

# GINKGO BILOBA THE TREE OF LIFE

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Engelbert Kämpfer, son of an Evangelical clergyman, was born in Westfalia in 1651.

He studied medicine in Königsberg and then moved to Upsala. In 1683 he was appointed as doctor of the Swedish diplomatic mission and began traveling around the world. He started collecting medical data and practical information that he noted down in his diary.

In 1712, the information he gathered was published in a book called *Amoenitates Exoticarum*, which tells of the wonders of nature.

Towards the end of the 17<sup>th</sup> century, Kämpfer set out for the Far East with the Dutch East India Company. He spent over a couple of years in Japan, and it was there, in the vicinity of the places of worship and the beautiful temple gardens dedicated to Buddha, that he noted some magnificent, old trees with strange fan-shaped leaves, which were revered by the Japanese who considered them to be the sacred plants of the gods.

The ginkgo tree, with its characteristic feature of being either

male or female, symbolized the fundamental principal of oriental philosophy, namely the opposing vital forces of yin and yang, the two forms of energy that govern the life of both man and nature.

In his travel diary, Kämpfer wrote that the Japanese called this tree Ginkyo or “silver apricot”, probably because of its round, pedunculated, light-yellow, almost silver colored fruit. The fruit in itself is not particularly attractive, and by no means tasty. It has a rather nauseating smell and a very hard integument containing seeds rich in starch which are comestible (ginan) and commonly served on special occasions such as weddings in the East.

When Kämpfer's notes were printed, the original Japanese word, Ginkyo, was misspelt, and the mistake was not corrected in the subsequent prints of *Amoenitates Exoticarum*.

The book later came into the hands of Carlo Linneo, who gave the plant its current name of *Ginkgo biloba*. The word ‘ginkgo’ does not mean any-

thing, whereas the species is a clear reference to the bilobed shape of its leaves.

Some Ginkgo plants were shipped to Europe, and the first tree was planted in the botanical garden in Utrecht. Proving its robustness and longevity, the tree still stands at a height of 22 meters, its trunk boasting a circumference of four meters.

The peculiar shape of the tree and its leaves aroused great curiosity in Europe, and a number of patrician families, fascinated by the majestic nature of the Ginkgo, planted numerous specimens in their parks.

Charles Darwin was also rather taken up by the tree and noted that the fan-shaped leaves of the Ginkgo were similar to those found in fossils. He defined the Ginkgo a “living fossil”, hypothesizing that the tree existed 250 million years ago.

If this is true, then the Ginkgo is the only survivor of a prehistoric family of plants that populated our hemisphere in the Mesozoic era. These were seed bearing plants (gymnosperms), with no fruits or flowers. They have obviously survived for mil-

lions of years due to their extraordinary resistance and adaptability. They have preserved a reproductive system which is rather archaic from the point of view of evolution, and unique to higher plant forms.

The reproductive cells allow pollen to enter, and the presence of numerous cilia favor fertilization, just like in the case of primitive ferns.

The plant is said to be able to withstand extreme cold and drought, be immune to insects and parasites, and even counter air and industrial pollution. In fact it increasingly reigns supreme along town avenues. This is what some believe might have happened during the 1945 bombing of Hiroshima.

It is said that an old Ginkgo near the observatory was completely carbonized after the explosion, but only a few days later, green shoots were seen sprouting from its charred trunk.

It is no wonder, therefore, that in Japan the Ginkgo is considered the "tree of life", not only from a symbolic and religious point of view, but also bearing in mind its healing properties.

Doubtlessly the roots of Japanese medicine lie in the realm of the supernatural, and illnesses were once considered a sort of evil spirit to be driven away by religious rites, magic formulas and amulets.

However, as dealings with their Chinese neighbors began in the 5<sup>th</sup> century AD, the Japanese adopted the criteria of Chinese

medical practice.

The subsequent conversion to Buddhism in the 6<sup>th</sup> century, invariably influenced Japanese medicine and therapy. A group of Chinese bonze immigrants began spreading the notion that health and long life could be obtained not simply by religious rites, but also through the use of medicinal plants.

A centuries-old tradition in China had led to the drafting of long lists of medicinal plants, codified in the famous Pen-t'sao, a materia medica. The first few medical prescriptions, gathered in precious scrolls and protected with imperial seals, soon appeared in Japan as well.

