

63400 Gum Tragacanth

(from "Pitman's Common Commodities and Industries, GUMS & RESINS – by Ernest J. Parry, London; Printed by Sir Isaac Pitman & Sons, Ltd, Bath, England, v-(1465E))

Tragacanth is a gum obtained by the exudation from the stem of *Astragalus gummifer*, and other species of *Astragalus*, small shrubs widely distributed throughout the Turkish Empire and Persia. It appears to be produced by the process known as gummosis of the cell walls in the pith and medullary rays. It swells by absorbing water and on account of the pressure in the interior of the stem finally forces itself out through cracks or through artificial incisions which are made to increase the flow. It is collected when dry and graded for market. The finest gum which has been exuded from the long incisions dries almost white in colour and in flakes and is known as "flake" Tragacanth, being graded according to appearance. The portions which are forced through more or less rounded holes, and which dry in tears or vermiform pieces, are known as "vermicelli" tragacanth. The more inferior qualities are known as "hog" tragacanth. Two varieties of "flake" tragacanth are found on the London market viz., the Persian and Smyrna varieties. Persian tragacanth occurs in thin, horny, translucent flakes. The Smyrna variety is more opaque and less ribbon-like. "Hog" tragacanth appears to be little good and is the caramania gum. It occurs in yellowish or brown opaque pieces, and it resembles the genuine tragacanth in most respects.

The composition of tragacanth has not yet been fully investigated, but the part soluble in water appears to be a complex acid, which, on hydrolysis, yields various sugars and geddic acid, whilst the part insoluble in water consists of a complicated acid which breaks down on hydrolysis, into sugar and bassoric acid. Traces of starch and cellulose are also found in the gum.

Tragacanth is employed in medicine chiefly as a suspending agent in mixtures containing volatile oils, resins, or heavy insoluble powders. It is official in the British Pharmacopoeia, which requires it to have the following characters: Thin flattened flakes, irregularly oblong, or more or less curved, marked on the surface by concentric ridges. Frequently 2 ½ cm long and 12 mm wide. White or pale yellowish white, somewhat translucent. Horny, fracture short. Inodorous; almost tasteless. Sparingly soluble in water, but swelling into a gelatinous mass, which may be tinged violet or blue by decinormal solution of iodine. Ash not more than 4 %.

According to Giraud, gum tragacanth contains, on an average, about 60 % of a pectinous compound, which yields pectic acid on boiling with water containing a trace of hydrochloric acid. It also contains, according to the same authority, 8 to 10 % of a soluble gum of the nature of arabin, 5 to 6 % of starch in cellulose and 3 % of mineral matter. The average amount of moisture is 20 %.

Gum tragacanth is very hard to powder, and is best made into mucilage by soaking the pieces in fifty times its weight of water, when it swells up into a thick, jelly-like mucilage without actually dissolving. When diffused in a much larger amount of water it forms a ropy liquid which can be filtered. Mucilage of tragacanth is coloured yellow by solution of caustic soda; a solution of the gum gives no appreciable precipitate with borax, alkaline silicates or ferric chloride, but is precipitated in clots by alcohol. Solution of lead acetate thickens it, and, on treating the mixture, throws down a precipitate of the gum acids combined with lead.

The cheaper varieties of gum tragacanth are used in the calico printing industry, for which purpose the gum is first soaked in water for twenty-four hours until it has swelled to the fullest possible extent. It is then boiled with more water for about six hours, when a thick homogeneous solution results, but which has not a great deal of cohesive power.

Gum tragacanth is sometimes adulterated with cheaper gums, when in the powdered condition. The commonest adulterant met with is powdered gum acacia.

According to Reuter, if powdered tragacanth be extracted by means of 95 % alcohol, and the liquid evaporated, the residue contains a little fat, a bitter principle and a trace of sugar.

The tragacanth of commerce is principally obtained from mountainous regions of Asia Minor, Syria, Armenia, Kurdistan and Persia.

