036	694	1298
South Africa	208	244	206	208	230	1096
Egypt	225	93	448	280	0	1046
Portugal	239	253	226	161	0	879
Taiwan, China Province	168	135	261	258	0	822
Chile	0	210	242	334	0	786
Malaysia	64	65	94	91	316	630
Colombia	129	69	149	122	122	591
Israel	0	0	198	221	103	522
Saudi Arabia	43	77	148	205	0	473
Slovenia	87	90	81	75	83	416
Iceland	83	66	109	43	84	385
Vietnam	54	108	78	63	0	303
Guatemala	22	35	66	86	92	301
Venezuela	58	51	93	99	0	301

Slovakia	26	28	12	11	206	283
Greece	45	39	28	51	110	273
Morocco	80	92	43	31	0	246
Costa Rica	77	62	30	63	0	232
Zambia	1	41	125	16	32	215
Romania	53	32	38	56	33	212
Czech Republic	48	55	36	35	31	205
Ecuador	20	33	48	60	36	197
Singapore	43	52	-56	30	60	129
Hong-Kong (RASC)	24	25	71	1	1	122
Tunisia	14	6	12	86	0	118
Bangladesh	24	72	8	9	0	113
Libya	3	0	7	102	0	112
New-Zealand	12	15	26	30	24	107
Others	270	271	273	330	102	1246
TOTAL tons/year	61005	61914	74837	64075	51728	313559
European Union	22290	20501	27143	12608	24549	107091

Source: ITC (TradeMap) based on COMTRADE statistical data ¹ European Union

A close examination of Table 6 shows that there are numerous other countries, apart from the major ones, in the Gum Arabic import market, many of which are emerging economies. These major countries, namely the USA, India, France, Germany, Italy, United-Kingdom, Japan, China, Switzerland, Mexico, Sweden, Ireland, Brazil, imported over 5000 tons between 2003 and 2007.

The European Union countries consumed more than one third of available gum, between 2003 and 2007. It is noteworthy that this was still lower than the quantity consumed by either India or the USA, in the same period. These two countries remain the top consumers of Gum Arabic.

Table 6 also shows that the prospects of the Gum Arabic market destined to Latin American countries, by way of the major negotiating countries was more than 4 750 tons in 2007. This figure is, however, a 36% reduction of the prospects in 2002. These prospects, incidentally, have been in steady decline as a result of the economic crisis that has gripped several countries; Mexico's economy, especially, underwent a few stagnant periods. In fact, Mexico's consumption dropped more than 69% between 2002 and 2007. Brazil, on the other hand, established itself as a major consumer country with an increase of 26% in imports, during that same time period. Four other countries emerged on the market between 2003 and 2007, as listed below with associated average annual quantities (in tons):

- Argentina made a dramatic breakthrough with 486 tons imported (172 tons in 2002);
- Chili's increase was of 262 tons (200 tons in 2002);
- Colombia consolidated its imports with 118 tons (101 tons in 2002) ;
- Costa Rica showed a slight increase with 58 tons (48 tons in 2002).

The prospects for Asian countries (China, Pakistan, Malaysia, Thailand), apart from Japan and India, were more than 4000 tons in 2007, a 200% rise from 2002. This region has been predominantly supplied via the large bargaining (trading countries) but increasingly by the producer African countries themselves.

Internal consumption of Gum Arabic has also increased for Australia, South Africa and Canada. In 2007, each country imported close to 350 tons on average in 2007. The combined amount was 3,754 tons between 1998 and 2002 to more than 5,700 tons between 2003 and 2007, a 53% increase.

Finally, Russia's consumption also increased from 1,193 tons between 1998 and 2002 to 3,691 tons between 2003 and 2007—a 200% increase.

From the 1998-2002 to the 2003-2007 Arabic increased by 65, 600 tons. The underlying breakdown for this figure is as follows: A 12% increase by the USA (8,000 tons), a 19% for India (12, 700 tons), a 24% increase by the European Union (15, 800 tons), and a 45 % (about 29, 600 tons) increase for other consumer

time period, global consumption of Gum countries, most of which are emerging economies. The dynamic nature of these economies allows for the latter to pull up the global Gum Arabic market and relieve/take over from western industrial powers and Japan.

Market characteristics

Exports, importance and trends of consumption

Based on analysis of trade data, it is apparent that exports, re-exports and imports of Gum Arabic are dominated by a small number of countries. In 2007, three countries yielded 96% of the supply (Sudan, Chad and Nigeria), 80% of the global Gum Arabic is consumed by 13 countries, three of which are responsible for 70% of re-exports (France, Great-Britain and Germany).

Hence, it is a highly concentrated market where the leading positions have been occupied by a few countries, for a long time. However, recent examples demonstrate that it is possible to occupy one of those positions within a decade, particularly with a vibrant private sector. Chad illustrated this perfectly, going from

supplying 5 to 25% of the global Gum Arabic in 10 years.

There are currently no recent studies on the various uses of Gum Arabic. Hence, it is impossible to neither accurately list the exact breakdown of the market nor describe it quantitatively or qualitatively (hard/flaky gum).

The uses of Gum Arabic, though, are related to two main characteristics: its high solubility and low viscosity in water. These allow Gum Arabic to serve as an excellent emulsifier, stabilizer, thickener and adhesive—all with low toxicity and caloric content, which make it equally suitable for use in dietary foods.

Rates

The prices set on Gum Arabic by the producer countries vary tremendously and are often difficult to index.

Information on the prices of Gum Arabic is obtained with difficulty. In fact, the renowned magazine 'Marchés Tropicaux', whose weekly publications were an international reference, stopped its publications in June 2008. Yet, information on the current prices set in recent years, was obtained by referring to other available sources.

It is important to recall that Gum Arabic is sold under different names and that the prices vary depending on the name given or on the country. Gum from Kordofan (a province situated in the center of Sudan's gum-producing belt) is known worldwide for being of exceptional quality. This gum, when secreted by *Acacia senegal* and still referred to "hard gum", is subjected to an industrial process in which it is cleaned and calibrated. "Hard gum" also obtained

from *Acacia Senegal* in Nigeria is sold under the name "grade 1", but it is has only been cleaned. This gum is related to the Chadian "hard gum", which is best known as "Kitir".

Talha Gum Arabic is flaky gum, which is secreted by *Acacia seyal* and exported from Sudan, after only having been cleaned. Grade 2 Gum Arabic is flaky gum exported from Nigeria and is also gum secreted by *Acacia seyal*, which has just been cleaned. Talha Gum Arabic from Chad is related to this product.

The tables below present the rates of hard and flaky gum in the major producer countries: Sudan, Chad, Nigeria as well as Mali. The rates of Gum Arabic had been published in the 'Marchés Tribunaux' magazine for over 10 years. The Tribunal of Justice liquidated the magazine on June 2nd following a decision. The rates of Gum Arabic have no longer been published since 19 may 2006.

