

3.3.3. *Cheilanthes vellea* (Aiton) F. Muell., Fragm. 5: 123 (1866); Boulos, Fl. Egypt 1: 5 (1999).

Syns. *Acrostichum velleum* Aiton, Hort. Kew., ed. 1, 3:457 (1789).

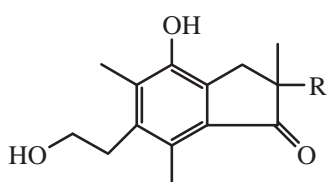
Cheilanthes catanensis (Cosent.) H.P. Fuchs Brit. Fern Gaz. 9: 45(1961);
Täckh., Stud. Fl. Egypt, ed. 2: 48 (1974).

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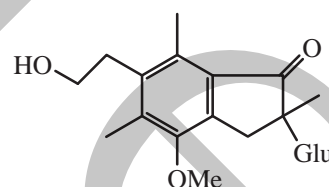
Nothing has been reported about the constituents and/or biological activities of this species.

3.4. **ONYCHIUM** Kaulfuss

The compounds isolated from *Onychium* species include flavonoids, andanoids and diterpenoids. Onychiol B (a diterpene alcohol) was identified as one of the cytotoxic principles from the aerial parts of *Onychium japonicum* (Hseu *et al.*, 1980; Xu *et al.*, 1993). Oleanolic acid, ursolic acid and β -sitosterol were isolated from *Onychium lucidum* (Xu *et al.*, 1999b; Chen and Zheng, 2008), and daucosterol and β -sitosterol from *Onychium contiguum* (Xu *et al.*, 1999a). Petroside M, (an indanone) was also isolated from *Onychium japonicum* (Hasegawa *et al.*, 1974; Akabori *et al.*, 1980). Phenolic petrosins *viz.* onitin (**45**) and onitisin (**46**) were identified from *Onychium auratum* (Banerji *et al.*, 1974a,b) and *Onychium siliculosum*, which also contained onitinoside (**47**) (Wu *et al.*, 1981b). Protocatechuic acid, 3,4-dihydroxy-acetophenone, caffeic acid, vanillic acid, 2,4-dihydroxybenzaldehyde, syringic acid (Li *et al.*, 2010), 3-(3',4'-dihydroxybenzyl) -6,7-dihydroycoumarin and 3-(3',4'-dihydroxyphenyl)- 3,4-dihydroisocoumarin (Li *et al.*, 2011) were isolated from *Onychium japonicum*.



45 Onitin; R=Me
46 Onitisin; R=CH₂OH



47 Onitinoside

Flavonoids

The occurrence of flavonoids in few *Onychium* species has been reported. Examples of these flavonoids are shown below:

- 1- *Onychium auratum*: Pinostrobin (**48**) (Ranakrishnan *et al.*, 1974), 2',6'-dihydroxy-4',5'-dimethylchalcone and 2',6'-dihydroxy-4'-methoxychalcone (Banerji *et al.*, 1974b; Ramakrishnan *et al.*, 1974).
- 2- *Onychium contiguum*: Kaemferitrin (Wu *et al.*, 1981a), contigoside A (**49**), contigoside B (**50**) and onychin (**51**) (Xu *et al.*, 1999a).
- 3- *Onychium japonicum*: Onychin (Xu *et al.*, 1993), a kaempferol dirhamnoside (Kobayeshi *et al.*, 1944), 4,3,4'-trihydroxy-2,6-dimethoxychalcone, butin, luteolin 3',4',6-trihydroxy-2,4-dimethoxy-3-(3'',4''-dihydroxybenzyl)chalcone, 3',6-dihydroxy-2,4,4'-trimethoxy-3-(3'',4''-dihydroxybenzyl)chalcone, α,β -dihydro-3',6-dihydroxy-2,4,6'-trimethoxy-3-(3'',4''-dihydroxybenzyl)chalcone, 3',4,4'-trihydroxy-2,6-dimethoxychalcone, 4',5,7-trihydroxy-6-

