

# ALOE TODAY

## Part Two

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### 1. ALOE LATEX AND ALOE GEL

The various species of aloe (see Part One in Natural 1, September 2002) are the source of two important groups of compounds used in therapy: anthranoids [aloe latex (1)] and polysaccharides (aloe gel); both groups are contained in the leaf and this may cause some discriminatory difficulties, aggravated by the easy, reciprocal and inevitable contamination during extraction.

The Aloe genus is typically defined a "succulent" or "xerophyte" that is, a plant which, living in arid environments, accumulates the little water available and limits its evaporation from the foliar surface, by means of a resistant cuticula.

The cross-section of a leaf (see figure 1) appears, from the exterior towards the interior, as follows: under the epidermis (ep), along the whole of the foliar perimeter, a strong tissue (parenchyma) of green chlorophyllian cells (chl) are developed under which there lies a thick colourless aquiferous tissues with several layers of large cells (p) to retain the hydration water.

The vascular bundles, made up of vessels (g) and cribriform tubes (si), all of which are enclosed in a half-moon involucre formed by brown excreting cells (ex) which, like the vascular bundles, extend for the whole length of the leaf. These cells contain a bitter brown fluid aqueous solution of anthranoids (aloe latex), which is clearly distinguished from the viscous mucilage of the aquiferous tissue (aloe gel).

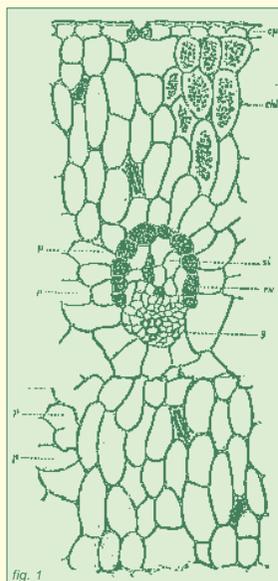


fig. 1

### 2. EXTRACTION

#### 2.1 Aloe latex

The long aloe leaves are cut at the base and hung up, in bundles, above suitable recipients that can collect the latex which flows out spontaneously, and without pressure, from the excreting cells by autolysis of their thin transversal walls.

The solution collected this way is then concentrated in dry form by heating, obtaining, depending on the method followed, the so-called "aloe hepatica" or "aloe lucida". If the latex is left to concentrate slowly in the sun or at a

relatively low temperature, an opaque (hepatic) and microcrystalline powder is obtained which under the microscope reveals crystals of aloin; if the latex is concentrated at higher temperatures (as is the case in South Africa for Cape aloe) a black homogeneous reflecting mass defined "lucida" is obtained which, under the microscope, does not reveal any crystals.

#### 2.2 Aloe gel

While the aloe latex is released, by falling from the leaf, the gel is not released due to its high viscosity and it therefore has to be extracted by pressure or subsequent scraping. Each manufacturer follows reserved procedures which aim to collect the largest amount of gel avoiding, as far as possible, the contamination of the gel with anthranoids and its degradation in the light and heat: in the former case, the gel, having been taken due to its gastro-protective characteristics, would also show undesired laxative properties, in the latter case, it would lose part of its therapeutic action. The mechanical removal of the excreting fibres allows the elimination of the anthracenic compounds whilst the extraction of the gel by cold homogenization of the foliar tissues, followed by lyophilization or vacuum concentration at moderate heat or even immediate incorporation in the mixture for the product to be used, guarantee the gel is pure.

### 3. THE USE OF THE DIFFERENT SPECIES OF ALOE

As already observed in Part One, all the pharmacopoeias deal exclusively with two, out of the very many, spe-

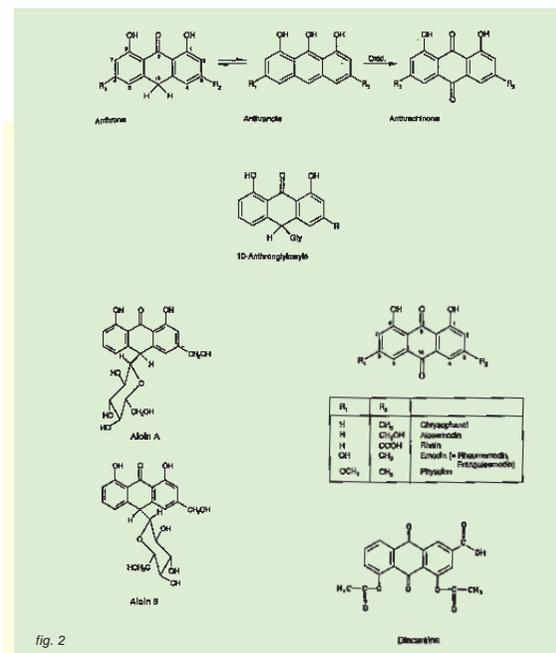


fig. 2

cies of aloe: Cape aloe (ferox) and aloe barbadensis (vera) and only their anthranoid content. For some years, however, research has examined the therapeutic action of other species and, amongst their constituents, the gel has also been taken into consideration. Thus there

is much discussion on the total extract of the leaf of Aloe arborescens and alongside Aloe vera gel, that of Aloe ferox is also to be found on the market. Aloe marlothii A. Berger, or Natal aloe was mistaken for Cape aloe due to the great morphological resemblance and as

such is used: at present, it is considered a serious sophistication and has disappeared from the market; Aloe succotrina All., also naturalized in southern Spain and France and already widely used, is not a medicinal plant. These brief observations show the difficulties, connected with the use of aloe preparations, and the need to take due consideration of these starting from the identification of the botanical species.

### 4. THE THERAPEUTIC ACTIVITIES OF THE CONSTITUENTS AND THEIR DERIVATIVES

The following diagram shows (with some derivatives) the original constituents of aloe leaf, the characteristics of which will be discussed later. Figure 2 shows some of their chemical formulas.

#### (5) NOTE

(1) Contrary to the definition of aloe as "dried juice" shown in the European Pharmacopoeia 4, p. 608 (see Natural 1, September 2002), the English wording recommended by the USP for the Italian "succo" is "latex" and not "juice": the latter is considered too generic and would indicate both the latex and the gel [cf. Capasso F. et al., "Aloe and its Therapeutic Use", Phytotherapy Research, vol. 12, p. 124 (1998)]

