

2. The history of Aloe

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2.1. History

The name aloe is from the Greek *alsos* and refers to the bitter juice from the leaves of these plants. It is probably derived from the earlier Arabic word *alloeh* or the Hebrew word *allal*, both meaning bitter.

Aloe, the drug, one of the oldest crude drugs, has been used as five types of extract from aloe plants: fresh whole leaf, fresh gel (pulp), juice (sap), juice extract and dried gel. Among them, first three were restricted in their use for the reason of preservation of the plant while the last two have been available in the market. Juice extract was used as a crude drug in West, but in the Orient, having been introduced as a Western crude drug (in contrast to Oriental crude drugs originated from the Orient, mainly China), it has been produced by evaporating water from the juice by boiling, to produce a black, hard and shining mass material, whereas dried gel, as a healthy functioning food and drug, is normally a yellow to brown powder made up usually manufactured by freeze drying. The former was believed to be produced historically due to for the reason of the difficulties in preserving or carrying an aloe before use and preventing deterioration. However, almost all of the aloe used recently is the latter.

From the ecological nature of the aloe plant, aloe originated from the Africa and the history of its use dates back almost 6000 years. In 4000 B. C. the aloe plant was engraved in intaglio on an Egyptian temple fresco. A Sumerian clay tablet from 2200 B. C. was the first document to include aloe among the plants of great healing power. The first detailed description of aloe's medicinal value is probably in the Ebers Papyrus written around 1550 B. C. in Egypt. This document gives twelve formulas for mixing aloe with other agents to treat both internal and external human disorders. One of the uses was as a laxative as well as *Senna* and *Oleum Ricini*. Other ancient records describe Hippocrates applying aloe clinically and Cleopatra using an aloe gel as cosmetics. Even in the Bible, aloe is described in several sections. Actually aloe has been used as a drug in north Africa from 20 ~ 30 centuries B. C. Alexander the Great conquered the island of Socotra to get sufficient amounts of aloe to use it as a wound healing agent for his soldiers. In 50 B. C. aloe was introduced into western medicine mainly as a laxative. The first detailed description about the pharmacological effects of aloe was in the Greek Herbal (written by Dioscorides, 41 ~ 68 A. D. It states that the sap, not the gel, was collected and boiled down into a thick black mass for storage and transportation. As for its healing effects, it induces sleep, cleanses the stomach, treats for boils and ulcerated genitals, heals foreskin, and is good for dry itchy skin

irritation, hemorrhoids, bruises, stops hair loss, and mouth pain, and stops bleeding of wounds, heals tonsillitis and diseases of the mouth and eyes. Until 1200 aloe plant and dried sap widely accepted healing agents throughout Europe. In 1300 ~ 1500, processed aloe (dried sap) was introduced to English medicine and used as a purgative and as a treatment for external wounds and diseases. Until 1700, aloe and aloe plant were spread throughout the Caribbean islands, Central and South America. Especially in the island of Barbados and Curacao in the Caribbean, aloe plant was developed as a commercial crop. Sap was extracted from the plant and boiled down into a black mass for export, mainly to Europe. In 1720, Carl Von Linne named aloe scientifically as *Aloe vera* L. (“true aloe”). Aloe was officially listed as a purgative and a skin protectant by the United States Pharmacopoeia (U. S. P.) in 1820.

In the Orient, aloe is referred as “Lu-hui” in Chinese, meaning “black deposit”, referring to the plant resin condensed black, being wrong in the origin of the word. Aloe was introduced to Asia in 300 ~ 400 B. C. in the course of the Persian Conquest by Alexander the Great to western Asia, via the silk road to China. The first record of aloe in the Chinese literature was in the official *Materia Medica* of the Song Dynasty (700 ~ 800 A. D.). In that book, the whole leaf of aloe, ground and boiled down to black extract, was cited as the main effective item in the treatment of sinus, fever, skin disease and convulsion in children. However, even before the Song Dynasty, in the Tang Dynasty, the same type of aloe (juice or whole leaf extract) was used as a healing agent both internally and externally. For the aloe plant, *Aloe vera* was first introduced for growth in 1817. In Korea, aloe was referred to as “Nohwe”, the same word as the Chinese “Lu-hui”, differing only in pronunciation. The introduction of aloe into Korea was uncertain, but considering the history of exchange between China, it must date back to the Tang or Song Dynasties from China. The first record about aloe in a Korean herbal book was in 1610 in *Donggeubogam* by Hur Joon, in which the records in several Chinese herbal books were introduced. After that, several herbal books or prescription books cited aloe for its precaution of use, clinical applications and prescriptions. Aloe (juice extract) was officially recognized as a drug and cited in the first edition of Korean Pharmacopia (K. P.) in 1958, and has continued to be listed to the most recent edition.