Table 7: Rates of Gum Arabic in major producing countries (2004)

Origin	Grade	Rate US\$ (24.12.04)	Unit	Incoterm
Sudan	Kordofan	1650	T	FOB
	Talha (n°2)	750	T	FOB
Chad	Kitir	1847	T	FOB/Douala
	Talha (n°2)	1020	T	FOB/Douala
Nigeria	Grade 1	1150	T	CAF/Europe
	Grade 2	750	T	CAF/Europe

Source : Marchés Tropicaux et Méditerranéens (Meditterenean and Tropical markets)

Table 8: Rates of Gum Arabic in major producing countries (2005)

Origin	Grade	Rate US\$			Unit	Incoterm
		04.09.05	25.11.05	06.12.05		
Sudan	Kordofan	4300	4800	4300	T	FOB
	Talha (n°2)	N.C	N.C	N.C	T	FOB
Chad	Kitir	N.C	N.C	N.C	T	FOB/Douala
	Talha (n°2)	N.C	N.C	N.C	T	FOB/Douala
Nigeria	Grade 1	3000	4200	3000	T	CAF/Europe
	Grade 2	N.C	N.C	1500	T	CAF/Europe

Source: Marchés Tropicaux et Méditerranéens (Meditterenean and Tropical markets)

Table 9: Rates of Gum Arabic in major producing countries (2006)

Origin	Grade	Rate US\$		Unit	Incoterm
		06.01.06	19.05.06		
Sudan	Kordofan	4800	4800	T	FOB
	Talha (n°2)	N.C	N.C	T	FOB
Chad	Kitir	N.C	N.C	T	FOB/Douala
	Talha (n°2)	N.C	N.C	T	FOB/Douala
Nigeria	Grade 1	4200	4200	T	CAF/Europe
	Grade 2	1500	1500	T	CAF/Europe

Source : Marchés Tropicaux et Méditerranéens ; ¹ Prix officiel de la GAC

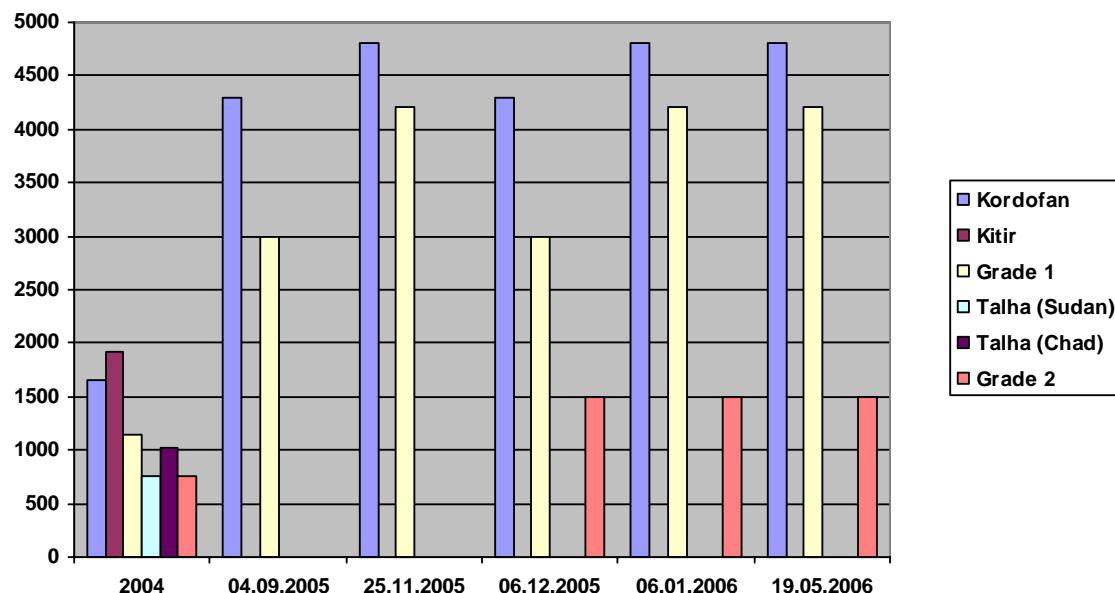


Figure 1: Changes in rates for major producing countries from 2004 to 2006 (in USD/tons)

Figure 1 shows that in 2004, before the explosion of prices, Kitir gum supplanted Kordofan gum from Sudan and Grade 1 gum from Nigeria. Similarly, Talha gum from Chad was quite ahead of the flaky gums of Sudan and Nigeria.

The data displayed in Table 10 came from “mirror” data from Chad and Nigeria and a mixture of direct data and “mirror” data for Sudan. According to the table, the rates are set just as before but Sudanese exports seemingly obtained the best rates.

Table 10: Unit export values in key African countries of Gum Arabic, all grades combined, from 2003 to 2007 (USD/ton)

Origin	2003	2004	2005	2006	2007
Sudan	1053	2252	3610	2724	4595
Chad	947	1236	2318	2276	1634
Nigeria	569	882	1324	995	1472

Source: ITC (TradeMap) based on COMTRADE statistical data

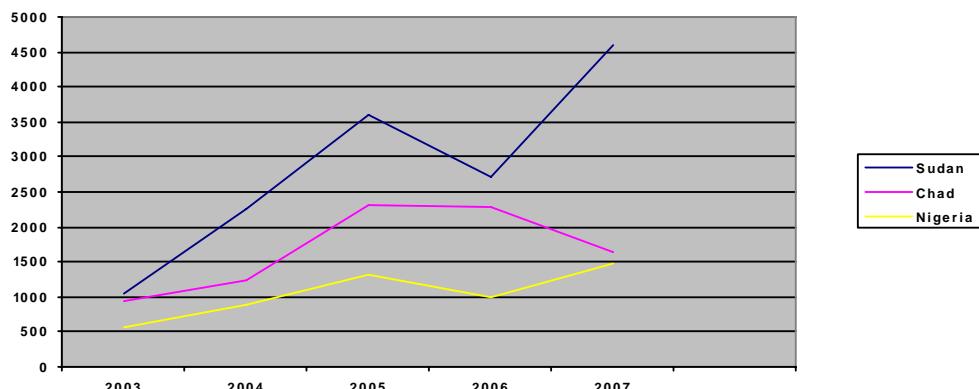


Figure 2: Changes in export rates in major African countries, all grades combined, 2003-2007 (USD/ton)

Figure 2 reveals that the prices of Gum Arabic are subject to trade policies and strategies, established by importing countries. As a result, there are differences between the well-established rates and those used by countries when dealing with trade partners.

The rates for flaky gum (grade 2, Talha, no. 2) did not fluctuate much in the 1990s. It would oscillate generally between USD750 and USD850 (CAF) per ton (Marchés Tropicaux). In fact, it is abundantly available; can be collected without cutting the tree, a tree that is widespread, growing well near shoals and water-rich soils. Hence, harvests are less sensitive to climatic hazards that harden gums. Apart from a small peak at USD 1000 in 1998-99, in general, there is a low risk of a surge in the rates of flaky gums.

