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Full Length Research Paper

Phytochemical screening and determination of flavonoids in *Secamone afzelii* (Asclepiadaceae) extracts

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The goal of this survey is to determine the amount of flavonoids in the leaves and stems of *Secamone afzelii* (Asclepiadaceae), a plant possessing some antioxidants qualities. The phytochemical screening revealed that the flavonoids are more abundant in the leaves than in the stems. The amount of anthocyane is 336 mg/100 g in the leaves, whereas it is only of 180 mg/100 g in the stems. We also discovered that the stems did not possess aglyconic flavonoids while the amount is 86 mg/100 g in the leaves. This plant's flavonoid have several structural shapes. All these flavonoids could act in synergy in order to increase the antioxidant property of *S. afzelii*.

Key words: *Secamone afzelii*, flavonoids, anthocyanine, aglycones, antioxidant.

INTRODUCTION

Plants offer a large range of natural compounds belonging to different molecular families which have various properties to humans. These molecules possess interesting biological activities which attracted several researchers to their elucidation to provide knowledge that will lead to advancement medicine. The flavonoids are among the bioactive molecules.

The flavonoids are a category of natural substances belonging to the family of polyphenols. Their main function seems to be the coloration of plants (just like chlorophyll and carotenoids). Their presence in the plant is sometimes concealed under their "leuco" shape (white shape), which explains their commercial interest in the food industry (Fiorucci, 2006). The pioneer research of Albert Szent-Györgyi who won the Nobel prize of physiology and medicine in 1937, revealed some pharmacological properties notably the efficient particularities of the flavonoids for the reduction of permeability of the blood vessels (Globitza, 1985; Hougton et al., 2005; Szent-Györgyi, 1965). The great interest in flavonoids today is because of their antioxidant property. The flavonoids also possess other important pharmacological properties (Rusznyak and Szent-Györgyi, 1936; Tournaire, 1992; Porter, 1989), and they been recognized to have anti-inflammatory, anti-coagulant and aphrodisiac properties (Adjanohoun and Akeassi, 1979; ACCT, 1989).

Secamone afzelii plant used in traditional medicine against various pains. *S. afzelii* possesses the aphrodisiac qualities and permits a better blood circulation. Mansah et al. (2004) and Hougton et al. (2005) showed antioxidant activity of a methanol extract of *S. afzelii* using the 2,2-diphenyl-2-picryl-hydrazyl (DPPH) method. HPLC analysis allowed the authors to identify one of the molecules responsible for this important activity; it is one flavonoid, α-tocophérol or vitamin E. A direct correlation could therefore exist between the antioxidant activities of *S. afzelii* and the presence of flavonoids in the plant. The main objective of the present work is to determine the amount of flavonoids in the extracts of the leaves and stem of *S. afzelii* after an initial phytochemical screening. *S. afzelii* is a liana that grows in the bushes, in the tropical climates. It belongs to the family Asclepiadaceae (Figure 1).

Investigations by botanist and traditional healers, allowed us to distinguish two families. The other family

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Table 1. Phytochemical screening of the methanol extract of the leaves and stem of *Secamone afzelii*.

Class of compounds	Methanol extract of the leaves	Methanol extract of the stems
Flavonoids	+++	Weak presence
Saponins	++	Weak presence
Reducing sugars	++	-
Coumarines	++	+
Alkaloids	-	Weak presence
Proteins	Weak presence	Weak presence
True tannins or tannoids	+	+
Sterols and polyterpenes	-	+
Quinones	Weak presence	Weak presence

+++ = Abundant; ++ = moderately presence; + = present; ± = weakly present; - = absent

Figure 1. *Secamone afzelii* (ASCLEPIADACEAE).

Table 2. Amount of anthocyanin and aglycone in the methanol extract of the leaves and stem of *Secamone afzelii*.

Phytochemical	Leaves (mg/100 g)	Stems (mg/100 g)
Anthocyanins	336	180
Aglycones	86	0

is APOCYNACEAE. The family that we study here is called in vernacular languages of the Ivory Coast “donien” (in Baoulé) and "Nonfon-egbelèni" (in Malinké). This plant is used by some traditional healers to care for pregnant women till the period of post-childbirth. This plant is also used to take care of the children who have some swelling. The traditional healers use this plant mainly in aqueous solution (Szent-Györgyi, 1965; Rusznyak and Szent-Györgyi, 1936).

MATERIAL AND METHOD

Extraction and phytochemical screening

The lianas of *S. afzeli*i that was studied was harvested in Abidjan, within the university of ABOBO-ADJAME. The leaves and stems were washed under a continuous water current for 15 min. These were dried separately at steam temperature of 70°C for two weeks. The dry organ was pulverized to powder by a grinder (RETSCH marks SM 100). The powder was then extracted according to their polarities (Dohou et al., 2003; Bekro et al., 2007).

Phytochemical screening was done as described in literature (Dohou et al., 2003; Bekro et al., 2007). The phytochemicals analyzed are flavonoids, saponins, reducing sugars, coumarines, alkaloids, proteins, true tannins or tannoids, sterols and polyterpenes, and quinones. Anthocyanines and the aglycones were extracted and quantified according to the method of Lebreton et al. (1967).

RESULTS AND DISCUSSION

The results of the phytochemical screening of the methanol extract of the leaves and the stems of *S. afzelii* show the presence of some important phytochemicals (Table 1). The amount of anthocyanin in the leaves is presented in Table 2. The value of 336 mg/100 g, is relatively higher than that found in orange (200 mg/100 g) and raspberry (10 to 60 mg/100 g) (Winkel-Shirley, 2002). Anthocyanin have also been determined in other plants including cherry (350 – 400 mg/100 g) and red grape (30 - 750 mg/100 g) (Winkel-Shirley, 2002). The amount of anthocyanin in *S. afzelii* stem is lower (180 mg/100 g). Aglycone could not be detected in the stems; its amount in the leaf extract is 86 mg/100 g. Therefore, the leaves are the most suitable for a good supply in flavonoids.

The strong presence of anthocyanines in the leaves indicates that the antioxidant property of this plant could not be due to the presence of α-tocopherol only as suggested by Mensah et al. (2004). Nevertheless, our result reinforces those of Mensah all about the antioxidant property of the plant, especially since α-tocopherol is an aglycone. These results allow us to confirm the strong presence of flavonoids in the leaves of *S. afzelii*.

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