

Research Article

Journal of Atoms and Molecules

An International Online Journal

ISSN – 2277 – 1247

**PHYTOCHEMICAL SCREENING OF ZIZIPHUS SPINA CHRISTI AND PIPER NIGRUM****Robiel Ermias^{1*}, Merih Tukue¹, Abraha Bahlbi²**¹Department of Chemistry, College of Marine Science and Technology, Massawa, Eritrea.²Department of Marine Food Technology, College of Marine Science and Technology, Eritrea.

Received on: 15-11-2011

Revised on: 20-12-2011

Accepted on: 26-12-2011

Abstract:

Ziziphus spina Christi grows wild in tropical Africa and Asia. It is used as a traditional medicine for the treatment of pain related ailments. *Piper nigrum* is a tropical plant which grows about 500m in the valleys. The fruits are used as spices in the foods and have a large number of medicinal properties. The various extracts of *Ziziphus Spina Christi* and *Piper nigrum* were investigated for the Natural products like Steroids, flavanoids, Carbohydrates, proteins, Amino Acids, Lipids, Tannins and Anhraquinones. Total six different solvents were used for the extraction of the chemical components from the two plants.

Key Words:

Ziziphus spina christi, *Piper nigrum*, Phytochemical screening, plant extracts.

* Corresponding author

Robiel Ermias,

Email: robineri02@yahoo.com

Tel: 00291 – 7156070

Introduction:

The local name of *Ziziphus Spina Christi* is *Guava*. The ripe fruits are edible and the flowers are important source for Honey in Yemen and Eritrea⁵. *Berebere Thsalem* is the local name of *Piper nigrum*. The fruit, known as a peppercorn when dried, is approximately 5 millimetres (0.20 in) in diameter, dark red when fully mature, and, like all drupes, contains a single seed. Peppercorns, and the powdered pepper derived from grinding them, may be described simply as pepper, or more precisely as black pepper, white pepper, or

green pepper. Green peppercorns are simply the immature black peppercorns. Dried ground pepper has been used since antiquity for both its flavor and as a medicine. Black pepper is the world's most traded spice. It is one of the most common spices added to European cuisine and its descendants. The spiciness of black pepper is due to the chemical piperine. It is used as traditional medicine for many diseases like tooth decay, and toothaches⁶

Materials and Methods:

The plants were collected from the surroundings of the capital city Asmara of Eritrea. The juvenile plants were collected along with some buds, and juvenile seeds of *Piper nigrum*. The plants were dried in the laboratory at room temperature of 26⁰C for two weeks, then by using blender it was made into a fine powder. A specific quantity of the plant powder was added to 500 ml of the different solvent and allowed for 72 hour for the extraction of the natural products with regular shaking. The extracts were filter first through a Whattman No 42 filter paper then by cotton wool. Then the extracts were concentrated by evaporating the solvent.

The concentrated liquid is used for the phytochemical screening.

S.N	Scientific classification	<i>Ziziphus Spina Christi</i>	<i>Piper nigrum</i>
1	Kingdom	Plantae	Plantae
2	Division	Magnoliophyta	Angiosperms
3	Class	Magnoliopsida	Magnolids
4	Order	Rosales	Piperales
5	Family	Rhamnaceae	Piperaceae
6	Genus	Ziziphus	Piper
7	Species	Z. spina - christi	P. nigrum

Phytochemical Screening:

The phytochemical screening was performed by using standard procedures¹⁻⁴.

Test for Carbohydrates (Molisch's test):

To the extract 1ml of the Molisch's reagent was added then along the walls of the test tube carefully conc. H₂SO₄ was added. Formation of a brown ring at the junction of the two liquids was observed.

Test for reducing sugars (Fehling's test):

The extract was taken in a test tube, and then 1ml of the Fehling's solution (A and B) was added and boiled on the water bath. The solution was observed for the colour change reaction.

