

## ECOLOGY AND CHEMICAL COMPOSITION OF MISTLETOE (*VISCUM ALBUM L.*) ACTION

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**ABSTRACT:** Mistletoe is a parasitic plant species, widespread in the hilly and mountainous regions, used as an ornamental plant, but also as a medicinal plant, it is used only for therapeutic action leaves because the fruits are toxic. Loodsucking species of hardwood and softwood, but also shrubs. Species that grow influence the chemical composition of mistletoe. Mistletoe is a plant atypical because linear logic does not adhere to the development of the plant, ignores heliotropism and geotropism, germinate only light, ignore rhythm and the laws seasons. Mistletoe has a diverse chemical composition and very active, plant body used in therapy being the leaves and young branches.

**KEY WORDS:** mistletoe, ecology, composition, action

### 1. INTRODUCTION

Mistletoe (*Viscum album L.*) belongs to the family Loranthaceae and is a native species, widespread in northern Europe, to northwest Africa and east Asia, to Japan. Popular name is white mistletoe, stoletnic, pear mistletoe, mistletoe fir, but is known as the golden bough, glue birds, grass or plant druid healing (fig. 1).



Fig. 1. Mistletoe (*Viscum Album L.*)

It is a **species plant parasite**, herbaceous, 30-60 cm high, evergreen, who lives about 70 years. It is used as an ornamental plant, but also as a medicinal plant, being used for therapeutic action only leaves, because the fruits are toxic. Mistletoe appears in polluted

areas, in cities, along underground watercourses. Fix host by sucker primary, which develops suckers secondary, grows and develops very slowly, species of hardwood and softwood: poplar, willow, hornbeam, alder, beech, oak, flasks, elm, apple, apple tree, pear, mountain ash, plum, maple, cherry, sour cherry, acacia, walnut, ash, birch, maple, linden, hawthorn, spruce, fir, pine forests, in the hills and mountains. Species that grows influence the chemical composition of mistletoe. Thus, the best host species are birch, fir, ash, apple and hair, and the most toxic maple, linden, willow, poplar.

### 2. MISTLETOE ECOLOGY

**Increasing mistletoe** it is realizing when following **conditions** are met:

- consumption of seeds by a bird (jay or mistletoe thrush)
- germination and trening haustor light conditions
- the elimination of carbohydrate in conducting vessels of the host tree

**Developing mistletoe** following **steps:**

- phase main activity of mistletoe – baking mucilaginous grain in winter, when the host tree has no leaves
- mistletoe seeds do not reach the ground, not germinate after a period of rest on the ground, but only after they are eaten by birds
- inside pearls are more embryos green after a while spent in the stomach of birds, they get in their droppings and tree branches (phage mistletoe does not grow ever, the oak rarely, showing that mistletoe embryo coniferous can never grow a category tree foiaselor and vice versa)
- when the light reaches the seeds, they sprout and there is a vine (**suckers**), which penetrate deep within the branch bark and form roots reaching wood vessels of the host tree
- mistletoe extract its not never only water and minerals from the soil, but through the tree, which donates a portion of gross sap taken from its roots and a part of the substances synthesized for him (there are male plants and female and both derive their water and minerals the host tree and produce carbohydrates through photosynthesis)
- in winter, when raw sap stream stops, mistletoe eliminates carbohydrate substances with antifreeze action in conductive vessels that supply the tree, forcing continue to circulate sap stream, while the vessels supplying only tree they are at rest
- after the haustor and roots develop, mistletoe manufactures leaves, identical in shape, it is similar cotyledons and the upper and lower face of the same limb, which makes this species to be unique
- in the early years, plant stands, is regularly branching V-shaped, the shape of a small tree
- third year of life, appear first branches floriferous and form mistletoe total change. Researchers Rolf and Thomas Goebel Dorka demonstrated with the

help of photographs taken at short intervals, time lapse method, a film with accelerated playback, that within 28 days, during a monthly cycle, each branch starts to tilt movements slow forming a ball-shaped bush. This form, mistletoe keep for life, no longer guided by the position of the sun and the direction toward the center of the earth. Center is within him and be guided by its ambience, circular in all directions. It forms a globular reaching up to 1-2 meters in diameter (fig. 2).