The situation, which occurred between 2004 and 2005, had never occurred before. During that period, flaky gum, which had gained greater visibility in light of the scarcity of hard gum, saw its rates surge by more than 120%. As shown in

figure 1, the rate of flaky gum surged to USD 1500 (Nigerian grade 2) in 2006, following the trend for hard gum.

The rates of hard gums (Kordofan, grade 1, Kitir...), on the other hand, depend on a more tense market with frequent fluctuations. Between 2005 and 2006, its rates rose significantly to more than USD 4800/ ton in Sudan and USD 4200/ton in Nigeria.

The factors underlying this situation, among others, were as follows: the shortage of hard gum following a locust invasion, non-enticing rates set by producer regions, recurring drought and a decrease in the stocks of gum from Sudan to regulate and stabilize the market.

This depletion pushed consumers and producing countries to attempt, unsuccessfully till date, to build up again the available stocks. In fact, some consuming countries turned to other natural gums or substitutes.

In 2008, the rates of hard gum appeared to stabilize while the decline in rates, following the surge in 2005, is still

continuing. This can be illustrated by Mali's rates, which are indexed to the rates of the major producer countries.

Table 11: Rates of Gum Arabic in Mali 2004 – 2008 (In Euros)

Grade	Rates					Unit	Incoterm
	2004	2005	2006	2007	2008		
Number 1	1,02 ¹	3,35	3,11	1,76	1,3	Kg	FOB
Number 2	0,81 ¹	1,38	0,97	0,94	1,04	Kg	FOB

Source : ¹ Marchés Tropicaux et Méditerranéens ; Exporters, DNCC

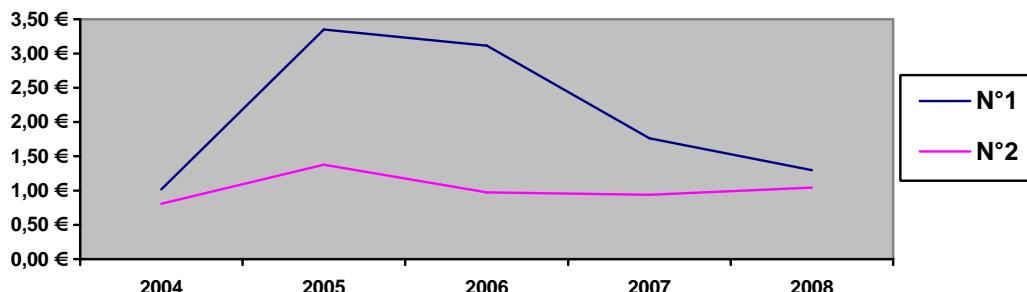


Figure 3: Changes in the price of Gum Arabic in Mali between 2004 and 2008 in Euro/kg

Figure 3 shows that Malian hard gum also followed general global trends, between 2004 and 2008: it rose to 3, 350 Euro (USD 4198) a ton in 2005 before decreasing to its current value of 1, 300 Euro (USD 2800) a ton.

The rates of flaky gum in Mali fluctuated as well during the same period and finally stabilized at 1040 Euro (USD 1508) a ton (FOB). The rates set for Chad in 2008 (2008 rates for other countries was unavailable) according to North American importer ranged from 840 Euro (USD 1218) and 1150 Euro (USD 1667) for flaky gum and from 1100 Euro (USD 1377) and 1600 Euro (USD 1377) for hard gum.

These rates are still relatively high, although somewhat close to the rates before 2004. These rates also have to be understood in the context of the food crisis, the weakening American dollar and the rise in petrol prices—all of which have contributed to a general rise in the rates of agricultural products.

Another variant of the rates is calculated by the stock values per unit when imported and when re-exported, which allows the countries dominating these sectors to make substantial profits.

Tables 12 and 13 shows the stock values per unit (USD/ton) for Gum Arabic at importation and re-exportation for the major countries between 2003 and 2007.

Table 12: Stock values per unit for Gum Arabic at importation, all grades combined, for the major countries (in USD/ton).

Countries	2003	2004	2005	2006	2007
USA	1665	2273	3167	3026	2396
France	922	1653	2736	2059	1653
United Kingdom	1147	2539	3946	3149	2125
Germany	1432	2540	4694	3870	2905

Source: ITC (TradeMap) based on COMTRADE statistical data

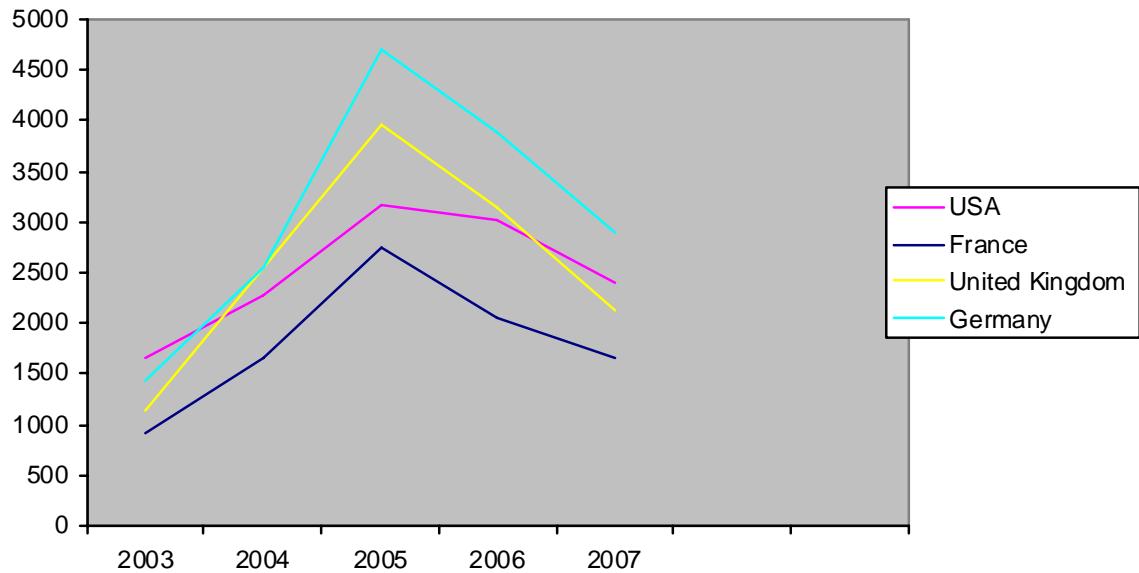


Figure 4: Changes in the import unit rates for major importing countries in stock units (USD)

The changes in stock unit values show that France buys its gum the cheapest while Germany and Great Britain paid the most for their gum, on average, over the past 5 years.