At that time the Chinese bonzo Kam-Jim practiced his trade under the auspices of the emperor and spread the Taoist principles of medical treatment. Empress Komyo, renowned for her concern for the ailing, had a precious list of herbal medicines drawn up. This parchment, bearing 45 imperial seals, was rolled around a wooden stick and is preserved even today.

Over the years the Japanese adopted Chinese medical practices, just like they imbibed a number of Chinese traditions such as tea-drinking, which was introduced only in the 12<sup>th</sup> century and soon became an essential part of Japanese etiquette.

Unlike the Chinese medical tradition, Japanese medicine has undergone vast change over the last two centuries and has been influenced by western medicine. Clearly, though it has con-

tributed greatly to pharmacology, the Japanese materia medica never took on an identity of its own.

It was probably in Empress Komyo's days that the first few sacred trees were planted near Buddhist temples. Scholars believe they were of Asian origin.

*Ginkgo biloba* trees were supposedly very common in the forests in the north of China. However, due to deforestation, the trees found shelter mainly in Japan, where they were planted mainly in places of worship to symbolize immortality. Some thirty-meter high specimens, with trunks of over five metros in diameter, still stand in temple grounds, and they are believed to be over a thousand years old.

The traditional use of "bai guo", as the Ginkgo-based remedy was known in China, soon spread to Japan and was used to cure a number of ailments such as bronchitis, insomnia, bladder disorders, parasite infections and circulatory problems.

The lattermost use has aroused great pharmacological interest over the past few decades and has led to the identification of a wide range of substances with the following active principles:

Flavonoid glycosides (in which the aglycon is quercetin or kaempferol) which improve choleic drainage, thereby reducing hypercholesterolemia; Flavone ament biflavonoids (gingketol and isogingketol) which counter lipidic hyperoxi-

dization, scavenge free radicals and have a trophic effect on cell membranes. These active principles notably enhance peripheral microcirculation, and also improve peripheral vasopathy with ischemic and thrombotic tendencies;

Diterpene lactones (gingkolides A, B, C) which block the platelet activating factor, reducing the risk of blood clots and improving vasomotor regulation relating to adrenergic functioning, bringing about an improvement in patients suffering from memory disorders and giddiness.

Subsequent clinical experiments were carried out on the basis of the principle that the action of the various active principles of *Ginkgo biloba* were not to be considered separately but as a whole, taking into account their coordinated and synergic action on vascular and cerebral tissue blood flow.

This led to a number of interest-

ing and important pharmacological discoveries, especially as regards circulatory disorders.

Clinical tests on Ginkgo total extract revealed three different mechanisms of pharmacological action:

- improvement of plasma viscosity
- trophism of vascular walls
- inhibition of tissue metabolism disorders caused by free radicals

Proper plasma functioning depends on the inhibition of blood platelet aggregation by accelerating prostacycline synthesis and improving erythrocyte aggregate elasticity. This leads to a decrease in plasma viscosity and impairs erythrocytolysis. A series of experiments conducted on patients suffering from vascular syndromes have shown that Ginkgo biloba extracts block thrombocyte aggregation by acting directly on the arachnoid acid tide.

The trophic action on the vessel walls also increases artery and

vein tone, thus strengthening capillaries and regulating their osmotic function.

This brings about an increase in blood flow and capillary circulation.

Oxygen free-radicals are involved in a number of pathologies such as ischemia, and experiments have highlighted the protective effects of Ginkgo extracts on reactive oxygen agents released by neutrophils due to the potent anti-radical action of the extract.

An increase in lipidic peroxidation impairs tissue metabolism, leading to the formation of toxic oxygen radicals which are particularly harmful to cerebral tissues as it makes them vulnerable to arteriosclerotic phenomena and leads to impaired cerebral performance, often accompanied by fatigue and depression attacks. Reduced cerebral circulation, and consequent mental deterioration, is known as cerebrovascular failure.

Cerebrovascular failure is not a well defined syndrome but the result of a number of disorders that lead to memory loss, confusion and dementia, which characterize the onset of Alzheimer's disease.

The Ginkgo extract seems to be able to prevent this serious neurodegenerative disorder, at least in its early stages.

The tree of life and immortality, so highly valued by the Orientals that it has become the object of veneration, therefore appears to antagonize the aging process.

The basic structure of ginkgolide

