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# Study of Rhizomes of Tectariacoadunata with special reference to Phytochemical and GC-MS

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**Abstract:**
Pteridophytes are one of the oldest and primitive vascular plant groups on the earth. Tectariacoadunata belongs to the family of Dryopteridaceae. The dried extract of rhizomes of Tectariacoadunata has various bioactivities such as antioxidant, antimicrobial and anti inflammatory. The present investigation was undertaken to study the presence of secondary metabolites and GC-MS analysis of rhizomes of fern. The secondary metabolites consist of Tannin, Flavonoids, Alkaloids, Saponin, Steroids and coumarin. All this phytochemical plays an important role in the development of plants.The GC-MS study reveals that the presence of 11 metabolites.
**Keywords: -** *Tectariacoadunata, Qual itative Phytochemical analysis, GC-MS study.*

**Introduction:**

Medicinal plants are the backbone of traditional medicine, which means more than 3.3 billion peoples in the less developed countries utilize medicinal plant of regular basis (Davidson, 2000). Medicinal plants are used by 80 % of the world population as the only available medicines especially in developing countries. The use of medicinal plant is very wide it is commonly considered that herbal drugs are cheaper and safer as compared to synthetic drugs and may be used without or minimum side effect.

PteridophytesTectariacoadunata (J.Smith) C. Chr. is one of the medicinally important plant. The rhizome of T. coadunata is used against anthelmintic activity, stomach pains, gastrointestinal disorders, eradication of worms in Childrens. Fresh rhizome and frond is used in insect bites or getting relief in centipede bites and extraction of dried rhizome, stem and stipe is used in respiratory disorders like cold cough, asthma and bronchitis (J. Malviyaet.al. 2012).On the basis of number of applications of Rhizomes of Tectariacoadunata, this plant was taken for the present study.

**Material and Methods:**

**Source of the material**

The collection of the plants and fresh rhizomes of TectariaCoadunata was done in the Month of September and October from different area of ShahuwadiTahsil of Kolhapur district. The collected samples were brought to laboratory for further observation. The fresh rhizomes were cleaned thoroughly and washed repeatedly with tap water. The cleaned rhizomes were then air dried at room temperature and grounded to powder form and kept ready for further analysis

**Phytochemical Screening:**

**Qualitative Analysis**

Extraction: The powdered rhizome of TectariaCoadunata was subjected to extraction with Acetone, Chloroform, Water and Ethyl Acetate using Soxhlet apparatus. The extracts were dried under shades and stored for further analysis. Qualitative Phytochemical test were carried out adopting standards procedure (Treaseet.al 1983, Kokate, et.al 1997 and Hegdeet.al, 2010)

**GC-MS Analysis**

The Clarus 680 G C was used in the analysis employed a fused silica column, packed with Elite-5MS (5% biphenyl 95% dimethylpolysiloxane, 30 m × 0.25 mm ID × 250µm df) and the components were separated using Helium as carrier gas at a constant flow of 1 ml/min. The injector temperature was set at 260°C during the chromatographic run.

The 1µL of extract sample injected into the instrument the oven temperature was as follows: 60 °C (2 min); followed by 300 °C at the rate of 10 °C min−1; and 300 °C, where it was held for 6 min. The mass detector conditions were: transfer line temperature 240 °C; ion source temperature 240 °C; and ionization mode electron impact at 70 eV, a scan time 0.2 sec and scan interval of 0.1 sec. The fragments from 40 to 600 Da. The spectrums of the components were compared with the database of spectrum of known components stored in the GC-MS NIST (2008) library.

**Result and Discussion**

The rhizomes of Tectariacoadunata was subjected to extraction by various solvents by using Soxhlet apparatus. The qualitative phytochemical analysis result was shown in Table 1. The aqueous extract of Tectariacoadunata contains more secondary metabolites as compared to other. The ethyl acetate extract contain less number of secondary metabolites.

The GC-MS spectrum was shown in Table 2. About 11 compounds were identified based on retention time, peak area and interpretation of mass spectra. Amongst these most prevailing

compounds is N- Hexadecanoic acid, Undecanoic acid, Oleic acid, Elcosanoic acid N-Hexadecanoic acid possess number of biological activities such as Anti-inflammatory (Aparna, et.al, 2012), Antioxidant, hypocholesterolemicnematicide, pesticide, anti androgenic flavor, hemolytic, 5-Alpha reductase inhibitor (Kumar, et.al,2010) potent mosquito larvicide (Rahuman, et.al, 2000). The Oleic acid contains antibacterial properties (Awa, et.al, 2012.). Similar work were carried out by Dubalet.al in which determined 16 secondary metabolites from the plants (Dubal, et.al 2013)

