



*Research Paper*

**PHYTOCHEMICAL ANALYSIS OF SOME PLANTS IN IYAMHO-UZAIRUE,  
EDO STATE, NIGERIA**

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**Abstract**

Phytochemicals are naturally occurring metabolites present in plants and show its biological significance by playing an essential role in the plants to defend themselves against various pathogenic microbes through antimicrobial activity. These plants containing metabolites are widely used in the field of agriculture and recently in fisheries and aquaculture. *Oxalis corniculata*, *Desmodium triflorum*, *Desmodium adscendens* and *Sida acuta* are common weeds used in Nigeria. The leaves of the four different plant species were qualitatively screened for phytochemicals using standard tests for the presence of metabolites using standard routine methods. The results revealed the presence of Alkaloids, Tannins, Flavonoid, Cardiac glycoside, Phenols and Saponins. The qualitative analyses of *Desmodium triflorum*, *Desmodium adscendens*, *Oxalis corniculata* and *Sida acuta* carried out in this study proves that these medicinal plants are of rich in essential metabolites. These metabolites could be incorporated in animal, aquaculture and human consumption as food supplements and as herbal remedies. The use of such plants in aquaculture may prove effective for disease control and possibly cost effective for management.

Key words: metabolites, phytochemicals, herbal remedies, antioxidants

**INTRODUCTION**

Phytochemicals are naturally present in plants and show its biological significance by playing an essential role in the plants to defend themselves against various pathogenic microbes through antimicrobial activity. Phytochemicals also protect plants against bacteria, fungi, viruses and cell damage, these phytochemicals that protect plants also help the humans who eat them. These plants are also known to have antioxidant compounds which include phenolics, carotenoids, anthocyanins and tocopherols

(Suffredini 2004; Ammar et al., 2017), which protect cellular systems from oxidative damage and lower the risk of chronic diseases. Hence the more we eat plant antioxidant-rich foods, the greater the health benefit. Antioxidants protect our cells from free radicals and reduce our risk of developing certain types of cancer (Valko 2006). More so, these phytochemicals present in the different plant parts are used up by the local peoples for the healing of certain disorders (Bansode and Salalkar 2015). These plants with phytochemicals are widely used in the field of agriculture and recently in fisheries and aquaculture. Secondary metabolites which are simple synthetic modifications of these naturally occurring substances are obtained from these plants are used to manufacture drugs, flavours and fragrances, dye and pigments, pesticides and food additives (Hussain et al., 2012). In fisheries management, there is an advocacy to use these antioxidant compounds present in local plants to curb infections and diseases. Many microbial infections militating against the growth of fish, managements of fishes, fish ponds and fish farms could be solved with the use of possible phytochemicals present in plants. Therefore it is deemed necessary to evaluate the phytochemicals from different plant extracts. In this study, the leaves of four different plant species were qualitatively screened for phytochemicals using standard tests. These medicinally important plant species are *Oxalis corniculata*, *Desmodium triflorum*, *Desmodium adscendens* and *Sida acuta*. *Oxalis corniculata* commonly known as sleeping beauty is a low growing herbaceous annual plant belonging to the family Oxalidaceae. The leaves are quite edible with a tangy taste of lemons. A drink can be made by infusing the leaves in hot water. The whole plant is rich in Vitamin C and often used in the treatment of influenza, fever and urinary tract infections, enteritis and poisonous snake bites. The leaf juice is applied to insect bites and swellings (Anon 2019a). *Desmodium adscendens* – (Sw.) DC. is a herbaceous perennial plant belonging to the Fabaceae. It is a creeping plant with erect stems that can grow up to 100cm tall. The plant is known for its rich medicinal use in the treatment of asthma and allergies and the relief of muscular spasms and back pain. The plant and flower can produce fruits all year round (Anon 2019c). *Desmodium triflorum* is commonly known as the three-flower beggar weed belonging to the family Fabaceae, found in a wide range of soils. It is a very hardy plant noted for attracting wildlife. The plant is antipyretic, antiseptic and expectorant. A decoction is commonly used to treat dysentery, a mouth wash, a poultice of the leaves is used to treat ulcers and cure wounds (Anon 2019b). *Sida acuta* is a

typical shrub belonging to the family Malvaceae. It is an effective emollient, analgesic and diuretic herb with hypotensive, antimicrobial and diuretic action. It is also good for body pains and fevers. It is often used as a remedy for antimalarial and fever (Muanda et. al. 2011 and Annon 2019d).

## **2.0 MATERIALS AND METHODS**

### **2.1 Sample Collection**

Fresh leaves of *Oxalis corniculata*, *Desmodium triflorum*, *Desmodium adscendens* and *Sida acuta* were collected in separate sterile polythene bags in and around Edo University Iyamho, Edo State, Nigeria. Collected leaves were examined and identified with the help of regional flora and Edo University Herbarium and further confirmed with voucher numbers, EUI/00029 – *Oxalis corniculata*, EUI/00030 – *Desmodium triflorum*, EUI/00031 – *Desmodium adscendens* and EUI/00032 – *Sida acuta*.