In Japan, Aloe was referred to as “Rokai” or “Roeh”, the same word as the Chinese “Lu-hui”, differing only in pronunciation. Aloe was introduced by missionaries after the opening of a port to foreign trade. Aloe was cited in several herbal books as a plant resin imported by western people for its bitter taste and for its effectiveness in killing insects. Aloe was officially recognized as a drug and cited in the first edition of Japanese Pharmacopia (J. P.) in 1886. Traditionally, the Japanese called aloe “the plant to make a doctor needless” and cultivated some in the garden. The main species cultivated in Japan is *Aloe arborescens* Mill. var. *natalensis* Berg. (“Kitachi” aloe), which is different from the aloe plant used in the West. They have used fresh leaf juice in the treatment of constipation and gastric disorder internally, and of burns, wounds and abrasions externally.

Aloe, historically used as a laxative in a large dose or a stomachic in a small dose in the form of juice (or whole leaf) extract and as a healing agent of burns,

skin ailments and wounds in the form of fresh juice for more than 20 centuries, fell into disuse in the West as the seat of civilization moved to the temperate zones where the tropical plant could not survive the freezing winters. The more common use and rediscovery of aloe had to wait until Dr. Collins (U. S. A.) reported the first medical paper on the new effects of aloe on radiation dermatitis or radiation burn. Radiation burns showed skin ulcerations which were nearly incurable were cured successfully even without gross scar tissue. The applications of aloe to atomic radiation burns as well as the addition of folk medicinal uses like stomach ulcer or constipation have focused scientific attention upon aloe again and have lead to the development of the aloe industry. The Aloe plant has come to be grown in warm regions world wide for commercial production of aloe sap and gel. The first commercial aloe farm was established in Florida, U. S. A. in 1912. In 1959 Mr. Stockton successfully stabilized the healing gel and developed Alo-Creme ointment for the treatment of thermal burn. During the last fifty years, research programs on aloe have been undertaken in many parts of the world. In the West, including Russia which is the leader by far, many intensive studies have been carried out to determine the mechanism and components of aloe's effectiveness. As its effectiveness began to spread, numerous companies were formed to produce aloe products. There is still great expectation that soon everyone will fully appreciate this amazing gift of nature.

2.2. Aloe, the drug

To say nothing of the West and the Orient, the drug form of aloe was different from the form of aloe used as functioning health foods or drugs recently. The juice that flowed out from the leaves stacked like books was evaporated by boiling, to form a dark brown to black brown mass, hard and shining material, whereas the recent product was obtained by cutting off the outer layer and freeze drying the inner gel. Aloe products differ in their shape, property and name according to the place of production. The main Aloe products are as follows.

1. Cape Aloe: *Aloe ferox* Mill. is the main plant source. Besides this species, the crossbreds with *A. africana* Mill. or *A. spicata* Baker are also used. The cutinized leaves are cut from the bottom of the leaf and over 200 leaves are stacked like a tent. The exuded leaf juices are collected on sheepskin for 6 hours. The collected leaf juice is heated for 4 hours to be concentrated. This concentrated leaf juice is collected in tin bottles and left to be solidified. This drug is an irregular, massive, solid black brown to green brown material. The crushed surface is shiny like glass and a slice is semitransparent like amber and yellow to yellow-brown in color. Because of its semi-transparency it is called Aloe Lucida.

2. Socotrine Aloe: Made of *Aloe perryi* Baker. A semitransparent, yellow-brown, resinous solid. in which tiny solid crystals of aloin can be seen.

