PHYTOCHEMICAL CONSTITUENTS OF VARIOUS EXTRACTS OF SUDANESE MEDICINAL PLANT (CORN SILK).

Dr. Haj Elamin E. Azhari *; Dr. Makawy. Abd. A . **; Dr. M. R. Rasha***; Dr. Abd. A. Mona****
*Department of Clinical Pharmacy & Therapeutics, Faculty of pharmacy, Karary University, Khartoum University & General Military Hospital, Sudan
** Department of Pharmacognosy, Faculty of pharmacy, Elrazi College, Sudan
*** Faculty of pharmacy, Omdurman Islamic University, Sudan
**** Faculty of pharmacy, Elrazi College, Sudan

Correspondence to: Dr. Azhari . Elnour.Haj.Elamin, Department of Clinical Pharmacy & Therapeutics, Faculty of pharmacy, Karary University, Khartoum University & General Military Hospital, Sudan.

Email id: azhari_elamin@hotmail.com

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ABSTRACT

Corn silk is a collection of the stigmas (fine, soft, yellowish threads) from the female flower of the maize plant. Corn silk has been used traditionally as diuretic, antilithiasic, uricosuric and for curing cystitis, gout, kidney stones, nephritis and prostatitis. In this study phytochemical constituents were extracted from corn silk using various solvents such as benzene, chloroform, ethanol, ethyl acetate, methanol and petroleum ether and the general phytochemical screening showed positive results for the presence of flavonoids, alkaloids, glycosides, terpenoids and tannins, this screening was conferred by using TLC method for polar and non-polar compounds. Also from these studies finger print scanning method (using spectro photometric method) was done and the highest peak for detection of the active constituents for this plant was found to be λ 210

Key words: Corn silk, Phytochemicals screening, prostatitis, kidney stones, finger print.

INTRODUCTION

Local medicinal plants and wild herbs are of great significance to the sustainable health of individuals and its geo-communities. People from all continents and ethnic groups have long applied poultices and imbibed hundred of infusions, if not thousands, indigenous plants, dating back to prehistoric time. Plants have an almost limitless ability to synthesize aromatic substances, most of which are phenols or their oxygen-substituted derivatives. Most of these are secondary metabolites, of which at least 12,000 have so far been scientifically isolated, a number estimated to represent less than 10% of its total metabolites1.

In many cases, these substances serve as plant defense mechanisms against predation by micro-organisms, insects, and herbivores. While some, such as terpenoids, give plants their odors; and others (quinones and tannins) are responsible for plant pigment. Many compounds are responsible for plant flavor attributes (e.g., the terpenoid capsaicin from chili peppers), and some of the same herbs and spices are used by humans to season food that yield useful medicinal compounds1.

Corn silk (Zea mays L.) refers to the stigmas of the maize female flowers. Historically, it has been used as a therapeutic remedy for various ailments such as the inflammation of the urinary bladder and prostate as well as treatment for irritation within the urinary system. To date, numerous commercially viable products prepared from corn silk are available2.

Although not scientifically proven, theoretically, corn silks have long been reported in ancient literatures to be able to assists with prostate problems, bed-wetting, carpet tunnel syndrome, edema and obesity. It has also been used to lessen the effects of premenstrual syndrome, and said to promote relaxation. Corn silk was also reported to be useful to treat urinary infections and cystitis. It is helpful for frequent urination caused by irritation of the bladder and urethral walls as well as for difficulty in passing urine, e.g. prostate disorders. It soothes and relaxes the lining of the urinary tubules and bladder, thus relieving irritation and improving urine excretion3.
There are indications that utilization and acceptance tendency towards medicinal herbs to give relief and treat human ailments are globally very positive although there are side effects. The interest toward elucidating the chemical composition of medicinal herb products is also growing as commercializing exploitation increases.

The biological activities of corn silk constituents are well cited in literatures. This includes:

- Antibiotic activity towards corn earworm by a flavones glycoside maysin.
- Attractant activity towards corn earworm
- inhibition of IgE formation by glycoproteins,
- immune enhancement by nonstarch polysaccharides
- anticoagulant activity by neutrugar/saminogugar derivatives, phytochemical and biological study
- purification and characterization of an anticoagulant from corn silk
- phytomedicines as a treatment of benign prostatic hyperplasia
- glomerular function and potassium urinary excretion
- volatiles inhibit cultures of *Aspergillus flavus*

Other than these reported biological activities, some local species are used as tea, and they were powdered as food additive and flavorings agents in several regions of the world.