### **2.2 Preparation of Extracts**

The leaves were cleaned and dried under shade for three weeks and then ground into a fine powder using an electric grinder. The powders were then stored in an airtight container. 10g of each powdered plant material was weighed into an amber bottle containing 100 ml of analytical ethanol and kept for 48 hours at room temperature with slight shaking. This was followed by filtration with fine mesh cloth and Whatmann No.1 paper to get extracts. The extract was concentrated and stored in airtight containers under refrigeration condition.

### **2.3. Qualitative Phytochemical Analysis**

2g of the crude extract was weighed and dissolved in 20 ml of distilled water. Following standard methods (Trease and Evans 1984; Harbourne1998), qualitative analysis of the plant extracts was carried out to confirm the presence of Alkaloids, Tannin, Flavonoid, phenol, Saponins, Anthraquinone and Cardiac glycoside.

#### **2.3.1 Test for Alkaloids**

To 1 ml of each extract, 3 drops of Wagner's reagent were added. The presence of a precipitate and colour change after 5 minutes was observed.

### **2.3.2 Test for Tannins**

To 2 ml of each extract, 10% of alcoholic ferric chloride was added; formation of brownish blue or black colour revealed the presence of tannins.

### **2.3.3 Test for Phenols**

To 2 ml of each extract, 2 ml of 5% aqueous ferric chloride were added; formation of blue colour shows the presence of phenols in the sample extract.

### **2.3.4 Test for Flavonoids**

3 drops of 20% sodium hydroxide were added to 2 ml of each extract in a test tube and allowed to stand for 2 minutes, the formation of intense yellow colour which disappeared upon addition of 70% dilute hydrochloric acid.

### **2.3.5 Test for Saponins**

6 ml of distilled water were added to 2 ml of each extract, the mixture was shaken vigorously and observed for the formation of bubbles or persistent foam.

### **2.3.6 Test for Cardiac Glycosides**

To 1 ml of each extract, 0.5ml of glacial acetic acid and 3 drops of 1% aqueous ferric chloride solution were added. The mixture was observed for an interface of brown ring formation.

### **2.3.7 Test for Anthraquinone**

0.1 g of the crude extract was dissolved in 10 ml concentrated chloroform and filtered. To 5 ml of filtrate was added 5 ml ammonia solution and shaken vigorously. The mixtures were observed for the presence of precipitate and colour change.

## **3.0 RESULTS**

The phytochemicals present in *Desmodium adscendens* include alkaloids, Tannins, Flavonoid, Cardiac glycoside and Phenol. Those present in *Desmodium triflorum* includes alkaloids, flavonoid, Cardiac glycoside and Phenol. For both *D. adscendens* and *D. triflorum*, Saponins was present in sparing amount. For *Oxalis*, alkaloids, Tannins, Flavonoid. Cardiac glycoside and Phenol are presented on Table 1.

**Table 1: Qualitative Phytochemical screening of four indigenous plants in Iyamho-Uzairue, Edo State**

Plants tested	Alkaloid	Tannin	Phenol	Flavonoid	Saponins	Cardiac glycoside	Anthraquinone
<i>D. adscendens</i>	+	+	+	+	+	+	-
<i>D. triflorum</i>	+	-	-	+	+	-	-
<i>O. corniculata</i>	+	+	+	+	-	+	-
<i>S. acuta</i>	+	+	+	+	+	+	-

**Key**

- + Present
- Absent

The phytochemicals present in *Desmodium adscendens* include alkaloids, Tannins, Flavonoid, Cardiac glycoside and Phenol. Those present in *Desmodium triflorum* include alkaloids, flavonoid, Cardiac glycoside and Phenol. For both *D. adscendens* and *D. triflorum*, Saponins was present in sparing amount. For *Oxalis*, alkaloids, Tannins, Flavonoid, Cardiac glycoside and Phenol were found to be present as shown in Table 1.

**4.0 DISCUSSION**

Plant Phytochemicals have been exploited for several curative properties in human and animal medicine, these secondary metabolites are known to contribute significantly towards the biological activities of medicinal plants such as antioxidant, antibacterial, antifungal, anti-inflammatory, antimalarial, anticarcinogenic, anticholinergic and antileprosy activities (Yadav et al., 2014), thus its application is well noticed and efficient in drug discovery. In this study, we investigated qualitatively, the phytochemicals present in *Desmodium trifolium*, *Desmodium adscendens*, *Oxalis corniculata* and *Sida acuta*. Result revealed the presence of alkaloid for all plants tested, also present in some of the plants were phenols, flavonoids, Saponins, cardiac glycosides and tannins. The presence of some of these compounds in the four plants tested have also been demonstrated by other researchers to possess the same properties.