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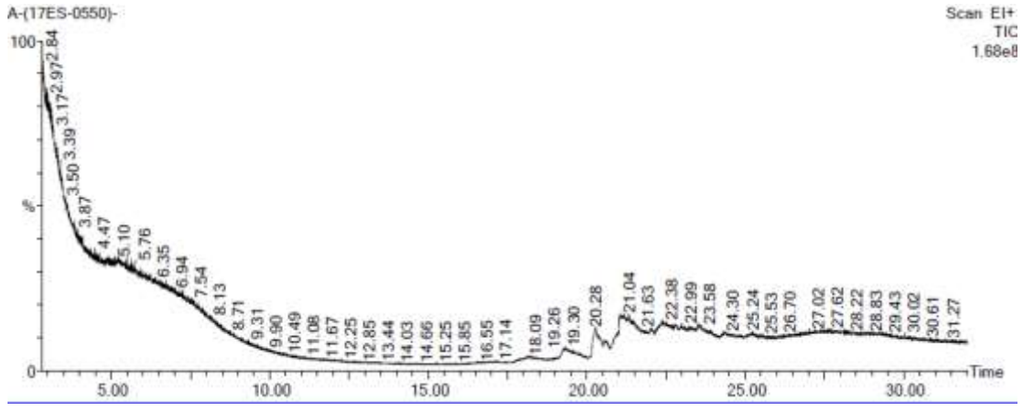
**Table 1. Qualitative Phytochemical Analysis**

| Sr. No. | Content | Acetone Extract | Chloroform Extract | Water Extract | Methanol Extract | Ethyl Acetate Extract |
|---|---|---|---|---|---|---|
| 1 | Saponin | - | - | + | - | - |
| 2 | Steroid | - | - | + | + | - |
| 3 | Tannin | + | - | + | + | - |
| 4 | Anthocyanin | - | - | - | - | - |
| 5 | Coumarin | - | - | - | - | - |
| 6 | Emodin | + | - | + | + | - |
| 7 | Protein | - | - | + | - | - |
| 8 | Flavonoid | - | - | + | - | - |
| 9 | Diterpene | - | - | + | - | - |
| 10 | Phenol | + | - | + | + | - |
| 11 | Anthraquinone | - | - | - | + | + |
| 12 | Carbohydrate | - | - | - | - | - |
| 13 | Quinones | + | - | + | - | - |

- = Absent, + = Present

**Table 2. GC-MS report of Rhizomes of Tectariacoadunata.**

| # | RT | Scan | Height | Area | Area % | Norm % |
|---|---|---|---|---|---|---|
| 1 | 19.300 | 3299 | 3,727,907 | 385,983.1 | 3.390 | 12.74 |
| 2 | 19.345 | 3308 | 4,180,885 | 218,162.2 | 1.916 | 7.20 |
| 3 | 19.430 | 3325 | 2,616,700 | 196,572.8 | 1.726 | 6.49 |
| 4 | 20.285 | 3496 | 14,068,298 | 2,971,756.8 | 26.100 | 98.12 |
| 5 | 20.570 | 3553 | 5,261,694 | 613,290.7 | 5.386 | 20.25 |
| 6 | 20.835 | 3606 | 3,749,965 | 162,394.4 | 1.426 | 5.36 |
| 7 | 20.991 | 3637 | 6,454,044 | 741,557.1 | 6.513 | 24.48 |
| 8 | 21.166 | 3672 | 14,051,335 | 3,028,850.5 | 26.601 | 100.00 |
| 9 | 21.321 | 3703 | 12,863,059 | 2,587,462.0 | 22.724 | 85.43 |
| 10 | 21.586 | 3756 | 4,671,994 | 310,094.9 | 2.723 | 10.24 |
| 11 | 22.806 | 4000 | 2,697,444 | 170,121.1 | 1.494 | 5.62 |




A-(17ES-0550)-

| Hit | REV | for | Compound Name | M.W. | Formula | CAS |
|---|---|---|---|---|---|---|
| 1 | 885 | 730 | N-HEXADECANOIC ACID | 256 | C16H32O2 | 57-10-3 |
| 2 | 875 | 794 | PENTADECANOIC ACID | 242 | C15H30O2 | 1002-84-2 |
| 3 | 863 | 688 | OLEIC ACID | 282 | C18H34O2 | 112-80-1 |
| 4 | 862 | 843 | EICOSANOIC ACID | 312 | C20H40O2 | 506-30-9 |
| 5 | 849 | 744 | 4-FLUORO-1-METHYL-5-CARBOXYLIC ACID, ETHYL(ESTER) | 172 | C7H9O2N2F | 900129-56-3 |
| 6 | 848 | 655 | OCTADECANOIC ACID | 284 | C18H36O2 | 57-11-4 |
| 7 | 845 | 679 | NONADECANOIC ACID | 298 | C19H38O2 | 646-30-0 |
| 8 | 844 | 697 | N-DECANOIC ACID | 172 | C10H20O2 | 334-48-5 |
| 9 | 841 | 721 | UNDECANOIC ACID | 186 | C11H22O2 | 112-37-8 |
| 10 | 841 | 671 | PENTADECANOIC ACID | 242 | C15H30O2 | 1002-84-2 |
| 11 | 839 | 645 | OCTADECANOIC ACID | 284 | C18H36O2 | 57-11-4 |
| 12 | 832 | 654 | NONADECANOIC ACID | 298 | C19H38O2 | 646-30-0 |
| 13 | 831 | 691 | N-DECANOIC ACID | 172 | C10H20O2 | 334-48-5 |
| 14 | 831 | 627 | EICOSANOIC ACID | 312 | C20H40O2 | 506-30-9 |
| 15 | 829 | 666 | HEPTADECANOIC ACID | 270 | C17H34O2 | 506-12-7 |
| 16 | 828 | 651 | OCTADECANOIC ACID | 284 | C18H36O2 | 57-11-4 |
| 17 | 828 | 638 | OCTADECANOIC ACID, 2-(2-HYDROXYETHOXY)ETHYL ESTER | 372 | C22H44O4 | 106-11-6 |