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Chemical and Photochemical Studies on *Clitoria Ternatea* (L) and *Annona Muricata* (Soursop)

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Abstract

The aims of study determination approximately analysis of *Clitoria ternatea* and *Annona muricata* (L) also determination of phytochemical properties of all parts of plants. Methodology was applied : A proximate analysis of all parts of plant according to (AOAC) and Qualitative analysis of secondary metabolites in *clitoria* parts**.** The plant is a rich source of secondary metabolite products , with high content of phenolic compounds in flowers. The main natural constituents found in *Clitoria ternatea* are the flavonoids in all tested parts , alkaloids in seeds and flowers while saponins just in leaves and absence of sterols and triterpens in all palnt parts. While a proximate analysis of the ***Annona muricata* L** leaves and seeds contained appreciable amount of moisture (4.16) , (5.64) , ash (1.22), (28.48), oil content (0.58),(0.89), crude fiber (0.70), (6.13) while high content of carbohydrate (84.22), (40.32), follow by protein (7.60), (18.55) respectively. Chemical study of *Annona muricata* L has reported the isolation of a wide diversity of phytochemical components, including alkaloids , sterol , triterpens, saponine and flavonoids from the seeds and absence of phenolic compound . while the leaves presence of phenolic copmpound in high level and presence of alkaloid.

Keywords: phytoconstituents, Clitoria ternatea, proximate analysis, flowers, phenolic compounds **,** Annona muricata L, Soursop.

Introduction

Clitoria ternatea called Butterfly pea belonging to the family fabaceae and sub-Family Papilionaceae is a perennial leguminous twinned (Pulok , 2002). Also known as Clitoria, blue-pea, kordofan pea (Sudan), cunha (Brazil or pokindong (Philippines) (Parimaladevi *et al* , 2003). *Clitoria* linn. Consist more than 50 species spread in equator area and few species grow in temperate belt. *Clitoria ternatea* is mostly studied species(Pulok , 2002). All plant parts are uses in ancient time . *Clitoria ternatea* has stems 0.5-3 m long , double fine. Flowers are singular , dark blue to blue mauve; 4 - 5 cm long and very short pedicellate. The leaves are pinnate, with shortly pubescent underneath and 5 cm long , 5-7 elliptic to lanceolate leaflets. Pods are linear, flat, beaked, 0.7 - 1.2 mm wide 6-12 cm long and slightly pubescent with up to 10 seeds. The seeds color are brown or black , often mottled, olive, 3-4mm wide and 4.5 - 7mm long (Pulok , 2002). All plant parts are useful in uses . It used in treatment of digestive system , the drug shankhapushpi used as nerve tonic and skin disease at the same time different part can use as edible food products in Thailand, Malaysia, and Philippines. Also, the seeds containing sequence of amino acid in nucleoprotein with its similar to insulin but for the absence of crystine , histidine , proline, and,

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threonine. Different secondary constituent can be found in clitoria but the major are the pentacyclic triperpenoids (Banerjee and Chakravarti ,1964). Like seeds contains flavonol glycosides , cinnamic acid while leaves have glycosides of kaempferol Solanki and Jain (2010). The stem contains many types of, phenol compound and carbohydrates. While the roots have all constituent class Pulok. K (2002). The petal of flowers contains the main classes of phytochemical substances kaempferol , flavonol glucosides , alkaloids like myricetin, and quercetin. Triterpinoids , phenolic compound such as (phenols and flavonoids) , antho-cyanins, and saponins that share to the tea's medicinal characters (Gomez,2003). Clitoria ternatea is good source of secondary metabolite components which have pharmacological properties. Beside it's advantages to the plant defenses' contains antifungal proteins to be homologous (ct-AMP1). Also, have advantage to environment by nitrogen fixation used as developing quality of soil (Thevissen et al., 2000).



Figure (1): A *Clitoria ternatea (seeds , flower and* twiner).