Phytochemicals are plant chemicals. Phytochemicals are defined as bioactive no nutrient plant compounds in fruits, vegetables, grains, and other plant foods that have been linked to reducing the risk of major chronic diseases.

It is estimated that 5000 individual phytochemicals have been identified in fruits, vegetables, and grains. They are otherwise called as the secondary metabolites. The phytochemicals vary in distribution within the plant parts, as well as in their occurrence within plant species.

The present work deals with the preliminary phytochemical investigation of various extracts (benzene, chloroform, ethanol, ethyl acetate, methanol and petroleum ether) of corn silk, to identify the major group of phytochemicals, which impart the medicinal property to the plant.

MATERIALS AND METHODS

Plant Materials:

Corn was bought from Bahry market on 26/3/2009, and then the corn silk was collected and dried in normal room temperature. The dried powder material was then used for different experimental procedures.

Phytochemical Screening of Corn Silk:

Fresh sample of corn silk was used to screen the presence of phytochemicals. For this, five grams of the corn silk was weighed, mashed and homogenized with 50ml of alcohol, acid (1% HCl) and water separately. These were boiled for one hour, cooled, filtered and used for the analysis of phytochemicals. The extract was analyzed for the presence of phytochemicals such as flavonoids, phenols, anthocyanins, tannins, saponins, steroids, alkaloids and terpenoids using standard procedure.

Soxhlet Extraction of The Plant Sample:

The shade dried corn silk was ground into coarse powder. Dried corn silk powder was successively extracted with different solvents such as petroleum ether, benzene, chloroform, ethyl acetate, methanol and ethanol with their increasing order of polarity by soxhlation for 6-12 hours. For the extraction, 20g of dried powdered sample was used with 200ml of the solvent. Then the extract obtained were collected separately and kept for further analysis. The qualitative phytochemical tests of various extracts of corn silk were carried out using standard procedure.

Test for Unsaturated Sterols and Tri terpenes:

10 ml of the PE was evaporated to dryness on water bath and the cooled residue was stirred several times with petroleum ether. The residue was then extracted with 20 ml chloroform. The chloroform solution was dehydrated over sodium sulphate anhydrose. 5 ml portion of the chloroform solution was mixed with 0.5 ml of acetic anhydride followed by 2 drops of *con. Sulphuric acid*. The gradual appearance of green, blue and purple color was taken evidence of the presence of sterols (green-blue) and or triterpenes (purple) in the sample.

Test for Alkaloids:

7.5 ml of the PE was evaporated to dryness on a water bath. 5% of 2N HCl was added and heated on the water bath for 10 min, cooled, filtered and divided into 3 test tubes. To one test tube the mayer’s reagent was added, to other tubes the wagner and hagner were added. A slight turbidity was taken as evidence for the presence of alkaloids.

Test for Flavonoids:

To 3 ml of the PE in the test tube 1 ml of the 1% KCl was added. A dark yellow color indicated the presence of flavonoidal compounds.

Test for Tannins:

To 3 ml of PE 2 drops of FeCl3 reagent was added. A blue – black, or brownish green precipitate indicated the presence of hydrolysable or condensed tannins respectively.

2.8. Test for Anthraquinones Glycoside:

2 ml of the PE was shaken with 5 ml of chloroform in a separate funnel. 5ml of 10% ammonia solution was added to chloroform layer. Red rose color will develop in ammonia layer.
Test for Saponins:

10g of dried powder was placed in a test tube, then 10 ml of distilled water was added. The tube was shaken vigorously for about 30 sec. The formation of froth which persists for at least half an hour was taken as evidence for the presence of saponins.

Test for Cyanogenic Glycoside:

3 g of the powder was placed in flask and sufficient water was added, followed by 1 ml of chloroform. A piece of freshly prepared sodium picrate paper was inserted between a split crocks, a change in color from yellow to various shades red was taken as indication of the presence of cyanogenic glycoside.