The following are the principal species known to yield the gum:

1. *Astragalus gummifer*, a small shrub widely distributed in Syria, Armenia and Kurdistan.
2. *Astragalus adscendens*, a shrub growing to about 4 ft. in height, and found in South Western Persia at altitudes of 9,000 to 10,000 ft. It is also found in Armenia and Kurdistan.
3. *Astragalus leiocladus*, found in Persia
4. *Astragalus brachycalyx*, a shrub, 3 ft. in height, found on the mountains of Persian Kurdistan.
5. *Astragalus microcephalus*, a widely distributed shrub, found all over Asia Minor and Armenia.
6. *Astragalus pycnocladus*, a Persian shrub, said to yield abundant supplies of the gum.
7. *Astragalus stromatades*, found chiefly in Asia Minor.
8. *Astragalus Kurdicus*, a native of Silicia and Cappadocia.
9. *Astragalus verus*, found in Persia and Asia Minor.
10. *Astragalus parnassi*, a small shrub found on the northern mountains of the Morea.

In July and August, the shrubs are stripped of their leaves, and short longitudinal incisions or slits are made in the trunks. According to a British Consular Report on the trade of Kermanshah, 1903-1904, No. 3189, page 28, "the top of the plant is burnt, and when the leaves are all consumed the fire is put out and incisions are made." The gum flows out, and, drying spontaneously, is ready for gathering in three or four days. If the weather is fine during the drying process, the "white leaf" form of gum is obtained; this is the most prized variety. If, on the other hand, rain falls, or the wind rises, particles of dust are carried into the surface of the gum which thereby loses its whiteness, and becomes the "yellow leaf" form, the second quality. the shape of the incision, of course, determines the form of the pieces; longitudinal incisions produce "leaf" or "flake" tragacanth, punctures yield "vermicelli" tragacanth, while irregularly-shaped incisions give knob-like masses, generally coloured, and of relatively low value. Another form, known in Persia as "Arrehbor", exudes from branches, which have been cut with a saw. In Persia the productive life of the shrub is seven years.

Smyrna is an important market for gum tragacanth; it is conveyed to that port of native dealers, who purchase it from the peasants, in bags containing about 2 quintals each. It is there sorted into the various qualities in order to fit it for the European market, packed into cases containing about 2 cwt. and shipped to London, Marseilles, or Trieste. Basra (near the mouth of the Euphrates) is also an important port of shipment. – (Colonial Reports – Imperial Institute.)

The exports of tragacanth from Smyrna are given in the following table:

EXPORTS OF GUM TRAGACANTH FROM SMYRNA.

<i>Year</i>	<i>Cwts.</i>	<i>Value in £</i>
1901	1.660	4.040
1902	3.000	9.577
1903	2.600	6.237
1904	2.300	5.104
1905	1.180	8.165
1906	880	5.369

There are a number of "insoluble gums" which closely resemble gum tragacanth in general characters, which have been examined in the laboratories of the Imperial Institute. A gum from Myasaland, whose botanical origin has not been identified was found to have the following characters. It consists of small fragments of translucent gum, varying in colour from pale yellow to deep brown. It had a slight odour of acetic acid and was almost tasteless. On analysis it gave the following results:

Amount soluble in water	32.8 %
Moisture	15.6 %
Mineral matter	2.57 %

The portion insoluble in water swelled up to a translucent jelly, similar to that of gum tragacanth.

The author does not agree with the statement made by the authorities of the Imperial Institute that insoluble gums of this class have at present no commercial value unless they can be obtained, like the well-known insoluble tragacanth gum, almost free from colour. Dark-coloured low grade tragacanth commands a market for certain purposes, where colour is of no importance at all, for example, in the manufacture of fumigating pastilles and other articles, where fine powders require "binding" together.

A sample collected in the Bukedi district of Uganda was examined. It is a gum locally known as "Nongo", and is derived from a small tree which has been identified as *Albizzia brownei*. On analysis it gave the following results –

Moisture	16.9 %
Mineral matter	4.6 %
Dirt	2.7 %

In order to effect any appreciable solution in water, it was found necessary to allow a small amount of the powdered gum to remain in contact with a large volume of water for five or six days with continual shaking. The solution so formed was rather gelatinous, and was so viscid that a 1 % solution was found to have approximately the same viscosity as a 20 % solution of Sudan gum acacia. A 10 % "solution" furnished a thin jelly in which a proportion of the gum was only swelled up without dissolving.