Annona muricata L. (Annonaceae), also called soursop, is a tropical plant found in parts of the Americas, Asia, Australia, and Africa. It possesses thick leaves that are shiny on the upper side. The soursop fruit is dark green, prickly, and ovoid with juicy, acidic, whitish, and aromatic pulp . The leaves are obviate, oblate, and acuminate to varying degrees (Coria-T´ellez, 2018). In tropical African countries, including Nigeria, the leaves are traditionally used to treat skin diseases (Adewole and Ojewole 2009). All parts of A. muricata are used in traditional medicine by people who live in tropical areas, with the leaves, stem bark, roots, and seeds primarily used as medicinal ingredients (Badrie and Schauss , 2010). Different parts of *A. muricata* have different activities. The use of *Annona muricata* in traditional medicine is well documented. Ethnobotanical studies have described the plant as being used to treat various disease conditions like bacterial infections, fever, respiratory and skin illness, diabetes, internal and external parasites, hypertension, inflammation, pain, and cancer (Coria-T´ellez, 2018). The seeds combat parasitic infections (Moghadamtousi,*et al*., 2015) ; and the leaves are used to treat cystitis, headaches, insomnia, and cancer (Wélé, *et al*, 2004). The fruit is used for the treatment of arthritis, nervous disorders, diarrhea and to treat diarrhea and neuralgia, eliminate worms and parasites, increase milk production in lactating women, and reduce fever (Pieme *et al*, 2014). Economically, species of *Annonaceae* are important as a source of edible fruits, for instance, the pawpaw

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(Asimina), custard apple, sweetsop, soursop and cherimoya (Moghadamtousi,*et al*., 2015). It has also been reported that some oils from the seeds might be used for the production of edible oils and as an ingredient in soaps, and the woods of some species have been reported for alcohol production (Wélé, *et al*, 2004). The major compounds are acetogenins, alkaloids, flavonoids, essential oils, vitamins, carotenoids, amides, and cyclopeptides (Coria-T´ellez, 2018).



Figure (2): (**a**) The fruits are dark green and prickly. (**b**) Leaves of *A.muricata* with an obviate, oblate, and acuminate shape. The leaf surface is dark green, with a thick and glossy upper surface

Objective of the Study

1.Determination approximately analysis of all parts of *Clitoria ternatea* , and *Annona muricata* L. (Soursop) seeds and leaves.

2.Determination of phytochemical properties of all parts of *Clitoria ternatea* and *Annona muricata* L. (Soursop) seeds and leaves.

3.Encourage researches towards better understanding and utilization of *Clitoria ternatea for more useful uses.*

Methodology

Collection and Preparation of Sample: The fresh *C. ternatea* plants were collected from Abu neama city – Sinnar state – Sudan, while the fresh *Annona muricata* L. plants were collected from wad madeni city – Gezira state –Sudan and separated according to different plant parts seeds , leaves, and flowers . The plant parts were dried at room temperature (35 ± 2°C), for one week, without loss of volatile photochemical, then after, they were grounded in a laboratory grinding mill (Model ED-5) for later analysis.

Approximately analysis: Proximate Analysis was determined by using the method stipulated by Official Agricultural Chemists (AOAC) International (1990). The six analyses are including moisture, ash, fat, protein content, fiber and carbohydrate as well.

Phytochemical examination of secondary metabolites : the flowers was screened for the presence of flavonoids , saponins and sterols and/or triterpens were carried

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according to (Harborne,1998). Test for tannins and alkaloids and/or nitrogen bases according to (Balbaa,1974).

Rustles and Discussion

Table (1) : **Approximately analysis of tested *Clitoria* parts**

Approximate	Seeds	Leaves	Flowers
Moisture	4.67	3.81	3.76
Ash	38.88	0.83	0.59
Protein	26.11	8.53	7.60
Oil content	1.16	0.36	0.26
Fiber	6.26	0.91	0.15
Carbohydrate	22.9	85.58	87.66

Table(2):**Qualitative analysis of secondary metabolites in *clitoria* parts.**

Tested Secondary Metabolites	Tested plant parts		
	Seeds	Leaves	Flowers
Phenolic compound	-	+	+++
Sterols and / or Triterpens	-	-	-
Alkaloids	+	-	+
Flavonoids	+	+	+
Saponins	-	+	-

The symbol ++ , + , - indicate a compound present in high , moderate and absent level.