Table 13: Stock values per unit at re-exportation for Gum Arabic, all grades combined, for major countries (USD/ton)

Country	2003	2004	2005	2006	2007
USA	1665	2273	3167	3026	2396
France	922	1653	2736	2059	1653
United Kingdom	1147	2539	3946	3149	2125
Germany	1432	2540	4694	3870	2905

Source: ITC (TradeMap) based on COMTRADE statistical data

Figure 5 shows that Germany and the United Kingdom similarly obtain the best re-exportation rates, followed by the USA. However, in absolute value, France remains the leader in this sector because it contributes significant amounts of Gum Arabic to the re-exportation market.

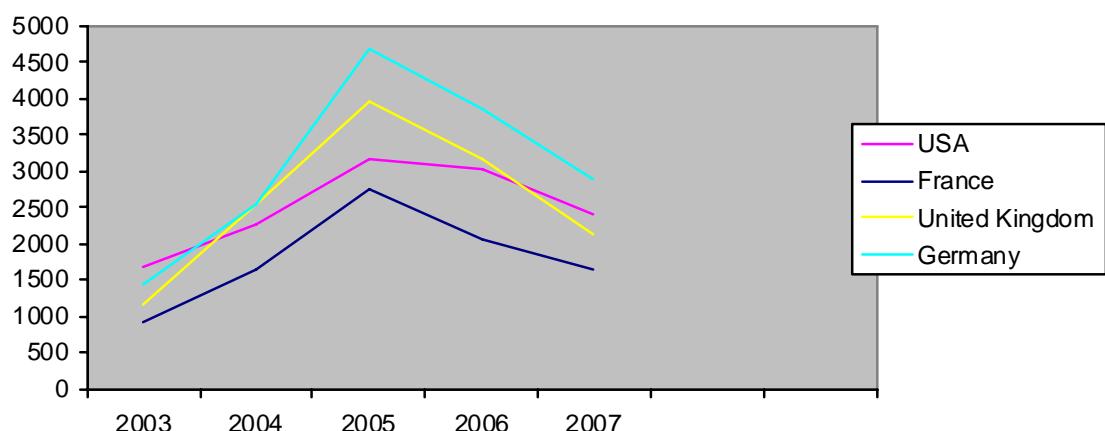


Figure 5: Changes in the Gum Arabic unit re-export rates for major countries, in stock value units (USD)

The manufacturing companies in the Gum Arabic sector in producer countries emulated in Sudan, which had been the sole one to do it so far, and continued installing sorting and crushing machines. Currently, there are about 20 such machines on the African continent.

This strategy has permitted to offshore a little the value-addition (by about 10%) and the workforce, the latter of which is more expensive than in industrial countries. It also allowed producer countries to stabilize the rates, eliminate a great deal of impurities and to have a stock of readily

available Gum Arabic to atomize via industrial processes. Very recently, atomized gum is even being produced in developing countries.

Nevertheless, whether a country posses sorting, crushing or atomization apparatus is a secondary concern to the actual purity of the final product. It must be maintained and developed in order to decrease the number of filtrations needed and to obtain products with well-defined types—whether the base is hard or flaky gum.

Market access

There are no significant barriers to the development of Gum Arabic. In most countries worldwide, especially in Europe and North America, there are no specific quotas or taxes on the Gum Arabic imports.

Some countries only request a certificate of origin while others, like the USA, also request a fumigation certificate in order to ensure that the packaging and Gum

Arabic meet phytosanitary standards and is innocuous.

On the contrary, consignments of "biological" Gum Arabic have to be accompanied with proof that they have not undergone fumigation. Methyl bromide, commonly used in the procedure, is strictly forbidden in European scope statement and controlled by ECOCERT.

Distribution channels and marketing practices

Gum Arabic does not follow a linear path from the producer to the consumer. The channels vary depending on the regulations of different countries. In some countries, issues related to Gum Arabic are partly or entirely controlled by the State. However, in the majority of them, these channels are arranged in a competitive manner, either by private agencies in the profit sector or by NGOs of the non-profit sector. Following, then, is brief description of the channels that relay producer and consumer countries of Gum Arabic, in a free and competitive system:

I. The farmer cuts his trees and collects the gum (hard Gum Arabic) or plucks the nodules by hand (flaky Gum Arabic), making sure to separate adequately the Acacia species in different clean bags. This harvest is subsequently spread out on a canvas, in a shaded area where it may attain maturity (or polymerization). It is then transported (by donkey, dromedary, truck) on market day to be delivered to a merchant.

II. The tradesman empties the bags, assesses the product visually and a price is established, based on a weighing or volume. The Gum Arabic is re-packaged in

new bags with the tradesman's imprint but also with an indication of the producer (obligatory for a biological certificate to allow for the product's origins to be traced.)

III. The tradesman, or an intermediary, after having chartered a medium truck or large carrier, groups together the bags and transfers them to an exporter—who is familiar with the intricacies of the passage through customs, exporting and international trade regulations. The merchandise is unloaded, the bags weighed and emptied in sets according to origin and, finally, inspected.

The remuneration is then calculated based on a basic previously established price (by an intermediary or agent) or based on a settled price (by tradesman or independent association). The cleanliness, purity and the polymerized state of the Gum Arabic furnished is also taken into account.

IV. The exporter refines the sorting process so as to export clean gum, or of higher grade. Increasingly, the gum is crushed or even atomized before exportation, depending on the equipment available. The Gum Arabic is then bagged,

paying attention to at least separate the hard gum from the flaky gum. The bags sometimes have specific colours, or are labeled with the name of the product, the name of the exporter agency, the country of origin, the net weight and information to trace their origin (for biological gums). The gum is then stockpiled on a pallet before being transferred to containers for expedition via customs and then by road, train and, ultimately, by sea.

V. The importer receives the merchandise, performs a visual inspection, analyzes a sample and only after a positive and satisfactory analysis, authorizes the bank to credit the exporter's accounts according to previously established documents.

VI. The importer, if it is a wholesaler, directs the merchandise to its industrial

recipient. If it is itself a production line, capable of atomization, it manufactures its own line of products. Commercial teams market the merchandise to different consumers in the food and pharmaceutical industries.

The outlined process is the standard process that has been employed for a long time by professionals. It is not uncommon for the process to be simplified in order to meet the high demand.

In the case of powdered Gum Arabic, already automated in the producer country, it is possible for it to be delivered directly to the end-user. This solution has been adopted by the SPINDAL-AEB group, which currently gets its supplies directly from the DANSA FOOD factory in Kano, Nigeria.

Packaging and labelling

Gum Arabic is a natural product and must be packaged in "breathable" material, allowing for its continued polymerization during transport. It must be packaged in bags made of weaved natural or synthetic fibers.

Gum Arabic may be transported via any method because it has an unlimited shelf life. As a result, it may be transported at low cost, namely by boat between Africa, Asia and other continents.

In the past, Gum Arabic was packaged in 100kg bags, however, in recent years, the 50kg bags are now the norm.

