



Original Research Article

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Antimicrobial, antioxidant and anticancerous (human breast cancer cell line, MCF-7) studies on *Dodonaea viscosa* leaf extracts

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Abstract

Cancer remains one of the most formidable health challenges, characterized by abnormal cell proliferation that invades and damages body tissues. *Dodonaea viscosa*, a plant with a rich history in traditional medicine, is known for its diverse medicinal properties. In this study, the leaves of *D. viscosa* were collected and subjected to extraction using methanol and chloroform. Phytochemical analysis revealed that the chloroform extract contained a higher concentration of bioactive compounds, including flavonoids, terpenoids, saponins, tannins, and phenols. Gas Chromatography-Mass Spectrometry (GC-MS) analysis further identified key bioactive metabolites such as Quinoline, 1,2-dihydro-2,2,3-trimethyl-, 1,1-Dodecanol, Dibutyl phthalate, Phthalic acid derivatives, and Oxirane octanoic acid methyl ester. Antibacterial assays demonstrated significant activity against *E. coli* and *Staphylococcus aureus* (MIC > 32 µg/mL). The antioxidant potential of the chloroform extract was confirmed by its radical scavenging activity, with the highest efficacy observed at a concentration of 100 µL. In anticancer studies, the extract exhibited potent activity against the MCF-7 breast cancer cell line, with an IC₅₀ value of 8.571 µg/mL as determined by MTT assay. Trypan blue dye exclusion assay revealed 50% cell death, further confirming its cytotoxic potential. These findings highlight the therapeutic promise of *Dodonaea viscosa* leaf extracts, showcasing their antibacterial, antioxidant, and anticancer properties. This study supports the potential application of *D. viscosa* in developing treatments for various ailments, including cancer, and underscores the value of traditional medicinal plants in modern therapeutic research.

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Introduction

Cancer is a group of disease that can be invade the body tissues, due to uncontrollable or abnormal cell growth. Cancer can cause due to gene of mutation. Nowadays, Cancer is mostly affecting the human beings and there

is no complete treatment for preventing the cancer. These diseases can be spreading in both developing and developed countries. Cancer is a heterogeneous disease and it can be invading the body tissue. Cancer can be reviewed in many articles and online site such as English journals, several data sources such as google

scholar, web of science, Pub Med, etc (Tariq et al., 2017).

The major reason is genetically mutation (sudden changes) in the normal genes to mutated genes. In 2008, cancer killed seven million deaths, while 13-17 million death cases on 2030. In 2016, one million new cancer cases can be estimated worldwide (American Cancer Society). In 2012, Denmark has highest and Nigeria has lowest attack of cancer (Ferlay). Recently, the treatment of cancer in two important ways: Malignant surgery for localized tumor and Chemotherapy and Radio therapy for metastasized tumor's.

Cancer caused during loss of cell cycle control. It is a major health problem and it is lack of early detection methods and techniques. Cancer is a malignant diseases and interaction between traditional and modern biotechnology tools to develop a new drug. Antioxidants are group of substance that are useful for fighting cancer (Ahmed). The medicinal plants can be authenticated and analyzed for anticancer activities and these anticancer plants can preventing the cancer.

Materials and methods

Plant identification and authentication

The plant was identified and authenticated by Dr. P. Jayaraman, Botanist, Plant Anatomical Research Centre, Chennai-35 and a voucher specimen number PARC/2017/3552.

Preparation of plant material

The collected leaves of *Dodonaea viscosa* was washed with distilled water and air dried in a room temperature (shade) without contact in a direct sunlight because to avoid the chemical losses in plant. After that, the dried leaves were grounded into fine powder using mortar and pestle or electric blender. The leaf powder was weighed and stored in an air tight container or zip-lock cover for future study.

Preparation of plant extracts

The dried leaves of *Dodonaea viscosa* were crudely powdered and subjected to extraction by a Soxhlet

extractor. The extraction was done with different solvents such as chloroform and methanol. Each time fresh plant material was taken and later extracted with other solvent. All the extracts were concentrated by a rotary vacuum evaporator and the left-over solvent was evaporated.

Phytochemical analysis

Phytochemical screening was performed to assess the qualitative chemical composition of plant sample using commonly employed precipitation and coloration reactions to identify the major secondary metabolites like alkaloids, flavonoids, phenolic compounds, saponins, tannins and terpenoids. The phytochemical analyses were carried out using standard procedures. The extracts of *Dodonaea viscosa* were screened for the presence of secondary metabolites using the following procedures:

Flavonoids

From the given sample, 2 ml of extract was taken and mixed with few drops of 20% NAOH. Formation of intense yellow color was observed. To that yellow color mixture few drops of 70% diluted HCl was added. The disappearance of yellow color was observed. The formation and disappearance of yellow color indicate the presence of flavonoids.