Test for monosaccharides (Barfoed's test):

To the extract in a test tube 1ml of Barfoed reagent was added and boiled on the water bath. The solution was observed for the colour change reaction.

Test for Tannins (Ferric Chloride):

0.5ml of the extract was boiled with 10ml of Distilled water in a test tube and then, few drops of 0.1% Ferric Chloride solution was added and the reaction mixture was observed for blue, greenish black colour change.

Test for Saponins (Frothing test):

0.5ml of the extract was added to 5ml of Distilled water in a test tube. The solution was shaken vigorously and observed for the stable persistent froth. The frothing was mixed with 3drops of olive oil and shaken vigorously after which it was observed for the formation of an emulsion.

Test for flavonoids:

Two different tests were used for the flavonoid identification.

Shinoda's test:

To the 0.5ml of the extract 5ml of distilled water was added and then a piece of Magnesium ribbon and 2ml of concentrated HCl was added. The reaction mixture was observed for the pink or red colour solution.

To the 0.5ml of the extract 5ml of distilled water is added then, 5ml of dilute ammonia and 1ml of Concentrated Sulphuric acid was added. The reaction mixture was observed for the yellow colouration that disappears on standing.

Test for terpenoids and steroids:

Two different tests were used for the identification of terpenoids and steroids:

Salkowski test:

To 0.5ml of each of the extract 2ml of chloroform was added and then 3ml of concentrated H_2SO_4 was carefully added to form a layer. A reddish brown colouration of the interface indicates the presence of terpenoids and steroids.

Liebermann - Bruchard's Test:

To 0.5ml of the extract 2ml of acetic anhydride was added and then concentrated Sulphuric acid was added along the walls of the test tube. The reaction mixture was observed for the formation of violet – blue ring at the junction of two liquids.

Test for alkaloids:

Two different tests were used for the identification of alkaloids

Mayer's test

To 0.5ml of the extract 2ml of Mayer's reagent (K_2HgI_4) was added and the reaction mixture was observed for the formation of creamy white precipitate.

Wagner's test:

To 0.5ml of the extract 2ml of Wagner's reagent (dilute Iodine solution) was added and the reaction mixture is observed for the formation of reddish brown precipitate.

Test for Proteins (Biuret test):

To 0.5ml of the extract 2ml of Biuret reagent was added and the reaction mixture observed for the formation of Violet colour solution.

Test for Amino acids (Ninhydrin test):

To 0.5ml of the extract 2ml of the Ninhydrin was added and heated for few minutes and the reaction mixture was observed for the deep blue to pale yellow colouration.

Test for anthraquinones (Borntrager's test):

To 0.5ml of the extract 5 - 10ml of dilute HCL was added and boiled on water bath for 10 minutes and filtered. Then the filtrate was extracted with carbon tetra chloride and the equal amount of ammonia was added. After shaking the reaction mixture was observed for the formation of pink – red colour in the ammonia layer.

Results and Discussion:

The different solvent extracts of *Ziziphus spina Christi* and *piper nigrum* was investigated and the results were tabulated in table 1 and 2.

Most of the natural components present in the two different samples were extracted in alcoholic extracts. Ethanol is the best solvent for the extraction of most of the bioactive components. Due to the presence of bioactive components these plants are using as traditional medicines.

Acknowledgement:

The authors appreciate the contribution of Mr. Madhu Babu. K, Department of Chemistry, College of Marine Science and Technology, Massawa.