3. Curaçao Aloe: *Aloe vera* L. (= *A. barbadensis* Mill.) and its variety *A. vera* L. var. *chinensis* (Haw.) Berger are the main sources. Collected leaves are stacked

in a V shape and the expressed leaf juice is collected and heated to evaporate the water. The temperature of heating is regulated at a rather low level compared to that of Cape Aloe and the product is not transparent. It becomes an opaque, red-brown to dark brown solid and minute solid crystals of aloin are formed. This aloe, as well as Socotrine Aloe, is called Aloe Hepatica.

4. Natal Aloe: Obtained from *A. bainesii* Th. Dyer mainly, as well as from *A. succotrina* Lam., *A. ferox* Mill. or *A. marlothii* Berger.

5. Bombay Aloe: From *A. perryi* Baker or uncertain. Probably produced in eastern Africa and exported from Bombay via Zanzibar.

2.3. Aloe, the plant

Aloe, the plant, belonging to the Lily family (Liliaceae), is native to the Mediterranean region of southern Europe and north Africa. Aloe genus contains over three hundred different species including inter-species crossbreeds which grow in the warm regions of Africa, Europe, Asia and the Americas. They are classified into two groups according to their use: for production of extract as crude drugs and for production of gel as health functioning foods. Among them, only a few species have been used commercially, others are merely of decorative value.

The species for the production of crude drugs are *Aloe vera* L. (= *A. barbadensis* Mill.), *A. ferox* Mill., *A. perryi* Baker, etc., and species for use in health functioning foods are *Aloe vera* L., *A. arborescens* Mill., *A. saponaria*, etc. Only two species are grown today commercially, with *Aloe barbadensis* Miller and *Aloe arborescens* being the most popular.

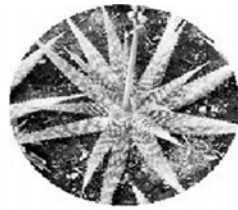
1. *Aloe vera* L. (= *A. barbadensis* Mill. = *A. vulgaris* Lam., Curaçao aloe, the true aloe): *Aloe vera*, meaning the true aloe, was spread throughout the Mediterranean region by man, so it is difficult to discern where it originated. Some have thought it native to the Canary Islands. Its closest relatives, however, occur in Arabia, and this is its most probable area of origin. It can be found there today, on the lower slopes of the coastal mountains. This species is a large, very short stem rosette perennial succulent. The fleshy, sword-shaped leaves are gray-green and grow to 80 cm long. Younger leaves have pale spots. The plant will slowly offset to form a clump. Only large plants flower. The unbranched flower spike carries yellow, tubular flowers. *Aloe vera* var. *chinense*, a hybrid, has smaller rosettes that offset vigorously and flowers rarely. This plant, coming from lowland, subtropical areas, is not very frost-hardy. It grows well along the coast where frost is rare. It prefers good sun, with some shade at midday. Plant it in a well-drained soil emended with organic matter and sand or expanded shale. Watering can be infrequent once the plant is established.

2. *Aloe arborescens* Mill. (= *Aloe mutabilis*, kranz aloe): The Latin word *arborescens* means tree-forming or tree-like, and is a bit misleading in that this

aloe is not really tree-like, but the name was originally applied to this species in reference to the stem-forming habit. The common name krantz aloe refers to its habitat, a krantz being a rocky ridge or cliff. The species formerly known as *Aloe mutabilis* is now regarded as a synonym of *Aloe arborescens*. It develops into a multi-headed shrub 2 ~ 3 m high with striking grey green leaves arranged in attractive rosettes. The leaf margins are armed with conspicuous pale teeth. The large, colorful flower spikes are borne in profusion during the cold winter months, brightening up a drab winter garden. Deep orange is the most common color, but there are also pure yellow forms, and an unusual bi-colored form of deep orange (almost red) and yellow. The inflorescence is usually unbranched, with two to several arising from a single rosette. As with all the aloes, the flowers produce nectar and are attractive to many kinds of bird, in particular the small and colorful sunbirds, which flit from flower to flower in search of nectar. The flowers also attract bees.

This species is distributed mainly over the eastern, summer rainfall areas of the country. It has the third widest distribution of any aloe, occurring from the Cape Peninsula along the eastern coast, through KwaZulu-Natal, Mpumalanga and Limpopo province and further north into Mozambique, Zimbabwe and Malawi. It is one of the few aloes that can be found growing from sea level right up to the tops of mountains. Although its common name refers to the habitat, it is usually found in mountainous areas where it favors exposed ridges and rocky outcrops. It is also found in dense bush. It is possibly the most widely cultivated aloe in the world and can be seen grown in gardens in many cities around the world.