Alkaloids

10 ml of extract was taken from the given sample. In that, 8 ml picric acid was added. The formation of orange color was observed. And then the appearance of dark orange or purple color was observed. This color change indicates the presence of alkaloids.

Saponin

From the given sample 2 ml of extract was taken and 5ml of distilled water was added, which needs to be vigorously shaken. The formation of bubbles and persistent form of foam indicates the presence of saponins.

Tannin

Two ml of extract was taken. In that 10% of Alcoholic ferric chloride was added. The formation of brownish blue or black color was observed. The color change

indicates the presence of tannin.

Phenolic compound

2 ml of extract was taken. In that 2 ml of 5% ferric chloride was added. The formation of blue color was observed. This indicates the presence of phenolic compound.

Terpenoids

From that given sample 1 ml of extract was taken. In that 0.5 ml of chloroform followed by few drops of con. H_2SO_3 was added. The formation of reddish brown color was observed. This indicates the presence of terpenoids.

Glycosides

One ml of given sample was taken. In that 0.5 ml of glacial acetic acid and 1% aqueous ferric chloride was added. The formation of brownish ring was observed. This indicates the presence of glycosides.

GC-MS analysis

The phytochemical investigation of chloroform extract was performed on GC-MS equipment (Thermo Scientific Co.). Thermo GC-TRACE ultra-version 6.0. Experimental conditions of GC-MS system were as follows: TR5-MS capillary standard non-polar column, dimension: 30 Mts, ID: 0.25 mm, Film thickness: 0.25 μ m. Flow rate of mobile phase (carrier gas: He) was set at 1.0 ml/min. In the gas chromatography part, temperature programme (oven temperature) was 30°C raised to 250°C at 5°C/min and injection volume was 2 μ l. Samples dissolved in chloroform were run fully at a range of 50-650 m/z and the results were compared by using Wiley Spectral library search programme

Antimicrobial activity

When microbes such as bacteria, mold and fungi come in to contact with the product surface, our antimicrobial agents penetrate the cell wall of the microbe and disrupt k cell functions to limit microbial growth and reproduction. Dilution methods are used to determine the minimum inhibitory concentrations (MICs) of antimicrobial agents. The lowest concentration of an antimicrobial agent (in mg/L) that, under defined in

vitro conditions, prevents the appearance of visible growth of a microorganism within a defined period is known as the MIC.

0.5Mc Farland inoculum preparation

The colonies are touched with a loop and the growth transferred to broth such as nutrient broth. The broth is incubated at 35–37°C until the growth reaches a turbidity equal to or greater than that of a 0.5 McFarland standard. The culture is adjusted with sterile distilled water to give a turbidity equivalent to the McFarland 0.5 standard. This can be done photometrically at 530 nm.



Fig. 1: a) Nutrient broth, b) 0.5 Mc Farland inoculums.



Fig. 2: Drug preparation.

Drug preparation

Plant extract is dissolved in respective solvent which gives concentration of 6300 mg/l. 150 μ l of the stock is taken and serially diluted in tubes containing DMSO. Take broth in 10 tubes and add drug from each tube to the respective tubes such that the concentration ranges from 63 mg/l - 0.125 mg/ml.

Table 1. DMSO dilution.

Preparation	Final concentration	Plant extract	Diluent
Main Stock (MS)	6300 mg/l	-	-
WS1	6300 mg/l	-	-
WS2	3200 mg/l	150µlWS1	150 µl
WS3	1600mg/ml	150µlWS2	150 µl
WS3	800 mg/ml	150µlWS3	150 µl
WS5	300 mg/ml	150µlWS3	150 µl
WS6	200 mg/ml	150µlWS5	150 µl
WS7	100 mg/ml	150µlWS6	150 µl
WS8	50mg/ml	150µlWS7	150 µl
WS9	25mg/ml	150µlWS8	150 µl
WS10	12.5mg/ml	150µlWS9	150 µl

Table 2. Broth dilution

Preparation	Final concentration	Diluted working Test substance	Broth
WB1	63 mg/L	10 µl of WS1	990 µl
WB2	32 mg/L	10 µl of WS2	990 µl
WB3	16 mg/ml	10 µl of WS3	990 µl
WB3	8 mg/ml	10 µl of WS3	990 µl
WB5	3 mg/ml	10 µl of WS5	990 µl
WB6	2 mg/ml	10 µl of WS6	990 µl
WB7	1 mg/ml	10 µl of WS7	990 µl
WB8	0.5 mg/ml	10 µl of WS8	990 µl
WB9	0.25 mg/ml	10 µl of WS9	990 µl
WB10	0.125 mg/ml	10 µl of WS10	990 µl