References:

- 1 Abdel – Galil FM, El – Jissry MA (1991). Cyclopeptide alkaloids from *Zizyphus spina – christi* phytochem. 30: 1348 – 1349.
- 2 Abdel – Wahhab MA, Omara EA, Abdel – Gali MM, Hassan NS, Nada SA, Saeed A, Elsayed MM(2007). *Zizyphus Spina – Christi* extract protects against aflatoxin B₁ initiated Hepatic carcinogenicity. *Afi. J. Trad. Compl. Alt. Med.* 4:248 – 256.
- 3 Amira M. Abu – Taleb, Kadriya El- Deeb, Fatimah O.Al – Otibi (2011). Assessment of anti fungal activity of *Rumex vesicarius*L. And *Ziziphus spina – Christi* (L.) willd. Extracts against two phytopathogenic fungi. *African journal of Microbiology research.* 5(9) : 1001 – 1011.
- 4 Ayoola.G.A, Coker.HAB, Adesegun SA,(2008), phytochemical screening and anti oxidants activities of some selected medicinal plants used for malaria therapy in southwest Nigeria. *Topical journal of pharma research.* 7(3) : 1019 – 1024.
- 5 Bulus Adzu, Abdul Kaita Haruna(2007). Studied on the use of *Zizyphus spina – Christi* against pain in rats and mice.

- African journal of Biotech. 6(11): 1317 – 1324.
- 6 Edeoga H.O, Okwu.D.E, Mbaebie. B.O(2005), Phytochemical constituents of some Nigerian medicinal plants. Afri. Jour. Of Biotech.4 (7): 685 – 688.
 - 7 Evans WC (1996). Trease and Evans Pharmacognosy, 14th Edition, Bailiere Tindall W.B. Sauders company ltd; London, pp 224 – 228, 293 – 309.
 - 8 Evans WC, Pharmacognosy,13th Ed, Balliere – Tindall; London, 1989.
 - 9 [http:\wikipedia.com\Ziziphus spina-christi](http://wikipedia.com/Ziziphus%20spina-christi) - Wikipedia, the free encyclopedia.mht
 - 10 [http:\wikipedia.com\Black pepper](http://wikipedia.com/Black%20pepper) - Wikipedia, the free encyclopedia.mht

S.No	Component name	Name of the test	Hexane	Ethanol	Di- Ethyl ether	Chloroform	Water
1	Carbohydrates	Molisch's test	+	+	+	+	+
2	Reducing sugars	Fehling test	+	+	-	-	+
3	Monosaccharide	Barfoed's test	+	+	-	-	+
4	Tannins	Ferric chloride	-	+	+	+	+
5	Saponins	Frothing test	-	+	-	-	+
6	Flavonoids	1.Shinoda's Test	-	+	+	+	+
		2. Conc. H ₂ SO ₄ test					
7	Terpenes/steroids	1.Liebermann Burchard's Test	+	+	+	+	-
		2.Salkowski test					
8	Alkaloids	1.Mayer's test	-	-	-	-	-
		2. Wagner's test					
9	Proteins	Biuret test	-	-	-	-	-
10	Amino acids	Ninhydrin	-	-	-	-	-
11	Anthraquinones	Borntragar's test	-	+	+	-	+

Table 1. Chemical components of *Ziziphus spina Christi*

S.No	Component name	Name of the test	Hexane	Ethanol	Di- Ethyl ether	Chloroform	Water
1	Carbohydrates	Molisch's test	+	+	+	+	+
2	Reducing sugars	Fehling test	-	+	-	-	+
3	Monosaccharide	Barfoed's test	-	+	-	-	+
4	Tannins	Ferric chloride	-	+	+	-	+
5	Saponins	Frothing test	-	-	-	-	+
6	Flavonoids	1.Shinoda's Test	-	+	+	-	+
		2. Conc. H ₂ SO ₄ test					
7	Terpenes/steroids	1.Liebermann Burchard's Test	+	+	+	+	-
		2.Salkowski test					
8	Alkaloids	1.Mayer's test	-	-	-	-	-
		2. Wagner's test					
9	Proteins	Biuret test	-	-	-	-	-
10	Amino acids	Ninhydrin	-	-	-	-	-
11	Anthraquinones	Borntragar's test	+	+	+	-	+

Table 2. Chemical components of *Piper nigrum*