Cassytha filiformis L. (Lauraceae)

(Syn. Cassytha americana)

English: Love vine, greek kasytas
French: Liane parasyte, liane d`amité, liane ficelle, liane sans fin, mouttaré, fausse cuscute, cord a violon, vermicelle German: Schlingfaden
Spanish: Alambrillo, bejuco dorado, bejuco fideo, fideos, tente en el air
Chinese (Taiwan): Kume, wu-kentaso Japanese: Sunazuru
Vernacular names:
Africa Venda: Luangala Philippines Tagalog: Kauad, kauad-kauaran

---

The plant

A sprawling parasitic vine, is widely distributed along the seashores up to 300m throughout the tropics. It is parasiting on many host plants like Acacia, Azadirachta, and Mangifera. Stem threadlike, leaves reduced to minute scales, spirally arranged, glabrous or pubescent. Inflorescences reduced to one flower being sessile or shortly pedicellate, green or white coloured. Fruits round black berries. Flowering and fructification is over whole the year. At some coasts the viscous mucus was used for caulking ships.

Plant parts used

The aerial parts and the leaves

Tradional uses

In Taiwan Cassytha filiformis is reported to be a useful medicine against gonorrhoea, kidney ailments and as diuretic (8). In Africa it is utilized to treat cancer, African trypanosomiasis and many other diseases (4).

Constituents

The plant genus Cassytha belongs to the plant family Lauraceae being a rich source of aporphine alkaloids (8). The total alkaloid content in Casytha filiformis, showing variations according to the material is 0.11-0.43 % (6).
In the **Brazilian species** of C. filiformis thirteen alkaloids were found (1). Fourteen compounds were isolated out of the methanolic extract of **Taiwanese plants**, ten of them were known. Out of the group of aporphin alkaloids, six ones were unknown. .They were analysed and named cathafiline, cathaformine, actinodaphnine, N-methylactinodaphnine, predicentrine and ocoteine (3). In an earlier Japanese work cassyfiline was described as light orange-brown microgranules, mp 217°C, chemical structure $C_{19}H_{19}O_5N$ (7).
In a crude alkaloid extract of C.filiformis four aporphine alkaloids neolitsine, dicentrine, cassythine (=cassyfiline) and actinodaphnine were isolated. Their chemical structure was determined by spectroscopic data. They all are cytotoxic (6).

Results of experimental studies

Antiplatlet and vasorelaxant activity
Six compounds out of the methanolic extract from **fresh plants** of C. filiformis exhibited significant vasorelaxant and inhibitory effects on the platelet aggregation. This was studied on washed rabbit platelets induced by ADP (20 μm), arachidonic acid (100 μM), collagen (10 μM) or PAF (3.6 nM), respectively. All six alkaloids showed antiplatelet effects with variable extent (3).

Cytotoxicity
The **alkaloid extract** of C. filiformis plants showed a cytotoxic property in vitro with IC50 value of 2.2 μg/ml. Three alkaloids, actinodaphnine, cassythine, dicentrine were active in vitro on trypynosomes with IC50 values of 3-15 μM tested by optical methods. The alkaloids bind effectively to DNA and behave as typical intercalating agents. Actinodaphnine, cassythine, dicentrine interfere with the catalytic activity of topoisomerases (4).
Four alkaloids from a **crude extract** of C. filiformis (neolitsine, dicentrine cassythine, actinodaphnine) were tested on cancer and non-cancer cells in vitro. Neolitsine was the most active against HeLa and 3T3 cells (IC50 21.6 and 21.4 μM). Cassythine and actinodaphnine showed the highest activity against Mel-5 cells with IC50 24.3 μM and 25.7 μM, and against HL60 cells (IC50 19.9 μM and 15.4 μM), respectively (6).

Pharmacological activity
Ocoteine from C.filiformis was found to be an alpha 1-adrenoceptor blocking agent in rat thoracic aorta as revealed by its competitive antagonism of phenylephrine-induced vasoconstriction (pA2 = 7.67 +/ -0.09). Removal of endothelium from the aorta did not affect its antagonistic potency (pA2 = 7.97 +/- 0.07). Ocoteine did not affect the contraction induced by U-46619, prostaglandin F 2 alpha or angiotensine II, but inhibited slightly those by high K^+ and endothelin I.
Neither the cyclic AMP nor cyclic GMP content of rat thoracic aorta was changed by ocoteine (10 μM). Comparing the EC 50 values, the potency of ocoteine against 5-hydroxytryptamine was about 60 times less than that against 5-hydroxytryptamine. Ocoteine (10 μM) also slightly antagonized the clonidine-induced inhibition of the twitch response evoked by field stimulation in the rat vas deferens.
In guinea pig trachea, the contraction caused by carbachol, histamine, neurokinin A or leukotriene C 4 and ß 2-adrenoreceptor -mediated relaxing responses induced by isoprenaline were not affected by ocoteine (10 μM).
The voltage clamp study in rat ventricular single myocytes revealed that ocoteine (3.10 μM) inhibited steady state outward currents or slow inward Ca^+-currents. It was concluded that ocoteine is a selective alpha 1-adrenoceptor antagonist in isolated rat thoracic aorta. At high concentrations, it also blocks 5-HT receptors and and Na^+ and steady state outward currents in rat ventricular myocytes (3).

Results of clinical studies
No results were available

Evaluation
Cassytha filiformis is rich of aporphin alkaloids of which fourteen are mentioned above. Their chemical structure belongs to the tetracyclic benzylisochinolides which interfere with the metabolism of human beings and animals.

They are very toxic and if eaten frequently they may show cancerogenic effects, especially in the methanolic extracts. This can be explained by the interference of most alkaloids with DNA.

All applications with men and animals must be advised against!

Cassytha filiformis:

No postive evaluation

References Cassytha

1. Cava MP, Rao KV, Douglas B, Weisbach JA (1968) The alkaloids of Cassytha filiformis americana L. J Org Chem 33,2: 2443-6
2. Chang CW, Ko FN, Su MJ et al. (1997) Pharmacological evaluation of ocoteine, isolated from Cassytha filiformis, as an alpha 1-adrenoceptor antagonist in rat thoracic aorta (1997) Japan J Pharmacol 73,3: 207-14, PubMed 912 7815
3. Chang FR, Chao YC, Teng CM et al. (1998) Chemical constituents from Cassytha filiformis II J Nat Prod 61, 7: 863-6
4. Hoet S, Stevigny C, Block S et al. (2004) Alkaloids from Cassytha filiformis and related aporphines: Antitrypanosomal activity , cytotoxicity, and interaction with DNA and topoisomerases Planta Med 70,5: 407-13
5. Stevigny C, Wautier MC, Habib JL et al.(2004) Development and validation of high performance liquid chromatographic method for quantitative determination of aporphine alkaloids from different samples of Cassytha filiformis Planta Med 70,8: 764-70
6. StevignyC, Block S, De Pauw-Gillet MC et al. (2002) Cytotoxic aporphine alkaloids from Cassytha filiformis Planta Med 68, 11: 1042-4
7. Tomita M, Sheng-Teh L, Wang SJ (1965) Studies on the alkaloids of Formosan lauraceous plants VII: Alkaloids of Cassytha filiformis L. Yakugaku Zasshi 85, 9: 827-31
8. Wu YC, Chao YC, Chang FR et al. (1997) Alkaloids of Cassytha filiformis Phytochem 46, 1: 181-4