Fig. 2. Growth and development of mistletoe

**From the ecological point of view**, it demonstrated that:

- mistletoe does not adhere to linear logic of plant development
- ignore heliotropism (orientation to the sun) and geotropism (grow upside down, sideways or in any direction)
- germinate only to light (as opposed to most plants require darkness to germinate)
- ignore rhythm and laws seasons
- flower buds are formed in may, but do not open until february; fruits ripen in the middle of next winter; process from flower to fruit lasts 2 year (anglosaxons called this plant mistl tan tan = branch different because of its peculiariti)
- ripe fruits, green fruits, flowers and immature leaves are open at the same time on the same plant

In 1961 year, laboratory studies have shown that, mistletoe, together with other immunostimulating plants (eupatorium, astragalus, echinacea, acanthopanax,

chamomile) inhibit tumors in mice. Mistletoe originated from oak, after fermentation, stimulates the activity of cancer cells and produce a particularly strong effect on rats hematoma (liver cancer). Mistletoe unfermented produce a powerful effect on human leukemia type molt-4 cells, and korean mistletoe (*Viscum coloratum*) is active in inhibiting the growth of leukemia L1210, when used fresh.

**The resources of mistletoe plant** (fig. 3) are:

- **train** - short, cylindrical, woody, thick, branched, thickened at nodes, where they break easily, chestnut-gray color, greenish-yellow, rarely yellow - gray
- **leaves** - opposite edges entire, lacking petioles, thick, oblong-oval, with rounded tip, wider at the top than at the bottom, brushless, 4-5 ribs visible on the bottom, smooth, leathery to the touch, green - yellowish, 2-4 cm long
- **flowers** - appear on the branches of a year, are small, greenish-yellow, free from defect, grouped two or three (male and female flowers are arranged each on separate bushes)
- **fruits** - berries round, green on top and white translucent maturity, are grouped two or three
- **seeds** - are number two in a sticky substance and mature in december



Fig. 3. The resources of mistletoe plant

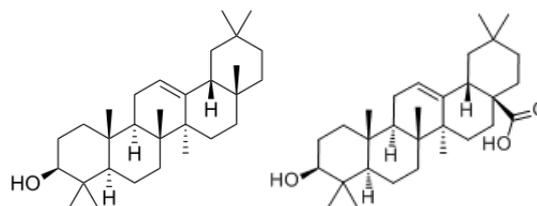
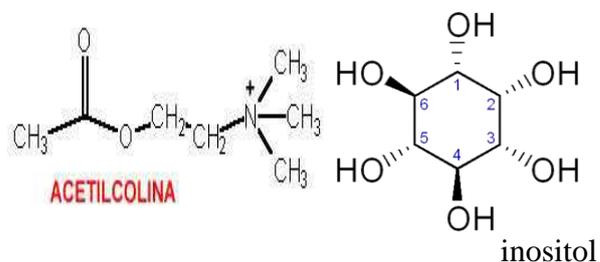
### 3. CHEMICAL COMPOSITION AND PHARMACODYNAMIC ACTION OF MISTLETOE

Mistletoe has a chemically diverse and very active. Body plant used for therapeutic purposes are the **leaves** and **young branches** (*Herba viscera*) harvested all year round, but especially during the winter when tree

branches are distinguished by the host. The most valuable in terms of quality mistletoe is that parasitize apple, then the increased pear, fir, birch, and ash rose, as demonstrated consistent between the toxicity of mistletoe bushes and tree on which it grows. Not harvested mistletoe on maple, linden, willow, poplar, because it is very toxic.