3. *Aloe saponaria* (Ait.) Haw. (African aloe, soap aloe): *Aloe saponaria* is native to arid regions in eastern South Africa, Botswana and Zimbabwe. It grows in a stemless rosette, and produces little offset rosettes around its margin. The main rosette gets up to about 45 cm tall and just as wide. The lance-shaped leaves are thick and succulent, pale green with white speckles, and 25.4-30.5 cm long. The leaf margins are armed with sharp, dark brown teeth. Throughout much of the summer, it sends up a purplish-branched stalk about 0.6 m tall, bearing showy tubular yellow, orange or red flowers. It is cultivated mainly for decoration.



Aloe barbadensis Mill *Aloe arborescens* Mill *Aloe saponaria* (Ait.) Haw
(See Plate 1.)

4. *Aloe arborescens* Mill. var. *natalensis* Berg.: This species is used mainly in Japan, as a folklore for the treatment of gastrointestinal ailment, burns, bites, athlete's foot and so on.

5. *Aloe brevifolia* Mill. (Blue aloe): *Aloe brevifolia* grows on small hills and slopes in clay in stony ground. This aloe is a coastal species and is found from Bredarsdorp to the Riversdale area. Occurs in a winter and summer rainfall area (375 mm). A neat, compact aloe of height 40 cm - 50 cm that grows in groups of 10 rosettes of 100 mm in diameter, these are formed by offsets at the base. The leaves are glaucous-green, often tinged pink, with white teeth on the margin. The sap is clear. The inflorescence is 400 mm long with a conical raceme. The racemes are orange-scarlet. Flowers in October and November.

6. *Aloe ferox* Mill. (= *A. supralaevis* Haw., bitter aloe, red aloe): This bitter aloe is most famous for its medicinal qualities. In parts of South Africa, the bitter yellow juice found just below the skin has been harvested as a renewable resource for two hundred years. The hard, black, resinous product is known as Cape aloes or aloe lump and is used mainly for its laxative properties but is also taken for arthritis. "Schwedenbitters" which is found in many pharmacies contains bitter aloe. The gel-like flesh from the inside of the leaves is used in cosmetic products and is reported to have wound healing properties. Interestingly, *Aloe ferox*, along with *Aloe broomii*, is depicted in a rock painting which was painted over 250 years ago.

Thus bitter aloe will reach 2-3 meters in height with the leaves arranged in a rosette. The old leaves remain after they have dried, forming a "petticoat" on the stem. The leaves are a dull green, sometimes with a slightly blue look to them. They may also have a reddish tinge. The "*A. candelabrum* form" has an elegant shape with the leaf tips curving slightly downwards. The spines along the leaf edge are reddish in color. Spines may also be present on upper and lower surfaces of the leaves as well. Young plants tend to be very spiny. The flowers are carried in a large, candelabra-like flower head. There are usually between five and eight branches, each carrying a spike-like head of many flowers. Flower color varies from yellowy-orange to bright red. "*A. candelabrum*" has six to twelve branches and the flowers have their inner petals tipped with white.

7. *Aloe marlothii* Berger: *Aloe marlothii* is widely distributed throughout the warmer parts of southern Africa. Plants grow on rocky hillsides and on open plains. In its habitat, rain averages 35 to 100 cm per year, falling in summer. Plants are single-stemmed and can reach 6m in height, though 2 to 3m is more common. The stem is densely covered with old, dry leaves. The fleshy leaves can be more than 1m in length. Both upper and lower leaf surfaces are covered with stout, reddish-brown spines. The inflorescence is a many branched panicle up to 60cm tall with 20 to 30 racemes. The racemes are never upright but instead carried horizontally. Flowers range in color from red to gold with various shades of orange being most common.