Alkaloids, constitute a very large group of natural nitrogen-containing compounds with diverse effects on the human organism. Excess of it in the human body could affect the central nervous system, reduces appetite and act as a diuretic. It, however, acts as protein and as bodybuilding components and blocks of life (Taylor and Hefle 2017).

Seriki et al., (2019) revealed the presence of alkaloids in *D. adscendens* and its use in therapeutic purposes. Alkaloids are potent antimicrobial agents; flavonoids and phenols act as scavengers of free radicals and are thus effective as anti-oxidative, anti-inflammatory and antibacterial agent. The presence of alkaloid in the four plants analysed could be attributed to the antimicrobial potency of the plants possesses. Extract of medicinal plants from the Lamiaceae and Apocynaceae family was seen to inhibit the fish bacterial *Aeromonas hydrophila* (Kavitha and Haniffa 2012) and one of the most effective plants discovered to be rich in alkaloids. Besides investigation by Ekanem et al. (2011) reveals a strong presence of alkaloid for the medicinal plant with potent antibacterial effect against *Aeromonas* and *Pseudomonas* bacteria of farmed catfish (*Heterobranchus longifilis*). Tannins have positive health benefits, it possesses efficient astringent properties, its anti-oxidising nature makes it possible to be used as anti-carcinogenic and anti-mutagenic compounds. Tannins are also known to hasten the healing of wounds and inflamed mucous membranes, remove harmful microbes from the body, and fight against harmful bacteria, viruses and fungi, therefore these plants could be suggested for be used as skin remedies against burns and wounds. Research has shown that plants tannins are good sources of antimicrobial properties hence their use as remedies for microbial ailments. (Ruiz-Cruz et al 2017, Minatel et al 2017 Archana et al 2010, Von Linné 2007) . Phenol was not present in *D. triflorum* but present in all the other three plants. Studies have shown that Flavonoids can inhibit a variety of cancers in animal, the intake of extracts from rich from flavonoid-rich onions provided strong anti-proliferation effects against liver and colon cancer cells, reduced dangerous inflammation in the arteries, and may also have positive effects on blood clotting, coronary artery function and insulin sensitivity. (Seriki et al., 2019). In this research, only *D. triflorum* did not possess flavonoid. Saponins in plants are chemicals with the ability to improve immune function. They also fight free radical damage, which is a risk factor for cancer thus induce death of cancer cells. Picincu 2018 observed that these compounds have been shown to destroy leukaemia cells and keep them from spreading throughout the body. Saponins may help reduce cholesterol levels, kill disease-causing bacteria, scavenge oxidative stress and inhibit tumour growth. According to the latest research by, Picincu (2018) on the study of Saponins confirmed that Saponins possess the unique property of precipitating and coagulating red blood cells. Glycosides are used typically in the therapy of congestive heart failure and atrial

fibrillation. The cardiac glycosides have not been linked to serum enzyme elevations during therapy or with instances of clinically apparent liver injury (Anon. 2018). Its presence in *D. adscendens*, *O. corniculata* and *S. acuta* show that these plants can be of great use in the pharmaceutical industry in the creation of drugs and herbal remedies in nervous and cardiac disorders. Reports on the pharmacological properties of *Desmodium adscendens*, *O. corniculata* and *S. acuta* and investigated in our study reveals the antimicrobial, antioxidant, anti-inflammatory and analgesic properties which were attributed to their phytochemical constituent (Adeniyi et al 2013; Ilandara et al 2015; Ayoola et al 2018; Sharma et al 2018 and Seriki et al 2019). The four plants tested didn't show the presence of Anthraquinone. The plants did not have any red colouration on leaves as well as stem which is a unique physical sign of its presence in any plant. However, Anthraquinone is active components of many plant blends which are used as medicines and exhibit laxative, diuretic, estrogenic, and immunomodulatory effects. These compounds impart colour to plants and have been widely utilized as natural dyes. Also, they are used as laxatives and possess antifungal and antiviral activities. Again, Maurizio and Corinna (2015) discovered that Anthraquinone is not toxic and there would be no expected cumulative effects from a common mechanism of toxicity. It was also stated that the derivatives should be avoided during pregnancy because some of them have a stimulating effect on uterine contractions. However, treatment with them does not necessitate either termination of the pregnancy or invasive diagnostic procedures.

## 5.0 CONCLUSION

The qualitative analyses of *Desmodium trifolium*, *Desmodium adscendens*, *Oxalis corniculata* and *Sida acuta* carried out in this study proves that these medicinal plants are of rich in essential metabolites. These metabolites could be incorporated in animal, aquaculture and human consumption as food supplements and as herbal remedies. The use of such plants in aquaculture may prove effective for disease control and possibly cost-effective for management. Moreover, some Nigerian fish farms are located in remote areas and there is a need for an effective and easily available control measure in cases of fish ill-health. Further work to be done includes in-vivo and in-vitro studies of these medicinal plants on fish disease and the development of a workable ratio for the incorporation of these plants into fish feed.



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