The branches of mistletoe have the following **chemical composition** (fig. 4):

- triterpenoid saponins
- viscina
- viscitoxina
- amines (choline, acetylcholine, with antiseptic)
- inositol (cyclohexane -1,2,3,4,5,6 - HEXOL, a polyol chemical formula  $C_6H_{12}O_6$  or  $(-CHOH-)_6$ )
- beta amyryn
- oleanoic acid derivatives (immunostimulatory)
- fatty substances extracted from oleic acid, linoleic acid, palmitic
- beta and alpha blizzard
- triterpenoid saponins
- phenyl-ethyl-amine
- mucilage
- amino acids
- viscous acid
- polysaccharide
- glycoside (siringina)
- quercitina
- minerals
- vitamins C and E



beta-amyrin

oleic acid

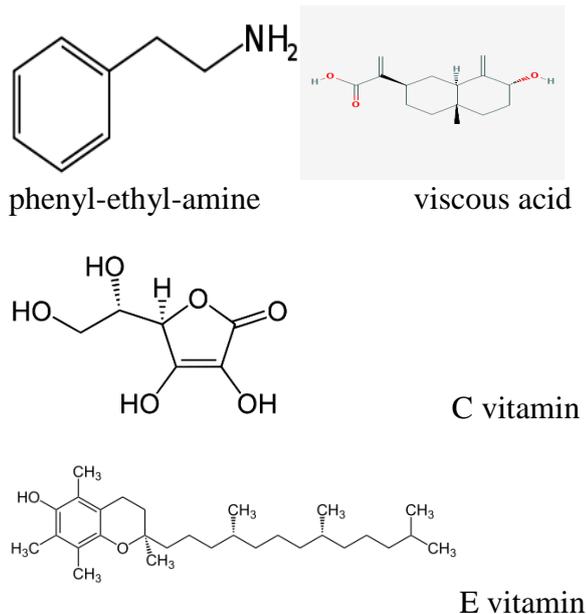


Fig. 4. Chemical composition of mistletoe

Phoradendron species contains foratoxina (fig. 5), and the species Viscum contains alkaloid tyramine, thin highly toxic, producing death (fig. 6).



Fig. 5. Phoradendron species containing foratoxina

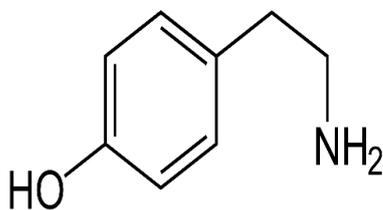


Fig. 6. Tyramine contained in Viscum

**Pharmacodynamic action of mistletoe:** due to the nature of substances triterpene derivatives of choline and viscotoxina, mistletoe has powerful hypotensive properties and cordials. Is peripheral coronary vasodilator, has immediate activity in bradycardia, tachycardia and late in

asntispasmodice properties, antifungal and antitumour. Due saponosides and two alcohols, alpha and beta blizzard, choline and acetylcholine mistletoe has the ability to influence blood circulation, acting as a hypotensive. The plant has antispasmodic action, soothes asthma, whooping cough, kidney disorders, cardiac depressant, acts on heart muscle and produce vasoconstriction. The therapy is used next plant protection preparations:

- syrup
- infusion
- cold macerate
- powder
- wine
- decoction

## CONCLUSION

- Mistletoe is a parasitic plant species, used as an ornamental and medicinal plant.
- It is used only for therapeutic action leaves, because the fruits are toxic.
- Species that grow influence the chemical composition of mistletoe.
- Mistletoe is a atypical plant, because linear logic does not adhere to the development of the plant, ignores heliotropism and geotropism, germinate only light, ignore rhythm and the laws seasons.
- Mistletoe has a diverse chemical composition and very active.
- Due to the nature of substances triterpene derivatives of choline and viscotoxina, mistletoe has powerful hypotensive properties and cordials.

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