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8. *Aloe bainesii* Th. Dyer: Main source of Natal Aloe.
9. *Aloe africana* Mill.: A crossbreed with *A. vera*. Main source of Cape Aloe.
10. *Aloe descoingsii* G. Reyn.: Short stem (4 ~ 5 cm). Small leaves are curled up into inside. White protuberance on the leaves. Red flower in winter.
11. *Aloe perryi* Baker : The true Socotrine aloe plant was first described from specimens sent to Kew Gardens by W. Perry, and was subsequently found by Balfour, of Edinburgh, growing abundantly upon the island of Socotra, especially in the limestone tracts, from the sea level to an altitude of 900 m. Along with it, but much less abundant, was a dwarf species with spotted leaves. It resembles in its general habit the Barbados aloe, but differs in its shorter leaves, and especially in its flowers, which are arranged in looser racemes on longer pedicels and have the tube much longer than the segments.
12. *Aloe spicata* Baker: This species of aloe is the one from which the better qualities of the drug aloes are obtained. It is a native of Southern Africa. Stem round, about 1m high; leaves about 60 cm long, wedge-shaped, spreading at the top of the stem; flowers large, white, spiked, bell-shaped.
13. *Aloe variegata* L. (tiger aloe): The tiger aloe is a succulent plant which belongs, like the other very numerous kinds of aloe, to the family of the lily plants (Liliaceae). It is approx. 30 cm high. It consists of fleshy sheets, which are rosettes forming one above the other. The dark-green sheets, which are finely pointedly at the edge, are provided with a light green to white grain, which runs crosswise in each case over the sheet. With good care in culture including room culture the first blooms in reddish colors with long panicle appear after a few years. Their homelands are dry areas in South Africa. The tiger aloe is a plant of easy handle, which prospers problem-free beside a bright window to some extent, if one does not kill it by too much water.

Other species of aloe not mentioned here are listed in Table 1. This large number of species is very important not only in view of resources but also in terms of the varieties of species. It is necessary to investigate species other than the currently used species, botanically, chemically and biologically, in order to develop new sources of aloe having special effectiveness like immune modulating, ulcer treating and whitening and so on.

Table 1. Aloe species

No	Scientific Name	No	Scientific Name
1	<i>Aloe abyssinica</i> Lam.	2	<i>A. aculeata</i> Pole Evans
3	<i>A. acutissima</i> H. Perrier	4	<i>A. adigratana</i> G. Reyn.
5	<i>A. albiflora</i> Guillaumin	6	<i>A. alooides</i> (Bolus) Van Druten
7	<i>A. ammophila</i> G. Reyn.	8	<i>A. amudatensis</i> G. Reyn.
9	<i>A. andogensis</i> Baker	10	<i>A. angelica</i> Pole Evans
11	<i>A. angiensis</i>	12	<i>A. ankaboensis</i> nom. nud. (= <i>A. vinabinensis</i> nom. nud.)
13	<i>A. antandroi</i> (R.Decary) H.Perrier	14	<i>A. arborescens</i> var. miller
15	<i>A. archeri</i> Lavranos	16	<i>A. arenicola</i> G. Reyn.
17	<i>A. aristata</i> Haw.	18	<i>A. audhalica</i> Lavranos & Hardy
19	<i>A. babatiensis</i> Christian & I Verd.	20	<i>A. baker</i> Scott Elliot
21	<i>A. ballyi</i> G. Reyn.	22	<i>A. barbertoniae</i>
23	<i>A. bargalensis</i> Lavranos	24	<i>A. bellatula</i> G. Reyn.
25	<i>A. bergalensis</i> 26	26	<i>A. berthana</i>
27	<i>A. branddraaiensis</i> Groenewald	28	<i>A. broomii</i> Schonl.
29	<i>A. buchananii</i> Baker	30	<i>A. buchlohii</i> Rauh
31	<i>A. buhrii</i> Lavranos	32	<i>A. bukobana</i>
33	<i>A. bulbillifera</i> H. Perrier	34	<i>A. burgersfortensis</i> G. Reyn.
35	<i>A. calidophila</i> G. Reyn.	36	<i>A. cameronii</i> Hemsley
37	<i>A. camperi</i> Schweinf.	38	<i>A. candelabrum</i> Berger
39	<i>A. capensis</i> 40	40	<i>A. castanea</i> Schönl.
41	<i>A. catengiana</i> G. Reyn.	42	<i>A. chabaudii</i> Schönl.
43	<i>A. cheranganiensis</i> Carter & Brandham	44	<i>A. chinensis</i> (= <i>A. vera</i> var. <i>chinensis</i>)
45	<i>A. chortolirioides</i> Berger	46	<i>A. christianii</i> G. Reyn.
47	<i>A. chrysostachys</i> Lavranos & Newton	48	<i>A. ciliaris</i> Haw.
49	<i>A. classenii</i> G. Reyn.	50	<i>A. commelini</i>
51	<i>A. comosa</i> Marloth & Berger	52	<i>A. compacta</i> G. Reyn.
53	<i>A. comptonii</i> Reynolds	54	<i>A. confusa</i> Engler
55	<i>A. cooperii</i>	56	<i>A. cremnophila</i> G. Reyn. et Bally
57	<i>A. crytopoda</i> Baker	58	<i>A. davyana</i> Schönl.
59	<i>A. dawei</i> Berger	60	<i>A. deltoideodonta</i> Baker
61	<i>A. deserti</i> Berger	62	<i>A. dhufarensis</i> Lavranos
63	<i>A. dichatoma</i>	64	<i>A. dichotoma</i> Masson
65	<i>A. distans</i> Haw.	66	<i>A. divaricata</i> Berger
67	<i>A. doi</i> Lavranos	68	<i>A. dolomitica</i> Groenewald
69	<i>A. dorotheae</i> Berger	70	<i>A. duckeri</i> Christian
71	<i>A. dumetorum</i> Mathew & Brandham	72	<i>A. dyeri</i> Schönl.