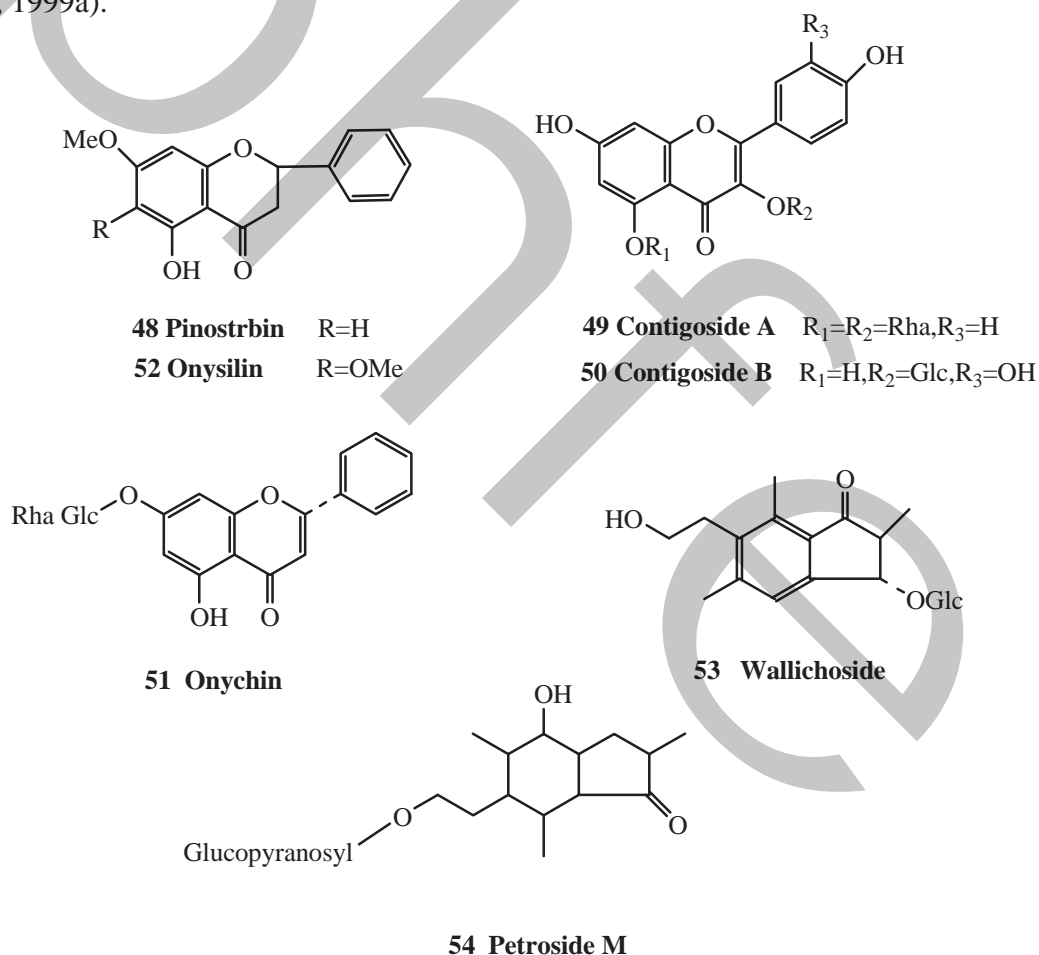
(3",4"-dihydroxybenzyl)flavone, 3',4,7-trihydroxy-5-methoxyflavone, and chrysoeriol (Li *et al.*, 2007, 2010, 2011).

- 4- *Onychium lucidum*: Luteolin 7-glucoside, quercetin 3-glucoside, onychin, luteoloside, and contigosside B (Xu *et al.*, 1999b; Zheng *et al.*, 2000).
- 5- *Onychium siliculosum*: Onysilin (**52**) and pinostrobin (**48**) (Wu *et al.*, 1981b). The yellow farina of fertile pinnules of *Onychium siliculosum* consisted of 2',6'-dihydroxy-4'-methoxychalcone (pashanone) (Wollenweber, 1982).

Examples of indanoids, isolated from certain *Onychium* species are:

- 1- *Onychium auratum*: Onitin (**45**) and onitisin (**46**) (Wadhwan *et al.*, 1977; Banerji *et al.*, 1974a,b).
- 2- *Onychium contigum*: Wallichoside (**53**) (Xu *et al.*, 1999a).
- 3- *Onychium japonicum*: Petroside M (**54**) (Hasegawa *et al.*, 1974; Akabori *et al.*, 1980) and wallichoside (Xu *et al.*, 1999a).
- 4- *Onychium siliculosum*: Onitinoside (**47**) (Wu *et al.*, 1981b).

The presence of chicoric acid in *Onychium japonicum* has been reported (Hasegawa and Tanayama, 1973). *trans*-Cinnamic acid was isolated from *Onychium contigum* (Xu *et al.*, 1999a).



Folk Medicine, Pharmacological and Biological Activities

In the folk medicine of Formosa, *Onychium* has been used for treating enteritis, dysentery, abdominal cramps, pyrexia, jaundice, and flu (Wu *et al.*, 1981b; Xu *et al.*, 1999a). A Chinese medicinal preparation from aqueous extract of *Onychium japonicum* (Thunb.) Kunze has effects in clearing away heat and toxic materials, stopping bleeding, quenching