Test for Coumarines:

3 g of the powder was boiled with 20 ml distilled water in a test tube and filter paper attached to the test tube to be saturated with the vapor after a spot of 0.5 KOH put on it. Then the filter paper was inspected under U.V light, the presence of coumarines was indicated if the spot has found to be absorbed the U.V light.

Thin layer chromatography:

2 drops from each extracts were applied to a TLC silica gel plate (10cmX10cm). Eight such plates were prepared and were performed in one of the following solvent system:

a) Ethyl acetate –methanol-water (100:13.5:10):

For analysis of anthra-gycosides, cardiac glycosides, bitter principles, flavonoids, alkaloids and saponins.

b) Toluene-ethyl acetate (93:7): For the analysis of essential oils,coumarins, valeporiates and plant acids.

Both solvents are allowed to run for a distance of 8 cm. after inspection in UV-254 nm and UV-365 nm, each chromatography was detected by iodine and concentrated H2SO4 for polar and non polar compounds.

Finger print detection:

Finger print scan method was used to scan aqueous-alcoholic extract from corn silk using spectro-photometer method and λ 210 was detected as the highest active constituents peak

RESULTS AND DISCUSSION:

Phytochemical screening of corn silk extracts revealed the presence of the following metabolites as indicated in table1:

<table>
<thead>
<tr>
<th>Phytochemicals</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anthraquinones</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Alkaloids</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Flavonoids</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Glycosides</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Saponins</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Tannins</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Terpenoids</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

A= Benzene, B= Chloroform, C= Ethanol, D= Ethyl acetate, E=M Methanol, F=PE Petroleum ether

**Table 1: The Chemical Constituents of The Corn Silk Extracts:**

**THIN LAYER CHROMATOGRAPHY:**

**POLAR COMPOUND DETECTION:**

*Figure (1): polar compounds before detection:*

*Figure (2): polar compounds after detection under UV:*
The phytochemical analysis of the benzene, chloroform, ethanol, ethyl acetate, methanol and petroleum ether extracts of corn silk showed positive results for the presence of flavonoids, alkaloids, phenols, steroids, glycosides, carbohydrates, aminoacids, terpenoids and tannins. Methanolic extract of corn silk gave the maximum extraction of phytochemicals than any other extracts.
Methanolic extract was followed by ethanolic extract for the presence of phytochemical constituents.

Saponins and glycosides of both triterpines and steroids have hyotensive and cardiac depressant properties. Saponins bind to cholesterol to form in soluble complexes; dietary saponins in the gut of monogastric combine with endogenous cholesterol excreted via the bile, these prevent cholestrol reabsorption. The presence of saponins in corn silk may account for proper management of excess cholesterol synthesized de novo or exogenous cholesterol. This may reduce the risk of cardiovascular diseases such as hypertension, and hence may be responsible for their hyotensive properties. Also the presence of alkaloids and flavonoids in corn silk could account for the antimicrobial and antioxidant activities.

This general phytochemical screening was conferred by TLC method for polar (figures 1,2,3,4) and non-polar compounds (figures 5,6,7).

Finger print, considered as marker for the active chemical constituents was made for the aqueous-alcoholic extract and the highest peak for detection of the active constituents for this plant was found to be λ 210. (figure 8)

*Zea mays* husk has analgesic and anti-inflammatory effects that are due to the presence of tannins and polyphenolic constituents.

CONCLUSION:

From this study, we can conclude that corn silk is a rich source of phytochemical. Phytochemical compounds were extracted best in methanol among the solvents and methanolic extract.

Presently, the use of traditional medicines remains widespread in developing countries while the use of complementary alternative medicine (CAM) is increasing rapidly in developed countries. Prostate cancer patients and those with benign prostatic hyperplasia (BPH) are increasingly exploring the potential use of CAM especially when compared with the risk of mortality and long-term morbidity associated with intervpective clinical surgical procedures.

Herbals which hold potential promise are mentioned, although much elucidation and tangible research is still found wanting. Medicinal plants and herbs are of great importance to the health of individuals and communities. Despite the existence of herbal medicines over many centuries, only relatively small number of plant species has been studied for their application 11.

REFERENCES:

10. (1973); pp 49-188.