Discussion

All plant parts (seeds, Flowers and leaves) are used from long time . Results of the proximate analysis of the *C. ternatea* parts are reported in Tables (1). The character determined in a proximate analysis were moisture , ash, crude oil, protein and fiber as well. The clitoria flowers, leaves and seeds contained amount of moisture (3.76), (3.81),(4.67), crude fiber (0.15) , (0.91), (6.26) , oil content (0.26),(0.36), (1.16) and ash (0.59), (0.83), (38.88) while high content of carbohydrate (87.66), (85.58),22.9) follow by protein (7.60), (8.53), (26.11). respectively. These results differ from (Neda,2013) who reported the moisture content of flower (92.4) more than our results that because the fresh part are used while the protein and carbohydrate are less than our results there for differ in environment factors. The plant is a rich source of secondary metabolite products , with high content of phenolic compounds in flowers. Flower is large part of plant which contains phenolic acids, flavonoids, anthocyanin and many other phenolic compounds as sours of natural antioxidants (Youwei *et al*, 2008). The main natural constituents found are Flavonoids and other classes of phenolic compounds Johnson, (2001). The large natural compounds found are phenolic and flavonoids which contain C6-C3-C6 structure as antioxidant , and they reduced oxidation of lipids with (OH)group in aromatic chain by scavenging free

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radicals (Yanishlieva-Maslarova., 2001). A large numbers of secondary metabolites such as flavonol glycosides, triterpenoids, anthocyanins and steroids has been detected in *Clitoria ternatea* Linn (Mukherjee et al,2008). The main phyto-constituents found in *Clitoria ternatea* are the flavonoids in all tested parts , alkaloids in seeds and flowers while saponins just in leaves and absence of sterols and triterpens in all palnt parts. Phyto-constituent survey of the roots shows the presence of ternatins, alkaloids, flavonoids, saponins, tannins, carbohydrates, proteins, resins, starch, taraxerol and taraxerone (Uma *et al*,2009).

Table (3) : Approximately analysis of tested Soursop parts

Approximate analysis	Seeds	Leaves
Moisture	5.64	4.16
Ash	28.48	1.22
Protein	18.55	9.13
Oil content	0.89	0.58
Fiber	6.13	0.70
Carbohydrate	40.32	84.22

Table(4):Qualitative analysis of secondary metabolites in Soursop parts.

Tested Secondary Metabolites	Seeds	Leaves
Phenolic compound	-	++
Flavonoids	+	-
Alkaloids	+	+
Sterols and / or Triterpens	+	-
Saponins	+	-

The symbol ++ , + , - indicate a compound present in high , moderate and absent level.

Various compounds and secondary metabolites are present in the ***A. muricata*** plant (Table 4). The compounds present in plants are responsible for their activities against various diseases (Moghadamtousi,*et al*., 2015). Chemical study of ***Annona muricata*** **L** in our research reported the isolation of a wide diversity of phytochemical components, including alkaloids , sterol , triterpens, saponine and flavonoids from the seeds and absence of phenolic compound . while the leaves presence of phenolic copmpound in high level and presence of alkaloid. Our study is vary in results reported by (Gavamukulya, *et al*,2014) who found Analysis of the compounds in *A. muricata* leaf extract revealed secondary metabolites such as flavonoids, terpenoids, saponins, coumarins, lactones, anthraquinones, glycosides, tannins, and phytosterols . The main active components of *A. muricata* are acetogenin, alkaloids, and flavonoids (Coria-Téllez *et al*, 2018) . Also differ from data reported by (Gyesi etal ,2019) who provide Sesquiterpenes were the major constituents of the leaf essential oils of *Annona muricata* from Ghana. That because the differ in type of soil or in environmental factors . However, not all secondary metabolites of *A. muricata* have been identified.

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