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PHYTOCHEMICAL SCREENING ON *COLOCASIA ESCULENTA* LINN

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Abstract:

Eddoe or Dasheen are two names for taro (Colocasia esculenta). It is a herbaceous plant from the Araceae family. Is a long-established crop in Asia that was first brought to Japan more than 2500 years ago.[1] It is grown in south east Asia under the names Arvi and Arbi, among others. Long underground tuberous rhizomes make up the roots. These plants are flowering and belong to a genus with over 25 species. The leaves are much longer than lamina, measuring up to 82 cm. The lamina has a triangular form and is quite averse to being near water.[2] Colocasia esculenta (CE) starch comprises 0.23-0.52% lipid and 0.017-0.025% phosphorus, which are the primary chemical components. Mucilage, dihydroxysterols, fat, calcium oxalate, vitamins, iron, and other nutrients are found in corm. Alkoloids, glycosides, flavonoids, terpenes, saponins, and phenol are also present in these plants phytochemically.[3]

Keywords: *Colocasia esculenta, Chemical constituent ,Unsaturated aldehyde, Ketones, Alcohol, Carbohydrate*

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INTRODUCTION :[2,5]

It is an edible corm of the plant C. esculenta, sometimes known as taro, and is grown esculent colocasia Linn is a big leafy herb from the Araceae family. It also grows by the name in marshy places. A plant's leaf is big and can reach a length of 50 cm when it is corded. The leaves have an elephant-ear-like appearance. The subterranean fleshy corm gives rise to the scented, 1.2 m-long plant. The herbaceous perennial plant C. esculenta has a sizable corm on or just below the ground's surface. "Clusters of two or five fragment inflorescences in the leaf axils" are produced by the plant.The acridity-causing calcium oxalate monohydrate tiny needle-like raphides are found in the C. esculenta plant. That only demonstrates irritability.

CHARACTERISTICS OF GENUS – C. esculenta linn

The generic name is derived from the ancient Greek term kolokasion, which may have implied the edible roots of C. esculenta to botanist Dioscorides in the first century AD. Colocasia Esculenta is the species that Linnaeus first described. A tropical root crop called C. esculenta is produced for its starchy corm or underground stem. The subterranean, thick stem of this maize, which is in the form of an edible corm, is packed with essential nutrients.[7]

BOTANICAL DISCRIPTION [8,9]

C.esculenta(L.) Schott, Araceae is the edible aroides distributed throughout the world particularly in tropics.

Figure-Colocasia esculenta and Corm of Colocasia

Table No.01: Properties of Colocasia esculenta

Type =	Bulb
Family =	Araceae
Height =	3 to 6 feet
Spread =	3 to 6 feet
Zone =	8 to 10 feet
Tolerates =	Wet Soil
Uses =	Suitable for water plant

BOTONICAL CLASSIFICATION:

Table No.02 : Botanical Classification

Rank	Scientific name
Kingdom	Plantae(plants)
Subkingdom	Trachebionta(Vascular plant)
Division	Magnoliophyta(flowering plants)
Super division	Spermatophytes(seed plants)
Class	Liliopsida(monocotyledons)
Subclass	Arecidae

Chemical Constituents-[4]

Two classes that are primarily present in colocasia extract include triterpenoids and flavonoids. The plant's leaves are mostly composed of calcium oxalate, fibre, starch, and vitamins. From the tubers two dihydroxysterols, 14α-methyl 5α cholesta-9,24-diene3β,7α-diol and 14α-methyl-24methylene-5α-cholesta-9,24-diene-3 α,7 α-dione,β sitosterol and cynidin 3- glycoside corn also contain unique aliphatic compounds tetracos-20 en 1,18-dione,25methyl tetracot-10 -one. Linalool, Diethyl Phthalate, Methyl sterate, Glycidyl palmitate, Glycidyl oleate 1-Hexacosanol, and other chemicals

Medicinal Uses-[6]

-Laxative, piles and for stings of wasps and other insects.
-Leprosy and tuberculosis.
-Earache.
-Alopaecia or hair loss.

Macroscopic characters:[10]

The lateral buds at the base of the leaves are where the cormels, which are slightly secondary, emerge. The concentrated outer scale rings are confined to the dark brown rhizome. Moreover, they include prismatic calcium oxalate crystals, and the mucilage-containing components cause the cut surface to be oily.

Microscopic characters: Powder:

It is Creamy in colour. The spiral fragments and blended starch grains. Leaves are green coloured heart shaped leaves, Usual taste and slimy and smell due to the mucilage,and also present cell of cork and parenchyma. The parenchymas cells varies with shape and shape which measures Seven to nine cells,with interspersed vascular element . The cortex is broad, thin walled multi-layered and also have their raphide layers.