In order to fulfill the regulations established by some industrial countries, the current trend is to package the Gum Arabic in 25kg bags. This facilitates handling particularly when mechanical apparatus are not available. Also, because Gum Arabic is soluble in water, it must be

preserved from contact with water or from humidity by being stockpiled on a pallet (to prevent the spread of maidenhair fern) or in sheds and containers in good condition (from rain).

In terms of labeling, there is no norm surrounding Gum Arabic but common sense and standard trade practices establish the following as necessary information:

- Country of origin;
- Name of product: Gum Arabic;
- Specific name: Kordofan, Kitir, Talha;
- Name of the exporter association;
- The net weight in kg.

Sales promotion

Gum Arabic, also known as E414 (or 9000-01-05 or 232-519-5), is still largely unknown to end-users who are especially unfamiliar with this code. Gum Arabic certainly requires media coverage or should at least be clearly indicated when contained in a product.

Gum Arabic manufacturing companies lack the means to promote it through the media. However, an organization like the Association for International Gum Promotion (AIPG), working in conjunction with producer countries, their exporters and financed by international partners, could achieve this.

Market outlook, opportunities and challenges

Gum Arabic faces the following major problems: fluctuations in global rates, heterogeneity of the production process and climactic factors affecting the producing zones.

Several studies have put forward the correlation between pluviometers and production of gum by Acacia trees. In addition, the following factors, among others, contribute to the depletion of gum trees and the consequent decrease in gum production in some regions: overexploitation of tree, excessive cutting of trees for wood, over-grazing and forest fires.

Recently, the increased value of cereal by-products potentially poses a threat to Gum Arabic trade. Yet, the current context favors Gum Arabic in a way that is unprecedented in the last quarter of a century, as outlined below:

- High demand of both hard and flaky gum
- Close attention by consumers to the quality of their food products
- Abundant production originating from several countries
- The rates of hard Gum Arabic are now reasonable
- A net revival of the economies of certain industrialized countries
- More countries developing their own user/consumer industries

All these elements project favorable conditions for the growth of the global Gum Arabic market over the next decade. Exports could return to and stabilize at the levels attained at the beginning of the '70s, before the droughts. This is confirmed by recent trends: the production objective of 70, 000 tons has been attained and even surpassed, already in 2005, it was 70 000 tons and, in 2006, it was 65 000 tons.

The only real threat remains the availability of stocks, rates and conditions surrounding the harvest of Gum Arabic. Recall that acacia gum trees counter soil erosion, enriches the soil and improves global hydric assessments by combating desertification. In addition, and most importantly, it sustains hundreds of thousands of farmers and shepherds in Sahelian areas by providing them with substantial revenues.

The NGARA network was created by African producer countries in recognition of the value of Acacia gum trees as ecological and economic resource. This network seeks to generate and develop initiatives to promote Gum Arabic and other resins in Africa.

The creation of NGARA in May 2000 allows for the formulation of a coordinated strategy by both Gum Arabic producer countries and their partners. This should allow for the sustainable development of their gum and resin resources so as to ultimately improve the standard of living in rural areas and to preserve the environment.

The objectives of the network are:

- To promote the exchange of information on production, trade, processing and quality control from both producer countries and their partners,
- To facilitate access to technological developments and to training,
- To carry out a study on the available resources and collect information.

The network emphasizes the following areas:

- Training and capacity building,
- Information and database,
- Research & technological development.

Training and capacity building was considered a priority especially as the various countries are at different levels in terms of knowledge, production, trade and research. Also, the main aim is to train and build capacity among the people concerned in the member countries in order to sustainably produce, treat and trade gums and resins.

In relation to information and databases, there is a dearth of information on the resources, production, trade and exportation related to Gum Arabic and resins in African producer countries.

Also lacking is an effective information network. Information, then, has to be generated and dispersed among producer farmers by agricultural advisers. It is also imperative to document the consumption of gum-derived products by indigenous populations.

Considering that Sudan, Chad and Nigeria, together, cover 95% of the exports on Gum Arabic on the global market, the following section examines each country individually.

Major Exporting Countries

Sudan

The Republic of Sudan, which has a long history and century old tradition of cultivating natural gum, remains the global leader in Gum Arabic production to date. Its leadership extends to various aspects of Gum Arabic: organized planting, large-scale production, quality control, research, organization of the market, training and a certain ability to capture some value-addition.

The government supports this sector by installing policies on research and quality control, which have maintained Sudan ahead in the management of this natural resource.

In Sudan, there are two key public sectors which support the trade of Gum Arabic: the National Forestry Department, in the production field, and the Gum Arabic Company, in the quality, processing and marketing field. These institutions are under the management of the Ministry of Agriculture and Trade but also work in conjunction with the Sudanese Research Agency, the Department of Standardization, the Gum Arabic Association of Sudan and several other participating public and private organizations. Consequently, reliable information is easily accessible in Sudan.

Reforms in legislations and regulations

For several years, it was impossible for any organization apart from the Gum Arabic Company (GAC) to buy Gum Arabic in Sudan or export from Sudan. This company maintained the monopoly because it was created by the State, in order to monitor and maintain control over a resource so key to the economy. However, over the last decade, changes arose in the demand and the suppliers of the global Gum Arabic market.

Improvements in the quality of Gum Arabic produced in Nigeria and Chad, coupled with the creation of strategic alliances between importers and these countries, resulted in increased preference of Chadian and Nigerian Gum Arabic.

In 1998, *A. seyal* gum was certified by the Codex Alimentarius and the JEFCA. As a result, *A. senegal* which had been prioritized in the food and pharmaceutical sectors began to lose ground especially since Chad and Nigeria have more abundant supplies of *A. seyal* than Sudan.

The dwindling importance of *A. senegal* threatened the leading position of Sudan in the Gum Arabic global market, thus, inducing inevitable reform in national policies.

As a result, between 1996 and 2004, the Sudanese government authorized ten new companies to freely purchase Gum Arabic in Sudan and could only export it, if transformed. The ten companies then built local treatment centers.

The aim of this policy was to end GAC's monopoly and gave numerous exporters direct access to raw Sudanese Gum Arabic. Fifty-nine exporters joined the local Gum Arabic market and energized it in the process. This policy was very successful because the exporters generated Gum Arabic transformation factories in Sudan, which eventually changed local trade practices and guaranteed better revenues for farmers and internationally acceptable rates for producers.

Price ranges established for producers

Analysis of available data on rates of *A. senegal* Gum Arabic established with the producers and during exportation, between 1975 and 2004, suggests that the local producers were underpaid for their products. Over the years, farmers receive less than 15% of the export price of Gum Arabic, leaving them poor despite improvements in the global market. It is for this reason that 60% of Gum Arabic remains untapped.

Yet, with the recent change in trade policies allowing private buyers to buy raw Gum Arabic directly from farmers and in light of global shortage, the price to the producers rose to 3500 USD/ton in 2004. This is the highest rate in 90 years of gum trade history in Sudan. It also corresponds approximately to 78% of the export price, which was about 4500 USD/ton for *A. senegal* Gum Arabic in 2004.

