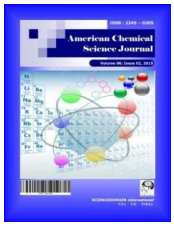

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Phytochemical Screening of Leaves of *Catharanthus roseus* (L.)

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Authors' contributions

This work was carried out in collaboration between all authors. Authors AFDA and SSMDSDA planned all experiments. Authors AFDA and SSMDSDA supported the study of physical and chemical composition and quality of fillet. Authors AFDA, SSMDSDA and RDSR wrote the first draft of the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Aims: To determine the major classes of secondary metabolites found in the leaves of *Catharanthus roseus* (L.).
Study Design: The study aimed to determine the major classes of secondary metabolites of plant species *Catharanthus roseus* through technical and classical methodologies.
Place and Duration of Study: Laboratory of Pharmacognosy and Phytochemistry of Pharmacy

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Course, in the period between July 2013 and May 2014.
Methodology: The analyzes carried out phytochemical: organic acids, phenols and tannins, anthraquinones, organic acids, depisides and depsidones, flavonoids, triterpenoids and steroids, alkaloids, purine, polysaccharides and saponins, catechins were carried out.
Results: The results of the phytochemical analysis were positive for organic acids, reducing sugars, phenols and tannins, depsides and depsidones, steroids and triterpenoids, alkaloids and saponins.
Conclusion: According to the biological activity, cited in the literature, the metabolites present in the leaves of *C. roseus* (L.) is associated with its use empirical; however, its use in folk medicine is very restricted due to their high toxicity.

Keywords: Secondary metabolites; natural products; plant extracts; preliminary analysis.

1. INTRODUCTION

For a long time, plants were used with a therapeutic primary objective [1] because of the wide variety of organic compounds that are produced from the secondary metabolism. In plants, there are two types of metabolites, primary and secondary.

The primary metabolites are associated with the essential activities for maintaining the operation of the plant; primary metabolites include the carbohydrates, proteins, chlorophyll, lipids, and nucleotides.

The secondary metabolites comprise of synthesized substances, which are not necessarily present in all plants as the plant may produce these substances because of interaction with the environment, extrinsic factors [2].

This broad diversification of these substances allowed a man to produce medicines of plant and animal origin as well as microorganisms, isolating its active principles for drug development.

Catharanthus roseus (L.) which belongs to Apocynaceae family is well known by the people of Madagascar to contain rich substances with the hypoglycemic action of pharmaceutical interest. Its wide morphological variability, lactiferous vessels and their variability compounds originating from its secondary metabolites [3] characterizing the family.

It is quite known to contain the vinblastine and vincristine alkaloid that has great importance in the treatment of Hodgkin's lymphoma, Kaposi's sarcoma, ovarian cancer and testicular and childhood acute lymphoblastic leukemia [4]. These alkaloids are toxic and are present in the leaves, in the form of tea and infusion are hallucinogenic [5]. *C. roseus* (L.) has more than one hundred of types of indole alkaloids monoterpenoids, of which the most abundant is the catharanthine and vindoline. Ajmalicina has also been extracted from *C. roseus* (L.) roots [6].

The objective of this research was to determine the major classes of secondary metabolites found in the leaves of the plant species *C. roseus* (L.) found in Macapá.

2. MATERIALS AND METHODS

The plant material was collected on the campus of the Federal University of Amapá in July 2013.

The leaves were separated for drying and grinding. The leave's material was placed in an oven at 45℃ for one day to remove water and grounded into powder form. The powdered leaves were extracted under reflux with 96% (v/v) ethanol for 45 min. This process was repeated three times. In each case, 500 ml of ethanol was added to a round bottom flask containing 60 g of the plant material and in the second triplicate, 50 g of the leaves of *C. roseus* (L) was extracted with ethanol. The extract was filtered and concentrated in a rotary evaporator to obtain the ethanolic crude extract.

The phytochemical analysis for the following secondary metabolites: organic acids, phenols, and tannins, anthraquinones, organic acids, depisides and depsidones, flavonoids, triterpenoids and steroids, alkaloids, purine, polysaccharides and saponins, catechins were carried out according to Barbosa's methodology [7].

3. RESULTS AND DISCUSSION

The results of the phytochemical analysis of leaves of *C. roseus* (L.) detected can be found in Table 1.

Organic acids, which are found in many plants, giving it acid flavor and private pharmaceutical properties, such as laxative and refreshing action and in vitro has bacteriostatic and bactericidal power [8].

The reducing sugars in alkaline solution precipitate copper and silver salts; it has a strong reducing action in high pH ranges, interconvert ketoses to aldoses [9].

Table 1. Study results phytochemical

Secondary metabolites	Presente	Ausente
Alkaloids	X	
Depsides and depsidones	X	
Saponins	X	
Flavonoids		X
Antraquinones		X
Organic acids	X	
Reducing sugars	X	
Cumarins		X
Tannins	X	
Steroids and triterpenoids	X	

Tannins, which have bactericidal and fungicidal due to its complexation of proteins, in which they explain their influence on the control of insects, fungi, and bacteria. They have as hallmark, its astringent property. Recent studies have shown that tannin is capable of capturing free radicals, which intersect the active oxygen, to form stable radicals. They affect the locking of lipid peroxidation in lives mitochondria, blocking leukocyte lipoxygenase and suppressing the formation of superoxide of anion radicals. Thus, tannins have a role in preventing and treating diseases caused by lipid peroxidation [5].

The saponins in the pharmaceutical industry are used as adjuvants to enhance absorption of other drugs to high the solubility. In aqueous solution form foam, this property comes from the aglycone, lipophilic part and sapogenin, hydrophilic moiety. Among other mechanisms of action of some saponins, it is the cell lysis ability, exhibit action on membranes, being capable of causing the disruption of the membranes of blood cells, conferring hemolytic action. It Can complex with steroids and, therefore, giving it the antifungal and hypocholesterolemic action [5].

Alkaloids, nitrogenous substances, which have broad biological activity can cite vinblastine and vincristine, alkaloids which are present in *C. roseus* (L.), acting as agonists or antagonists of the α-adrenergic receptors, serotoninergic, dopaminergic and cholinergic. They may have different activities due to interaction with other classes of receptors and their subtypes. The alkaloids possess antitumor activity by inhibiting synthesis of DNA, RNA, and proteins. Vincristine and vinblastine, used in the treatment of neoplastic diseases by interrupting cell division in metaphase due to their binding with tubulin, inhibiting polymerization [5].

Depsides and depsidones, which are related with antioxidant, antiviral, antitumor, analgesic and antipyretic properties, impart a bitter taste in many plant species [10].

Steroids and triterpenoids are substances in volatile oils [11-12] and having medicinal properties such as anti-inflammatory, bacterial, fungicidal, antiviral, analgesic, cardiovascular and anti-tumor [5].

4. CONCLUSION

About phytochemical analysis, positive results corroborate their use for therapeutic purposes, since the classes determined by phytochemical screening correlates their biological activities with those reported in the literature, mainly, because their use is related with anticancer activity due the presence of some types of alkaloids and also to other metabolites that have antitumor activity. However, their use are extremely limited, because *C. roseus* (L.) is considered a toxic plant, so it must be used with cautions. However, it may be used in other areas or in order to produce new drugs.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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