No.	Scientific Name	No.	Scientific Name
73	<i>A. ecklonis</i>	74	<i>A. elegans</i> Tod.
75	<i>A. elgonica</i> Bullock	76	<i>A. eminens</i> G. Reyn. & Bally
77	<i>A. erensii</i> Christian	78	<i>A. erinacea</i> Hardy
79	<i>A. eru</i>	80	<i>A. excelsa</i> Berger
81	<i>A. falcata</i> Baker	82	<i>A. ferox</i> Cape hybrid
83	<i>A. ferox</i> Kenya hybrid	84	<i>A. fibrosa</i> Lavranos & Newton
85	<i>A. flexifolia</i> Christian	86	<i>A. fleurentinorum</i> Lavranos & Newton
87	<i>A. flexilifolia</i>	88	<i>A. foetida</i> nom. nud.
89	<i>A. forbesii</i> Balf. fil	90	<i>A. fosteri</i> Pill.
91	<i>A. framesii</i> L. Bolus	92	<i>A. foetida</i>
93	<i>Aloe fosteri</i> Pillans	94	<i>A. gariepensis</i>
95	<i>A. gerstneri</i>	96	<i>A. gilbertii</i> Ined.
97	<i>A. gillilandii</i> G. Reyn.	98	<i>A. glauca</i> Mill.
99	<i>A. globuligemma</i> Pole Evans	100	<i>A. gossweileri</i> G. Reyn.
101	<i>A. gracilicaulis</i> G. Reyn.& Bally	102	<i>A. gracilis</i> Haw.
103	<i>A. graminicola</i> G. Reyn.104	104	<i>A. grandidentata</i> Salm-Dyck.
105	<i>A. grata</i> G. Reyn.	106	<i>A. greatheadii</i> Schönfl.
107	<i>A. greenii</i> Baker	108	<i>A. greenwayi</i> G. Reyn.
109	<i>A. harlana</i> G. Reyn.	110	<i>A. haworthioides</i> Baker
111	<i>A. heliderana</i> Lavranos	112	<i>A. hemmingii</i> G. Reyn.
113	<i>A. hendrickxii</i> G. Reyn.	114	<i>A. hereroensis</i> Engler
115	<i>A. hildebrandtii</i> Baker	116	<i>A. howmanii</i> G. Reyn.
117	<i>A. humilis</i> (L.) Miller	118	<i>A. ibitiensis</i> H. Perrier
119	<i>A. immaculata</i> Pill.	120	<i>A. indica</i>
121	<i>A. inermis</i> Forsskal	122	<i>A. inyangensis</i> Christian
123	<i>A. isaloensis</i>	124	<i>A. isoaloensis</i> H. Perrier
125	<i>A. jacksonii</i> G. Reyn.	126	<i>A. jexblakei</i> Christian
127	<i>A. jucunda</i> G. Reyn.	128	<i>A. juvemma</i> Brandham & Carter
129	<i>A. karasbergensis</i> Pillans	130	<i>A. keayi</i> G. Reyn.
131	<i>A. kedongensis</i> G. Reyn.	132	<i>A. khamiensis</i>
133	<i>A. kilifiensis</i> Christian	134	<i>A. khamiesensis</i> Pill.
135	<i>A. kirkii</i> Baker	136	<i>A. komatiensis</i>
137	<i>A. krapohlana</i> Marloth	138	<i>A. lateritia</i> Engler
139	<i>A.lensayuensis</i> Lavranos&Newton	140	<i>A. lettyae</i> G. Reynolds
141	<i>A. lineata</i> (Ait.) Haw.	142	<i>A. lingua</i> Willd.
143	<i>A. littoralis</i> Baker	144	<i>A. longibracteata</i> Pole Evans
145	<i>A. longistyla</i> Baker	146	<i>A. lucida</i>
147	<i>A. lutescens</i> Groenewald	148	<i>A. macleayi</i> G. Reyn.
149	<i>A. macracantha</i>	150	<i>A. macrocarpa</i> Tod..