Production

According to the National Forestry department, in its fullest capacity, Sudan can potentially produce 80 000 metric tons of *A. senegal* gum meanwhile barely 25% is currently available.

Production is currently on the rise, and will probably continue for the next years despite the partial liberalization of Gum Arabic trade in Sudan, increasing global demand, the depletion of the regulatory stock and a better rates being offered to producers.

The production of *Acacia senegal* and *Acacia seyal* between 1970 and 2003 in Sudan was very regular and interrupted only by three years of low production: 1992, 2000 and 2004, with less than 10,000 metric tons produced annually.

The low production of Gum Arabic in Sudan between 1990 and 1993 was the combined result of severe drought, an invasion by locusts and birds, and low rates, which discouraged farmers. The low production in 1999 and 2000, though, was not the result of locusts or drought but most likely caused by:

- The certification that *A. seyal*, and not *A. senegal* only, is Gum Arabic;

With higher rates for Gum Arabic, it is almost certain that farmers will be encouraged to produce more gum from season to season especially if such a reasonable rate is maintained from year to year. Yet, one indirect consequence of offering such high and attractive rates to producers in 2004 was the overproduction that followed, particularly in 2006 and 2007. This could eventually result in a collapse in prices and a subsequent decrease in production—and so on.

This constant cycle in the production and rates of Gum Arabic demonstrate the necessity to stabilize the market. This is not achievable without having a regulatory stock to lessen fluctuations: supplying in times of scarcity and buying the surplus in years of overproduction.

- Consistently low rates agreed for the producer.

In Sudan, *A. senegal* was produced in low quantities in 2004 because of the following factors:

- Prices in 2003 discouraged producer farmers to collect the gum;
- Complete depletion of the regulatory stock of Gum Arabic, previously Sudan's property;
- Continued desertification in Sudan;
- The invasion of locusts in the gum-tree regions;
- Conflict in the Darfur region, located in the gum-tree region.

The period between 1992 and 1999 showed a strong correlation between the rates proposed to the producers and the volume of Gum Arabic produced. In fact, this indicates that the higher the revenue the farmers receive, the greater the amount of Gum Arabic collected. This correlation is stronger in Sudan where the government monitors the Gum Arabic trade.

Marketing of Gum Arabic in Sudan

The marketing of Gum Arabic produced in Sudan is still dominated by the government-backed Gum Arabic Company (GAC). Although ten private organizations have been authorized to engage in the treatment and exportation of Gum Arabic, GAC still claims 70% of the Gum Arabic sales and exports in Sudan.

This hegemony is the result of well-established ties with a vast network of farmers, farmers' groups and intermediaries in the Sudan's Gum Arabic sector. For example, in 2004, which Sudanese production of *A. senegal* Gum Arabic is estimated to have been about 10,000 tons, GAC alone bought 7000 tons. The ten other companies had to contend themselves with the buying and selling of the remaining 3000 tons.

The range of categories of *A. senegal* Gum Arabic produced and sold by Sudan are outlined below:

- Cleaned
- HPS, Hand Picked Selected
- C&S, Cleaned and Sifted
- Kibbled
- Siftings
- Dust
- Powder

A. seyal Gum Arabic only exists in the 'cleaned' format. A large proportion of Gum Arabic produced in Sudan is exported in its raw form, just 'cleaned', and 'handpicked' or sifted.

Sudanese Gum Arabic clients exist worldwide: in Europe, the USA, India, South America, Asia and Japan, among others.

Local increase due to value-addition

Like in the majority of developing countries, transformation of Gum Arabic in Sudan did not produce the desired success. The grinding factory (KGAPC) established in Sudan over 15 years did not yield the expected results until it was purchased by the GAC. Consequently, Gum Arabic Company (GAC) and KGAPC are both managed by the government, which is not always efficient.

The ten companies authorized by the Sudanese government to transform the Gum Arabic export sector are still searching for a stronghold. Although these companies are involved in the crushing of Gum Arabic, the most basic processing of Gum Arabic, they are unable to establish themselves on the global market. The most successful companies are the ones, which undertake the most advanced processes on the Gum Arabic (atomization), in the importer countries. Examples include: AGRISALES, CNI, and ALFRED WOLF.

Among the 10 transformation companies in Sudan, Alfred Wolf is the only one to possess an atomization apparatus and is thus the terminal point of Gum Arabic treatment within the country.

The failure of the local treatment factories is linked to:

- The difficulty of trading already processed Gum Arabic on the international market;
- The coalition of competing international transformers who close the market;
- The certain capitalistic strength needed to sustain such a transforming sector.

The above-mentioned problems can be overcome as demonstrated by the successful Nigerian processing center whose products are in high demand and is even currently struggling to meet the demands of foreign importer countries.

Chad

As indicated in data and commentaries, Chad's Gum Arabic sector developed significantly in the last few years. It rapidly went from a minor actor in the Gum Arabic market in 1996 to become a major actor and a tough competitor to Nigeria in the Gum Arabic production and exportation sector, in 2000.

Unlike Sudan, the rapid development and trade of the Gum Arabic in Chad took place without any real support of the government. Officially, though, the Ministry of the Environment is responsible for production and the Ministry of Trade is

responsible for issues related to trade policy surrounding Gum Arabic.

Despite a virtually exponential increase in the quantity of Gum Arabic produced in Chad, the absence of governmental policy related to the production and trade of Gum Arabic has resulted in scarcity of available data. Apart from disparate information collected by Chadian customs, no data is archived.

Additionally, cross-border trade between Sudan and Chad and between Nigeria and Chad, on the other hand, also complicates the collection of data.

Organisation of the sector

The Gum Arabic sector in Chad depends entirely on the private sector. Although there is no governmental supervision, policy or support for Gum Arabic industry, farmers, intermediaries and exporters are organized in identifiable groups. There are over 55 farmer groups in the Gum Arabic producer regions of Chad. The traders, though, are mostly located around the Sanfil central market in the Chadian capital, N'Djamena. They are part of a professional group known as the

"Cooperative for the Exploitation of Gum Arabic". The exporters of Gum Arabic in Chad have also regrouped to form an association. These three groups collaborate with each other to develop the Gum Arabic sector of the country. Meanwhile, the government, through the Ministries of the Environment and Trade, are in regular contact with the private organizations of the Gum Arabic sector in Chad.

Production

Gum Arabic in Chad is grown in natural forests; afforestations; in individual, communal or even state properties; or in categorized forests or parks. Gum Arabic is often harvested in afforestations, with little to no taxes paid to local or government authorities.

The production of Gum Arabic in Chad grew rapidly and dramatically. Chadian production of Gum Arabic increased by 200% in a 5-year period(1991-1995). In comparison, the growth in Nigeria was only 50% and negative (about -30%) in Sudan for the same period.