**Fig. 3:** a) ELISA plate, b) Broth added to the well.

Assay preparation in microtiter plate

About 100 µl of the drug containing concentration of (63µg/ml, 32µg/ml, 16µg/ml, 8µg/ml, 3µg/ml, 2µg/ml, 1µg/ml, 0.5µg/ml, 0.25µg/ml and 0.125µg/ml) is added from well 1 to well 10 of the titer plate.

**Fig. 4:** Drug added to the well.

Inoculum addition in microtiter plate

A 100 µl of inoculums were added from well 1 to well 11. This reduces the concentration of each well by half such that it gives the concentration of wells 1-10 as 32 µg/ml, 16, 8, 3, 2, 1, 0.5, 0.25, 0.125, 0.0625 respectively. Well 11 served as positive control containing 100µl of drug and 100µl of inoculum, while Well 12 is negative control containing 200 µl of broth only.

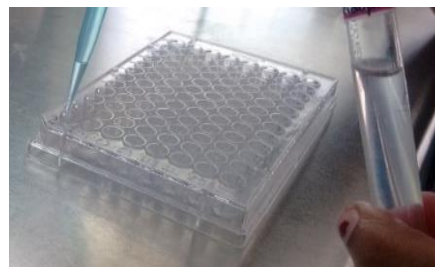
**Fig. 5:** Inoculum added to the well.**Table 3. Total volume in plate.**

Plate	Inoculum	Test substance+ broth	Broth	Final volume
Negative control	-	-	200	200
Positive control	100	-	100	200
Well 1 to 10	100	100	-	200

Incubation

Incubate the plates at 35–37 °C for 16–20 h for most antimicrobial agent combinations. The sufficient growth can be attained and take the absorbance or turbidity value. If there is sufficient growth of the test organism in positive growth control, no growth in the uninoculated or negative growth control and test organism plate was pure. The amount of growth in each well is compared with positive growth control and the MIC recorded. The lowest concentration of the agent that inhibits growth of the microorganism i.e., equal to or greater than 50% of the growth. MIC of the drug against the specific organism can be determined by either based on the absorbance or by visual turbidity.

Antioxidant activity

Antioxidant is a molecule that inhibits oxidation of other molecules. They donate electrons to free radicals, which neutralizes them and prevents them from causing

harm. Antioxidants are molecules that fight damage by free radicals, unstable molecules that can harm cellular structures. Oxidant such as Reactive oxygen species (ROS⁻), Hydroxy radical (ROO⁻), Nitrogen oxide (NO⁻) that damage the macromolecules such as proteins, lipids, enzymes and DNA. The DPPH assay is popular in natural product antioxidant studies. One of there as on is that this method is simple and sensitive. This assay is based on the theory that a hydrogen donor is an antioxidant. It measures compounds that are radical scavengers. The plant extract was treated with different concentrations.

Table 4. Concentration of plant extract

S. No	Stock plant extract [3 mg/mL]	Methanol	Concentration of extract
1	10 μ L	90 μ L	30 μ g
2	20 μ L	80 μ L	60 μ g
3	30 μ L	70 μ L	90 μ g
3	30 μ L	60 μ L	120 μ g
5	50 μ L	50 μ L	150 μ g
6	60 μ L	30 μ L	180 μ g
7	70 μ L	30 μ L	210 μ g
8	80 μ L	20 μ L	230 μ g
9	90 μ L	10 μ L	270 μ g
10	100 μ L	---	300 μ g

Table 5. Concentration of plant extract.

S. No	Reagent	Control	Test	Standard
1	Methanol	1950 μ L	1850 μ L	1850 μ L
2	Plant extract [3mg/mL]	-	100 μ L	-
3	Ascorbic acid [1mg/mL]	-	-	100 μ L
3	DPPH solution [2mg/mL]	50 μ L	50 μ L	50 μ L

All test tubes (10 Test samples, Control tube & Standard tube) incubated in the dark condition at room temperature for 20 mins. Then take the O.D values of all the 12 samples recorded at 517 nm using distilled water as blank in a spectrophotometer.

In vitro anticancer activities

Cell line

The human breast adenocarcinoma (MCF7) cell line was obtained from National Centre for Cell Science (NCCS), Pune.

