

# Oakmoss and Treemoss in China

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Oakmoss products including concretes, absolutes and resinoids have long been used extensively in perfumery. They form important parts of the notes in fougère, chypre or "moss" perfumes, and they are general ingredients in colognes, crêpe de Chines, forest notes, new mown hay, pine fragrances, lavender bouquets, Oriental, fancy or modern bases, etc. Oakmoss products can lend body and naturalness, rich pleasant undertones and high fixative value in numerous types of floral fragrances as well.<sup>1</sup>

The various extracts of oakmoss belong to some of the finest perfumery materials. There are few high-class French fashion perfumes which do not have at least a touch of an oakmoss product in their formulas.

True oakmoss is the lichen, *evernia prunastri*, which grows primarily on oak trees. It is collected all over central and southern Europe, particularly in Yugoslavia, France, Algeria and Morocco.

Besides true oakmoss, *evernia prunastri*, so-called "tree moss" or "fir moss" was obtained from two related lichens, *evernia furfuracea* and *usnea barbata*. Both of them grow on spruces and pines in the humid forests of central and southern Europe.<sup>2</sup>

Prior to 1960, neither oakmoss nor treemoss had been found in China. Oakmoss products had to be imported in order to satisfy the increasing consumption demands of the domestic fragrance industry.

In 1960, a senior perfumer of Scientific Research Institute, Cheng Zuxian, discovered a kind of lichen *ramalina fastigiata* in Yunnan. Since then, the Kunming Perfumery Factory began to produce treemoss extract with the help of Liu Jinghau and Zhang Guoyu, the senior engineers of Scientific Research Institute. Even though Chinese perfumers relied heavily on this treemoss extract for compounding perfumes, colognes, and soap fragrances, the treemoss extract could not replace oakmoss products yet. Treemoss produces a much darker extract, the odor of

**Photo 1. Oakmoss I**  
**Natural lichen *evernia mesomorpha***

**Photo 2. SEM Oakmoss I**  
401 X (Left); 2.44K X (Right)  
(by ISI-DS 130)

which is much less refined than that of the true oakmoss extract.

A project to introduce and culture oakmoss was begun by the Ministry of Light Industry. In September 1982, the project was undertaken by a group of botanists and chemists from the Chinese Academy of Sciences Kunming Institute of Botany. The group was leaded by researcher Sun Handong.

In October 1982, the botanists travelled to the northwestern area of Yunnan province. Among thousands of plant samples, a cousin of oakmoss, *evernia mesomorpha* was found. This natural lichen grows mainly on agalea plants or lives on the trunks and stems of fir and dragon spruce. The lichen *evernia mesomorpha* is widely spread in an area between 2,700 meters and 4,200 meters above sea level.

Researchers distinguished that *evernia mesomorpha* is of the same family as oakmoss *evernia prunastri*, but different species. It was

identified as "oakmoss I" (see photo 1). "Oakmoss I" is soft yellowish green in color, with plenty of lines and furrows on its outer layer (see photo 2). The true oakmoss is a light green color on one side, and a whitish color on the other.<sup>3</sup>

"Oakmoss I" concrete and absolute have been in production at the Kunming Perfumery Factory since 1984. The yield of "oakmoss I" concrete is 2.5% to 2.8%, and the yield of absolute is 50% based on concrete. The products have been proclaimed even superior to the imported oakmoss.

In point of fact, very few commercially available oakmoss extracts are "true and genuine" in the same terms as those applied to the essential oils.

The properties of "oakmoss I" are:

#### Petroleum Ether Concrete

Color: yellowish green  
Acid Number:  $\leq 70$   
Ester Number:  $\geq 50$   
Solubility: 1 g of sample dissolved in 100 ml of 95% ethyl alcohol

More than 20 volatile constituents of "oakmoss" have been detected. Among them, the main component was isolated:

Melting point: 42-43°C

Elementary analysis:  $C_{13}H_{18}O_4$

By UV, IR, MS,  $^1H$  and  $^{13}C$  NMR determination, the structure was elucidated as ethyl divaricatinatate (1).<sup>4</sup> Ethyl divaricatinatate has not yet been investigated in the volatile composition of natural lichens.

Another lichen, so called "oakmoss II," was also found in the central and northwestern area of Yunnan province. It is the treemoss collected from *cetrariastrum nepalensis* plants. It is light

**Photo 3. Oakmoss II**  
Natural lichen *cetrariastrum nepalensis*

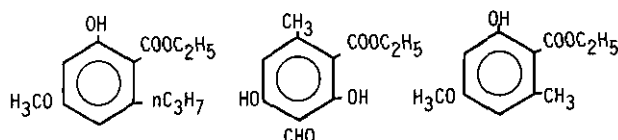
**Photo 4. SEM Oakmoss II**  
229 X (Left); 1.2K X (Right)  
(by ISI-DS 130)

## Oakmoss

green in color on one side, and a black-gray color on the other (see photos 3 & 4). Its appearance is similar to "sprout lichen," "treemoss," or "mousse d'arbre."

The yield of "oakmoss II" concrete is 2.9% and 50% of absolute can be isolated. The absolute is a very viscous liquid, of dark green color.

More than 30 volatile constituents were detected, but "oakmoss II" usually contains a considerable amount of crystalline substances. It was confirmed that the main compound of crystalline substances was ethyl haematommate (2). The minor components are ethyl everminate (3) and ethyl divaricatinatate (1).<sup>5</sup>



The odor of "oakmoss II" absolute is more greenish, tender and close to the odor of French products.

By my point of view, although Chinese "oakmoss I" and "oakmoss II" are not the true oakmoss *evernia prunastri* (L.) ach., from oak trees, the cousin *E. Mesomorpha* has the most pronounced and finest odor similar with true oakmoss. "Oakmoss I" and "oakmoss II" are not only excellent odor fixatives in fragrances, but they impart to the finished product, whether soap, cosmetic or lotion. These products, concrete and absolute, have been well received by Chinese perfumers now.

In my opinion, the Chinese oakmoss and Chinese treemoss will have a place in the world fragrance market if their quality is improved still further and if there is a good assortment available.

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