MATERIALS AND METHOD:

Plant Material:

plant was identified, confirmed and validated by Dr. M .Bachulkar , principal Shri plant taxonomist , was described after selection . Peth Vadgaon's vijaysingh B. Yadhav Arts and Science College.Corm of Colocasia esculenta Linn was collected from Bambawade, Dist-Kolhapur, Taluka:- Panahala.

Drying:

Plant material was rinesed , harvested with normal tap water and wash with 95% alcohol to separate undesirable material drying in oven temperature at 45 °C then powdered .

Extraction: [3]

The corm is air dried under shade for 14 days. Then dried powder extracted for 24hours with different solvent such as Petroleum ether, Chloroform and Methanol by using Soxhlet apparatus.

Preparation of TLC plate:[14]

Thin Layer Chromatography (TLC) was carried out using TLC plate Extracts of the petroleum ether, Chloroform and Methanol dissolved in soluble solvent. The spots of the solvents were as wide as possible, and sides of the plate split from each other. The diameter of the spot should not be greater than 0.25cm.

Table No. 03 : Thin Layer Chromatography Of Different Extracts

Sr. No.	Name Of Extract	Solvent system
1	Chloroform Extract	Chloroform:Methanol:Water (6:3:1) N Hexane : Chloroform (3:7)
2	Petroleum ether extract	Chloroform:Methanol:Water (6:3:1)
3	Methanol Extract	Chloroform:Methanol:Water (6:3:1)

Phytochemical screening:[11,12,13]

Preliminary phytochemical estimation is a phase after extraction to classify many types of components that exist in extracts such as lipids, proteins, essential oil, flavonoids, carbohydrates, amino acids, steroids. Polarity of ingredients to carry out polar components use only polar solvents. After chemical test of crude drug may be validated some identified any part or drug. The research involves full possible tests for preliminary phytochemical study.

Chemical test for amino acid:

1) Ninhydrin Test: 3ml aq. Extract then heat add 3 drops of Ninhydrin solution (5%) After boiling water bath for 10min. bluish or purple colour appears.

2) Test for Cysteine: Take 5ml aq. extract add drops of NaOH (40%) then add Lead acetate solution (10%) After boiling using water bath for 5-10 min. The solution turns black precipitated.

3)Test for tyrosine: Mix 2ml extract then boil the extract add 1ml Millon's reagent dark red colour appear in solution.

Chemical Test for Steroids:

1) Pinus Test: Take 2ml extract add 2ml $SbCl_3$in acetic acidthen blue colour appear.

2)Liebermann Test: 2ml extract with 2ml acetic anhydride heat and cool then add 2-3 drops Conc. H_2SO_4, blue colour appear.

3)Salkowasi Test: 2ml extract add chloroform and 2ml conc. Sulphuric acid then shake well greenish yellow fluorescence colour appears in acid layer and red colour appears in chloroform layer.

Test for Carbohydrate:

1) Barfoed Test: 2ml extract add 2ml barfoed's reagent (Copper acetate in distill water and add glacial acetic acid to it) then boil and wait brick red ppt. appear.

2)Fehling's Test: 2ml extract mix 1ml fehling solution A with B then boil it yellowto red ppt. appears

3)Molish Test: 2ml extract add 1ml conc.H_2SO_4 then 2-3 drops of molish reagent(Add naphthol in 95% ethanol) formation of purple colour in at junction

Test for proteins:

1)Xantho protein Test: 2mlextractadd 1ml Cone.H_2SO_4 Yellowish White ppt appears .

2)Biuret Test : 2ml extract in hot water add 2-3 drops of Biuret reagent(Copper sulphate ,Potassium hydroxide and sodium potassium tartarate) which turns Violet to Pink .

3) Lead acetate test : 2ml extract add 2ml NaOH (40%) then add few drops of lead acetate solution then boil it which turns Black to brown colour appear.

4) Precipitation Test : 2ml aq. extract turns White colloidal precipitate with add solute 2ml $HgCl_2$ (5%),5% ammonium sulphate .

Test for Fats and oils :

1) Saponification Test: Extract is evaporate it gives 10ml oil . To oil add 20ml NaOH (10%) Then heat in water bath for 30min . wait for cool. Add Sodium Sulphate solution Soap shapes and rise Filter then take filterate add sulphuric acid again Boil for ½ hr form residue in ethanol, To ethanolic solution add potassium sulphate, heat turns pungent odour is formed.