MTT assay

The MTT assay is a Calorimetric assay for assessing the cell metabolic activity, that measures the reduction of yellow 3-(3,5-dimethylthiazol2-yl)-2,5-diphenyl tetrazolium bromide (MTT) by mitochondrial succinate dehydrogenase. The MTT enters the cells and passes into the mitochondria where it is reduced to an insoluble, coloured (dark purple) formazan product. The cells are then solubilized with an organic solvent (e.g. isopropanol) and the released, solubilized formazan reagent is measured spectrophotometrically. Since reduction of MTT can only occur in metabolically active cells the level of activities a measure of the viability of the cells.

Trypanblue assay

The dye exclusion test is used to determine the number of viable cells present in a cell suspension. It is based on the principle that live cells possess intact cell membranes that exclude certain dyes, such as trypan blue, Eosin, or propidium, whereas dead cells do not. In this test, a cell suspension is simply mixed with dye and then visually examined to determine whether cells take up or exclude dye. In the protocol presented here, a viable cell will have a clear cytoplasm whereas a nonviable cell will have a blue cytoplasm.

Results and Discussion

Preparation of plant material

The collected leaves of *Dodonaea viscosa* was washed with distilled water and shade dried in room temperature.



Fig. 6: a) Before dry plant leaves, b) After dried plant leaves (*Dodonaea viscosa*)

Preparation of plant material

Dried leaves were grounded into fine powder using

mortar and pestle or electric blender. The powdered leaf was weighed and stored in an air tight container or zip-lock cover for further studies.



Fig. 7: *Dodonea viscosa* leaves powder

Preparation of plant extracts

Leaf powder was extracted with Methanol and Chloroform by using Soxhlet apparatus. The plant extract was subjected to condensation process at 30°C to yield crude extract.

Soxhlet extractor

The plant sample can be extracted with the help of Soxhlet extractor by using Methanol and Chloroform solvents.

After extraction

The plant sample can be extracted, and the solvent can be evaporated, and it was stored in a refrigerator.

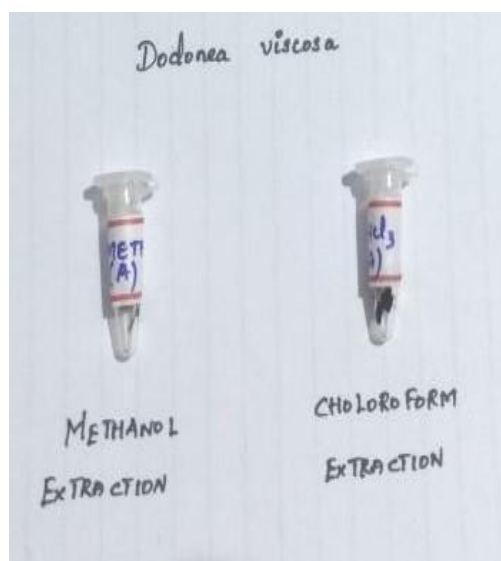


Fig. 8: Plant extracts transfer to Eppendorf tube.

Phytochemical analysis

The Phytochemical screening was performed to assess the qualitative chemical composition of plant sample of crude extract using commonly employed precipitation and coloration reactions to identify the major secondary metabolites like alkaloids, flavonoids, phenolic compounds, saponins, tannins and terpenoids. The phytochemical analyses were carried out using standard procedures. The extracts of *Dodonea viscosa* were screened for the presence of secondary metabolites. Terpenoids is the most suppressing anticancer compound of phytoconstituent. Terpenoids is present in chloroform plant extract and absent in methanol plant extract.



Fig. 9: a) Phytochemical Profile of *Dodonea viscosa* methanol extract, b) Phytochemical Profile of *Dodonea viscosa* chloroform extract.

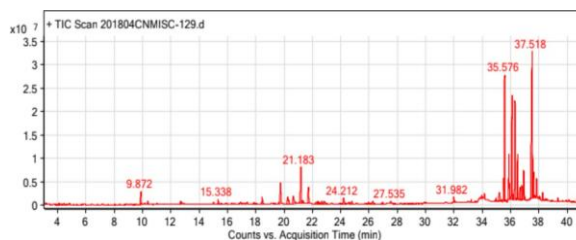


Fig. 10: a) GC-MS chromatogram of *Dodonea viscosa* chloroform extract

Table 6. Phytochemical profile of *Dodonaea viscosa* methanol extract.