No.	Scientific Name	No.	Scientific Name
151	<i>A. macrosiphon</i> Baker	152	<i>A. marsabitensis</i> I. Verd. & Christian
153	<i>A. massawana</i> G. Reyn.	154	<i>A. mawii</i> Christian
155	<i>A. mayottensis</i> Berger	156	<i>A. mcloughlinii</i> Christian
157	<i>A. medishiana</i> G. Reyn. & Bally	158	<i>A. megalacantha</i> Baker
159	<i>A. melanacantha</i> Berger	160	<i>A. menachensis</i> (Schweinf.) Blatter
161	<i>A. metallica</i> Engl. & Gilg	162	<i>A. microdonta</i> Chiov.
163	<i>A. microstigma</i> Salm-Dyck	164	<i>A. millotti</i> G. Reyn.
165	<i>A. milne-redheadii</i> Christian	166	<i>A. mitriformis</i> Mill.
167	<i>A. moledriana</i> ined.	168	<i>A. monotropa</i> I. Verd.
169	<i>A. monteiroi</i> Baker	170	<i>A. morijensis</i> Carter & Brandham
171	<i>A. morogoroensis</i> Christian	172	<i>A. mubendiensis</i> Christian
173	<i>A. mudenensis</i> G. Reyn.	174	<i>A. munchii</i> Christian
175	<i>A. mutabilis</i> Pillans	176	<i>A. mzimbana</i> Christian
177	<i>A. kirkii</i> Baker	178	<i>A. myriensis</i>
179	<i>A. myriacantha</i> (Haw.) Roemer & Schultes	180	<i>A. mzimbana</i>
181	<i>A. ngomeni</i>	182	<i>A. niebuhriana</i> Lavranos
183	<i>A. nobilis</i>	184	<i>A. nubigena</i> Groenew.
185	<i>A. nyeriensis</i> Christian	186	<i>A. nyeriensis</i> ssp. <i>nyeriensis</i>
187	<i>Aloe officinalis</i> Forsskal	188	<i>A. ortholopha</i> Christian & Milne Redh.
189	<i>A. otallensis</i> Baker	190	<i>A. pachygaster</i> Dinter
191	<i>A. palmiformis</i> Baker	192	<i>A. parvibracteata</i> Schönl.
193	<i>A. parvula</i> Berger	194	<i>A. patersonii</i> B. Mathew
195	<i>A. pearsonii</i> Schönl.	196	<i>A. peckii</i> Bally & I. Verd.
197	<i>A. peersii</i> nom. nud.	198	<i>A. peglerae</i> Schönl.
199	<i>A. pendens</i> Forsskal	200	<i>A. penduliflora</i> Baker
201	<i>A. percassa</i> Tod.	202	<i>A. petricola</i> Pole Evans
203	<i>A. petrophylla</i> Pillans	204	<i>A. pillansii</i> L. Guthrie
205	<i>A. pirottae</i> Berger	206	<i>A. plicatilis</i> [L.] Mill. (= <i>A. linguaeformis</i> L. f.)
207	<i>A. pluridens</i> Haw.	208	<i>A. polyphylla</i> Schönl. ex Pill.
209	<i>A. pratensis</i> Baker	210	<i>A. pretoriensis</i> Pole Evans
211	<i>A. pruinosa</i> G. Reyn.	212	<i>A. pubescens</i> G. Reyn.
213	<i>A. pulcherrima</i>	214	<i>A. purpurascens</i> Haw.
215	<i>A. rabaensis</i> Rendle	216	<i>A. ramosissima</i> Pillans
217	<i>A. rauhii</i> G. Reyn.	218	<i>A. recurvifolia</i>
219	<i>A. reitzii</i> G. Reynolds	220	<i>A. retrospecticiens</i> G. Reyn & I. Verd.
221	<i>A. reynoldsii</i> Letty	222	<i>A. rigens</i> G. Reyn. & Bally