2) Solubility Test: Oil are insoluble in water and alcohol

Oil are soluble in chloroform, benzene and ether

Test for glycoside:

Glycosides are non – reducing compounds on hydrolysis by reagent form sugar and Non sugar moiety (i.e glycone and Aglycone)

1. Test for Anthraquinone glycoside-

a)Borntragers test-Take 2 ml extract , add dil. Sulphuric acid boil and filter to cold filtrate then add equal volume of chloroform. Separate organic layer and shake with dil. Ammonia , Ammonical layer shows rose pink colour.

2. Test for Cardiac glycosides-

a)Killer-killani Test-

Take 2 ml extract add glacial acetic acid ,one drop ferric chloride (5%)&conc. sulphuric acid Reddish brown colour appears at the junction of the 2 liquid layer and upper layer appear bluish green.

b)Baljet Test-

Take 2 ml aq. Extract, add 1ml sodium picrate solution. A thick section shows blue to purple colour.

c) Legal's Test –

Take 2ml extract, add 2ml pyridine and sodium nitropruside. Pink colour appears.

3)Test for saponin glycoside-
foam test:
The extract is shake vigorously with distilled water.persistent foam appear.
4)Test for cynogenetic glycoside-
Sodium picrate Test-(Grignard reaction)
Take 2ml extract in test tube and add dil. Sulphuric acid suspend sodium picrate treat with filter paper.The hydrogen cyanide turns the paper to brick red colour.

5)Test for coumarin glycoside-
1)Alkali test-
Extract mix with alkali blue green fluorescence produced.
2) Fluorescence Test –
Take moist powder in test tube, cover test tube in filter paper . heat the test tube keep in water bath and After few min observe paper under UV light . It produces yellow green fluorescence .

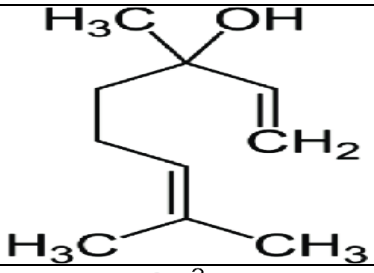
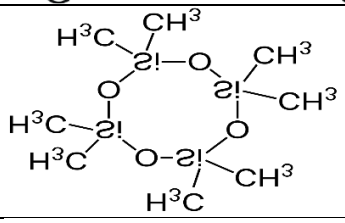
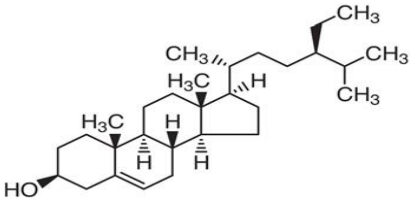
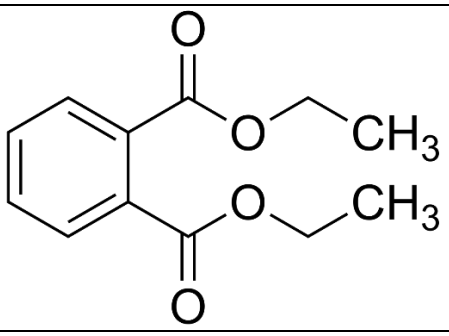
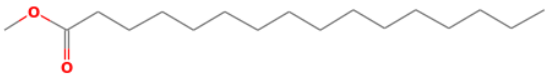
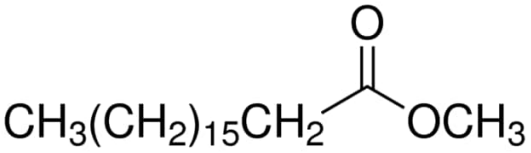
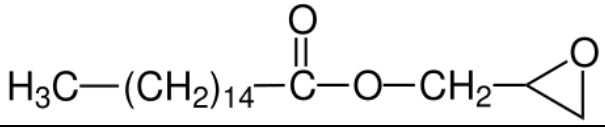
Table No. 4: Preliminary Phytochemical analysis of corm of colocasia esculenta linn of petroleum ether, Chloroform and Methanol extract shows following phytochemical constituents present:

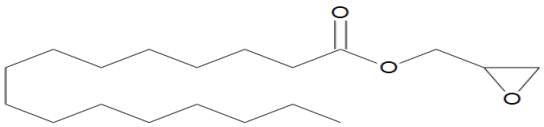
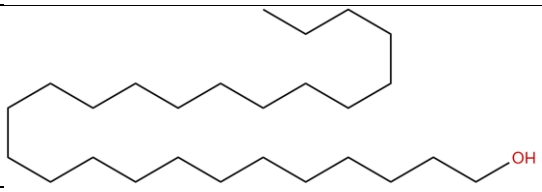
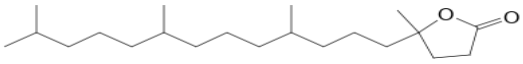
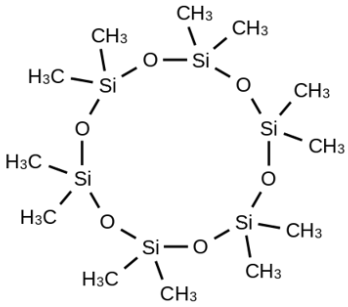
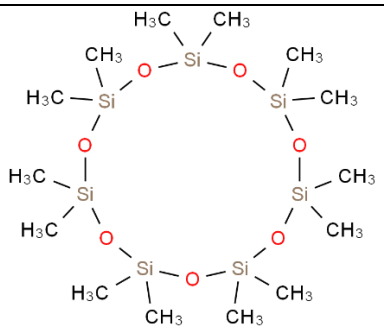
Sr . No.	Phytochemical Constituents	Petroleum Ether	Chloroform	Methanol
1	Alkaloids	+	-	+
2	Saponins	-	-	-
3	Glycosides	+	-	+
4	Carbohydrates	+	+	+
5	Amino acids	+	+	+
6	Flavonoids	-	-	+
7	Sterols	+	+	+
8	Sequiterpines	+	+	+

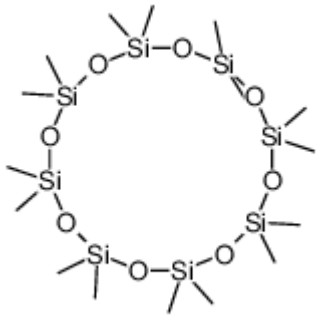
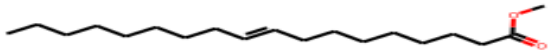
Table No. 05 :Data shows following compounds present in petroleum ether , Chloroform and Methanol extract .

Sr. No	Compound Name	Mol. Formula	Mol. Weight
1.	Linalool	C10H18O	154.25
2.	Cyclotetrasiloxane,octamethyl	$C_{23}H_{30}O_4Si_4$	482.8
3.	β-Sitosterol	$C_{29}H_{50}O$	414.7
4.	Diethylphthalate	$C_{12}H_{14}O_4$	222.24
5.	Hexadecanoic Acid,methyl ester	$C_{18}H_{36}O_2$	284.5
6.	Methyl Stearate	$C_{19}H_{38}O_2$	298.5
7.	Glycidyl Palmitate	$C_{19}H_{36}O_3$	312.5
8.	Glycidyl Oleate	$C_{21}H_{38}O_3$	338.5
9.	1-Hexacosanol	$C_{26}H_{54}O_4$	382.7
10.	4,8,12,16-tetraheptadecan-4-olide	$C_{21}H_{40}O_2$	324.5
11.	Cyclohexasiloxane,dodecamethyl	$C_{12}H_{36}O_6Si_6$	444.92
12.	Cycloheptasiloxane, tetradecamethyl	$C_{14}H_{42}O_7Si_7$	519.08
13.	Cyclooctasiloxane, hexadecamethyl	$C_{16}H_{48}O_8Si_8$	593.2
14.	9-octadecenoic,methyl ester,(E)	$C_{19}H_{36}O$	296.5

Table No.06 : Chemical Structure

Sr. No.	Compound Name	Structure
1.	Linalool	
2.	Cyclotetra siloxane,Octamethyl	
3.	β Sitosterol	
4.	Diethyl phthalate	
5.	Hexadecanoic Acid, methyl Ester	
6.	Methyl Stearate	
7.	Glycidyl Palmitate	

8.	Glycidyl Oleate	
9.	1-Hexacosanol	
10.	4,8,12,16-tetraheptadecan-4-olide	
11.	Cyclohexasiloxane,dodecamethyl	
12.	Cycloheptasiloxane, tetradecamethyl	

13.	Cyclooctasiloxane, hexadecamethyl	
14.	9 – Octadenanoic acid ,methyl ester, (E)	

RESULT :

The Phytochemical Analysis of corm of Colocasia esculenta Linn of petroleum ether , Chloroform and Methanol Extract showed the presence of alkaloids, flavonoids , glycosides, carbohydrates ,amino acids , sterols , sequiterpines. The petroleum ether , Chloroform and Methanol Extract of corm contained β – Sistosterol , Unsaturated aldehyde , carboxylic acid , n- alkane hydrocarban and LCMS data showed presence linalool ,glycidyl oleate , glycidyl palmitate, Diethyl phthalate , Hexadecanoic Acid, methyl Ester, Methyl Stearate, 1-Hexacosanol , 4,8,12,16-tetraheptadecan-4-olide, Cyclohexasiloxane, dodecamethyl , Cycloheptasiloxane, tetradecamethyl , Cyclooctasiloxane, hexadecamethyl , 9 – Octadenanoic acid ,methyl ester, (E)

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