Analysis of Gum Arabic exportation data, between 2003 and 2006, reveals that the production of Gum Arabic increased steadily, albeit at a slower rate than observed in Sudan and Nigeria.

In the seven regions of Chad where Gum Arabic is produced, local exporters and members of the Forestry department estimate that less than 50% of the Gum Arabic resources are exploited. They estimate that Chad can potentially produce 45, 000 metric tons of Gum Arabic annually. In light of increasing demand and increasingly attractive international rates, the production of Gum Arabic in Chad is projected to continue developing.

Rates proposed to producers

Despite the emergent oil industry, Chad is still a poor country with limited income generating and hard money sources.

Therefore, Gum Arabic is a vital source of income, specifically for farmers. Unlike Sudan, the rates proposed to producers in the Gum Arabic industry in

Chad are managed by the private sector. In the 1990s, high rates favoured the rapid growth and the revival of the Gum Arabic sector in Chad. According to available data, the average rate proposed to the farmer for *A. seyal* Gum Arabic was about 44% of the exported price while for *A. senegal*, it was about 64%.

Although these rates are an improvement on those proposed to producers in Sudan, the rates for *A. seyal* Gum Arabic need to be increased in order to maintain the current positive trend. As observed in Sudan, there is a strong correlation between the rates produced to producers and the production of Gum Arabic in Chad.

Marketing of Gum Arabic in Chad

The Gum Arabic supply channel in Chad is composed of 3 levels. On the first level, farmers harvest Gum Arabic from gum trees, more or less, naturally. These farmers then sell their gum to the local affiliates of larger buyers with warehouses in the Sanfil market of N'Djamena, Chad's capital. These suppliers then sell their gum either to Chadian exporters in N'Djamena or to Nigerian exporters who obtain their supplies in Sanfil.

In N'Djamena, there is only one central market dedicated to the sale of Gum Arabic, facilitating the trade of Gum Arabic in Chad. The market is located in Sanfil, on the outskirts of the capital. The suppliers of this market are grouped together in a professional association entitled "Cooperative for the Exploitation of Gum Arabic". This cooperative estimates that almost 75% of the Gum Arabic produced in Chad goes through the

market. The remainder goes directly through the Chadian exporters.

Gum Arabic from Chad is sold in numerous countries, the major ones being France, Germany, Great Britain and the USA. The international rates for this gum are competitive and comparable to those obtained in Sudan and Nigeria. The Gum Arabic market in Chad is centralized and cohesive which is the reason why several international buyers find trading relations with Chadian exporters to be very convenient. There is no Gum Arabic processing factory in Chad so that all the Gum Arabic produced in Chad is exported in its raw form.

In the last decade, Chad exported easily all the gum harvested in the country. It does not possess any Gum Arabic stocks or reserves.

Quality of Gum Arabic in Chad

Two gum-tree species are exploited in Chad: *A. senegal* which yields hard gum (or "kitir") and *A. seyal* which yields flaky gum (or "talha"). In their natural and purest form, these two types of gum fulfill the minimum requirements for viscosity, optical rotation and colour.

The members of the cooperative of suppliers confirm that the two types of gum are not mixed before exportation. In fact, exporters also physically examine the merchandise and perform other checks to verify that the gum's chemical properties are intact. Chadian Gum Arabic has a good reputation on the international market.

Local increase in value-addition

There is only one processing factory in Chad, belonging to SANIMEX Ltd, capable of processing 3000 tons of Gum Arabic annually. The increase from value added is achieved by the most basic processing technique of Gum Arabic, by crushing. There is no processing apparatus where the Gum Arabic is atomized using

humidity, in Chad. In order to truly combat poverty in African producer countries of the Sahelian region, the Gum Arabic needs to be processed entirely locally. Otherwise, sustainable poverty reduction remains illusionary.

Nigeria

Ever since the early 1950s when Gum Arabic trade began on a small scale, Nigeria has remained one of the leading actors in the Gum Arabic global market. It remained the second largest producer of gum, after Sudan, until Chad joined the global Gum Arabic trade in the 1990s.

However, ever since this trade activity became significant in Nigeria, its growth rate has not been encouraging. It grew at

a rate of 10% per year while Chad's growth was 25% per year, on average, between 1996 and 2000. Gum Arabic is a major economic resource particularly in the semi-desert region in the North of the country. Therein, gum-trees are spread over more than 250, 000 km² and more than 3 million people live there. Its importance has only increased with the decline of revenues from oil and gas, in the 1980s.

Organization of sector

The Gum Arabic sector in Nigeria is controlled by the private sector but heavily supported by the government. The National Association for Gum Arabic Producers, Processors, and Exporters in Nigeria (NAGAPPEN) is composed of major actors involved in Gum Arabic trade at the village level. It coordinates the official channels of the private sector. The Ministries of Trade, Agriculture and the Environment support the Gum Arabic channels at the federal level.

Various gum-tree plantations are managed differently: by state or local companies, by the federal government or even by companies in the private sector.

Production

Gum Arabic produced in Nigeria covers the whole Sahelian region, notably more than 250, 000 km² spanning fourteen of the thirty-six states in the country. The gum-tree plantations are essentially natural, with less than 4, 000 hectares of land dedicated to plantations or sectioned plots. A large proportion of these plantations are communally owned and controlled by community authorities.

Countrymen undertake the harvest of Gum Arabic after paying large sums either to traditional leaders or State authorities. It is noteworthy that the exact Gum Arabic resources in Nigeria are unknown, although forest-keepers assert that less than 40% of the total resource is currently being exploited. Little importance was accorded to Gum Arabic before the 1980s, which explains why gum trees were cut down and used in households as a combustible.

Nigeria also has a functional private sector capable of atomizing Gum Arabic, a first in West Africa, producing a capacity of 15 tons daily.

Nigeria is a densely populated country and an important consumer of Gum Arabic. In addition to its economic prospects, it also has hardy and dynamic entrepreneurs. Nigerian salesmen are also actively involved in Gum Arabic trade in other countries, including in neighboring Chad and Niger. All these factors suggest that Nigeria has an enormous potential of producing Gum Arabic. In fact, Nigeria is capable of propelling Africa in the Gum Arabic market soon.

The following factors complicated the harvest of Gum Arabic: very low rates proposed to producers and large distances between communities and gum-tree plantations. Nigerians, then, got accustomed to cutting down gum-trees for use as a combustible—a habit that must now be modified through educational campaigns on the environment.

Like in Chad, the data on Gum Arabic production in Nigeria are insufficient, not to say, imprecise. Yet, data obtained from Nigerian port authorities and 2 companies entitled "Commodity Consulting" and "Commodity Networks" provide adequate indications of the Gum Arabic trade in Nigeria.

Given the fact that data on Gum Arabic exports in Nigeria are not transferred to the International Trade Center (ITC), the statistical data available on Nigeria at the ITC is incomplete and incorrect. In fact,

the export data provided by the ITC does not always include figures for exports to India, which incidentally buys more than 50% of Nigerian Gum Arabic.