No.	Scientific Name	No.	Scientific Name
223	<i>A. rivae</i> Baker	224	<i>A. rivierei</i> Lavranos & Newton
225	<i>A. rubescens</i>	226	<i>A. rubrolutea</i> Schinz
227	<i>A. rubroviolacea</i> Schweinf.	228	<i>A. rupestris</i> Baker
229	<i>A. rupicola</i> G. Reyn.	230	<i>A. ruspoliana</i> Baker
231	<i>A. schelpei</i> G. Reyn.	232	<i>A. schimperii</i> Tod.
233	<i>A. schliebnii</i> Lavranos	234	<i>A. schomeri</i> Rauh
235	<i>A. schweinfurthii</i>	236	<i>A. scobinifolia</i> G. Reyn. & Bally
237	<i>A. scorpioides</i> Leach	238	<i>A. secundiflora</i> Engler
239	<i>A. sessiliflora</i> Pole Evans	240	<i>A. simii</i> Pole Evans
241	<i>A. sinkatana</i> G. Reyn.	242	<i>A. somaliensis</i> Walter Watson
243	<i>A. species</i>	244	<i>A. speciosa</i> Baker
245	<i>A. spectabilis</i> G. Reyn.	246	<i>A. spinasissima</i>
247	<i>A. squarrosa</i> Baker	248	<i>A. striata</i> Haw.
249	<i>A. striatula</i> Haw. (= <i>A. macowanii</i> Bak.)	250	<i>A. suarezensis</i> H. Perrier
251	<i>A. succotrina</i> Lam. (= <i>A. soccotrina</i> DC.)	252	<i>A. suffulta</i> G. Reyn.
253	<i>A. suprafoliata</i> Pole Evans	254	<i>A. suzannae</i> R. Decary
255	<i>A. swynnertonii</i> Rendle	256	<i>A. tenuior</i> Haw.
257	<i>A. thorncroftii</i> Pole Evans	258	<i>A. thraskii</i> Baker
259	<i>A. tidmarshii</i> (Schönl.) Muller	260	<i>A. tomentosa</i> Defl.
261	<i>A. tororoana</i> G. Reyn.	262	<i>A. transvaalensis</i> Kuntze
263	<i>A. trichosantha</i> Berger	264	<i>A. turkanensis</i> Christian
265	<i>A. tweediae</i> Christian	266	<i>A. ukambensis</i> G. Reyn.
267	<i>A. vacillans</i> Forsskal	268	<i>A. vanbalenii</i> Pillans.
269	<i>A. vaombe</i>	270	<i>A. venusta</i> G. Reyn.
271	<i>A. vera</i> var. <i>chinensis</i>	272	<i>A. vera</i> var. <i>littoralis</i>
273	<i>A. verdoorniae</i> G. Reyn.	274	<i>A. viguieri</i> H. Perrier
275	<i>A. vituensis</i> Baker	276	<i>A. vogtsii</i> G. Reyn.
277	<i>Aloe volkensii</i> Engler	278	<i>A. vryheidensis</i> Groenewald
279	<i>A. vulgaris</i> var. <i>officinalis</i> Forsk.	280	<i>A. wickensii</i> Pole Forsk.
281	<i>A. wickensii</i> var. <i>lutea</i> Reynolds	282	<i>A. wilsonii</i> G. Reyn.
283	<i>A. wrefordii</i> G. Reyn.	284	<i>A. yavellana</i> G. Reyn.
285	<i>A. zebrina</i> Baker		



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