Analysis of available data indicates that the production of Gum Arabic in Nigeria has increased at an annual average rate of 9.5% since 1998. Recent data shows that Nigerian exports are on the rise and this trend is projected to continue. The following factors are projected to complement this trend: the creation of large-scale Gum Arabic plantation projects, educational campaigns aimed at

farmers, higher proposed rates to producers and the active interest and participation of the government in the Gum Arabic sector.

In the absence of official data, the production potential of Nigeria is unknown. However, based on accounts of agents in the forestry department, the Nigerian production potential is as high as 40 000 tons. This potential is likely to increase in upcoming years in light of ongoing research in universities and institutions coupled with the educational campaigns advocating the protection of gum-trees.

Rates proposed to producers

Nigeria emphasizes a free and dynamic economic system. The average Nigerian farmer is also very informed. In fact, the rates proposed to producers are the highest in the region; on average, the

rates go from 55% to 60% of the export price of Gum Arabic. Based on analysis of Gum Arabic export data in Nigeria, the high rates proposed for the production of Gum Arabic encourage its production.

Marketing of Gum Arabic in Nigeria

Like the majority of agricultural products, Gum Arabic produced in Nigeria was exported in its crude form, until recently. In the last 20 years, there were never unsold stocks of Gum Arabic in Nigeria. The Gum Arabic exporter companies are 15 in total: 10 are foreign and 5 are local.

Nigeria's major trade partners, in the Gum Arabic sector, include: India, France, Germany, USA, Belgium, China and the United Kingdom, in addition to the interior market. Based on available data, more

than 50% of Nigerian Gum Arabic is exported to India. Indian buyers assert that the colour of the Nigerian *A.seyal* is of superior quality to those of *A. seyal* Gum Arabic produced in other countries.

Consequently, Indian buyers are capable of paying an additional 10% supplement to obtain Nigerian *A.seyal*, higher than the price paid for flaky gum produced in any other country. India purchases *A. seyal* Gum Arabic only when Nigeria is unable to satisfy its demand.

Nigerian Gum Arabic is sold in four major categories as shown below:

- Grade 1 (*A. senegal*): 57%
- Grade 2 (*A. seyal*): 15%
- Grade 2 Special (*A. polyacanta*): 12%
- Grade 3 (*Combretum*) : 16%

Local increase in the value-added

Nigeria possesses a processing center for Gum Arabic with an atomization tour (apparatus) in Kano, capable of processing 15 metric tons daily. In the beginning, this factory had technical and

marketing challenges but successfully overcame these and has been functional, yearlong, since 2003. The factory produces 7 varieties of atomized Gum Arabic, from Super White to Normal White.

CONCLUSION

In summary, it may be asserted that the prospects for gum arabic are good. The combined production and exportation capabilities of the three major producer countries, namely Sudan, Nigeria and Chad, was about 60, 274 metric tons in 2006. Furthermore, the production potential of the aforementioned countries is about 160, 000 metric tons. Together, and with the other African producer countries and the support of the international community, they are capable of satisfying the global demand of Gum Arabic, which is between 85, 000 and 11, 000 metric tons.

The production of Gum Arabic by these three major African producer countries has been increasing since 2000. However, in the absence of precise data on Nigeria and Chad's exports, and particularly on cross-border trade between Sudan and Chad, on the one hand, and Nigeria and Chad on the other, it is difficult to accurately describe the exports of these three countries. This is compounded by the fact that Nigerian Gum Arabic exports towards India, its most significant trade partner, are not reported.

It is then imperative to improve the availability of statistical data on the production of Gum Arabic in these three major countries but also in other African producer countries. Gum Arabic production and exportation data is adequately managed in Sudan meanwhile such information, vital for planning, is neither adequately collected nor managed in Nigeria and Chad.

In order to counter the recurrent shortage and overproduction of Gum Arabic, a stabilizing agent such as a regulatory stock, is indispensable and should be established urgently in order to sufficiently secure the future of this natural product.

In 2004, international rates of Gum Arabic tripled, most likely as the result of a shortage of Gum Arabic due to a low production but also of the depletion of a regulatory stock of Gum Arabic, previously maintained by Sudan. This situation occurs at least once every decade, forcing consumers to seek Gum Arabic substitutes. A regulatory stock of Gum Arabic would resolve this problem and reassure importers and end-users of Gum Arabic.

Following the 2004 shortage, attempts to establish (re-establish, in Sudan's case) a regulatory stock of Gum Arabic in the major producer countries (Chad, Nigeria and Sudan), were made. Yet, none of the countries were, individually, able to amass the capital necessary to maintain such a stock. Consequently, assistance from the international community is crucial not only to provide the funds but also to allow for research in all the countries—to accompany such development.

While the rates of raw Gum Arabic fluctuate significantly on international markets, the rates of processed (atomized) Gum Arabic is either stable or on the rise. Poverty reduction in producer countries can only be effectively attained if the transition is made from unrefined production to local processing of Gum Arabic, with the corresponding gain from value-added. Only such processed products allow for more lucrative rates.

The Gum Arabic processing factories also require important funds. Given the fact that market access for processed Gum Arabic is limited, African producer countries require international assistance to establish these processing factories and to successfully access the global market of atomized Gum Arabic.

APPENDICES

List of Abbreviations

AIPG: Association for International Promotion of Gum
CAF: Cost, Insurance, and Freight
ITC: International Trade Centre
FAO: UN Food and Agriculture Organisation
FOB: "Free On Board"
GAC: GUM ARABIC COMPANY
JECFA: Joint FAO/WHO Expert Committee on Food Additives
WHO: World Health Organization
NGO: Non-Governmental Organisation
USA: United States of America
USD (US\$): US dollar

Useful addresses

Associations

AIPG, Association for International Promotion of Gums
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Fairs and Exhibitions

	<i>Month</i>	<i>Date</i>	<i>Exhibition</i>	<i>Venue</i>
2008	September	24 - 26	Food Ingredients, Asia 2008	Bangkok, Thailand
October		03 - 04	Food Ingredients, India 2008	Mumbai, India
		15 - 17	Health Ingredients, Japan 2008 Safety and Technology, Japan 2008	Tokyo, Japan
November		04 - 06	Natural Ingredients 2008	Paris, France
		17 - 19	Health Ingredients, Europe 2008	
			Food Ingredients, Europe 2009	Frankfurt, Germany

FIPSS: Food Ingredients Processing Safety and Services: On the sidelines of FI Asia, FI India, and HI&FI Europe.

These events are the venue of most economic actors associated with Gum Arabic; Including food applications generally outweigh the technical or pharmaceutical applications.

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<http://www.marches-tropicaux.com> ;
- **Product Map**
www.p-maps.com
- **COMTRADE/DBS**, Statistics Division of the United Nations
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