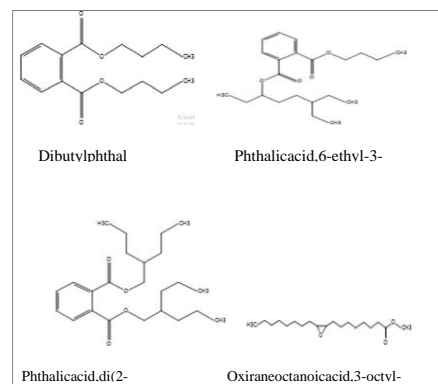
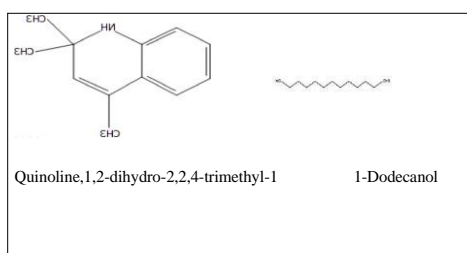
Test	Positive	Negative
Test for Phenol	+	
Test for Terpenoids	-	-
Test for Tannins	+	
Test for Flavonoids	+	
Test for Alkaloids	+	
Test for Saponins	+	
Test for Glycosides	-	-

Table 7. Phytochemical profile of *Dodonaea viscosa* chloroform extract.

Test	Positive	Negative
Test for Phenol	+	
Test for Terpenoids	+	
Test for Tannins	+	
Test for Flavonoids	+	
Test for Alkaloids		-
Test for Saponins	+	
Test for Glycosides		-

GC-MS analysis

GC-MS chromatogram analysis of the chloroform extract of *Dodonaea viscosa* showed six peaks which indicating the presence of five phytochemical constituents. On comparison of the mass spectra of the constituents with the NIST library, the five phytochemicals were characterized and identified. The various phytochemicals which contribute to the medicinal activities of the plant were shown. The mass spectra of all the phytochemicals identified in the chloroform leaf extract of *Dodonaea viscosa*. Of the five compounds identified, the most prevailing compounds were Phthalic acid, di(2-propylpentyl) ester, Dibutyl phthalate (25%), plasticizing compound (20%). Among the compounds, four compounds were reported to have antimicrobial activity and antioxidant activity was reported Quinoline, 1,2-dihydro- 2,2,3-trimethyl-, cytotoxicity activity in 1-Dodecanol.

**Fig. 11:** Structure of phytochemicals.**Table 8.** The absorbance value of *E. coli* and *S. aureus*

Concentration	Absorbance (595nm)	
	<i>E. coli</i>	<i>S. aureus</i>
Negative control	0.176	0.039
Positive control	0.386	0.195
32 µg/ml	0.208	0.083
16 µg/ml	0.227	0.097
8 µg/ml	0.236	0.098
3 µg/ml	0.232	0.119
2 µg/ml	0.238	0.108
1 µg/ml	0.267	0.130
0.5 µg/ml	0.288	0.135
0.25 µg/ml	0.350	0.163
0.125 µg/ml	0.325	0.165
0.0625 µg/ml	0.367	0.186

Table 9. The obtained MIC values of the drug against the organism based on absorbance.

Organism	MIC(µg/ml)
<i>E. coli</i>	>32
<i>S. aureus</i>	>32

Antimicrobial activity

Antimicrobial agent is an agent that can be killing microbes; the agent can be natural or artificial one and artificial agent (antibiotic) that does not kill all the bacteria. But natural agent like plant extract can be killed all the bacteria very effectively. *Dodonaea viscosa* is an effective antimicrobial agent against microorganisms. The absorbance values of the wells as follows: *E. coli* is a Gram negative bacteria and *S. aureus* is a Gram positive bacteria.

Based on turbidity

The lowest concentration at which there is visible reduction in the turbidity of the organism growth in the wells of the microtiter plate is considered as the MIC of the drug against that specific organism.

Table 10. The obtained MIC values of the drug against the organism based on turbidity

Organism	MIC(µg/ml)
<i>E. coli</i>	>32
<i>S.aureus</i>	32

DPPH assay

Antioxidant is a molecule that inhibits oxidation of other molecules. Oxidation is a chemical reaction that can produce free radicals leading to chain reaction that may damage the cells. Antioxidant is a group of substances to fight against cancer. It is preventing the onset of cancer during carcinogenesis and it can help to cells. The Antioxidant activity [% Scavenging] of each concentration calculated using the formula:

$$\% \text{Scavenging} = \frac{\text{Abs. of Control} - \text{Abs. of Test X}}{\text{Abs. of Control}} \times 100$$

Table 11. The Antioxidant activity [% Scavenging] against the organism.

Stock extract [10 mg/mL]	D.W	Conc. of extract	Absorbance	% Scavenging
10 µL	90 µL	100 µg	0.383	61.15%
20 µL	80 µL	200 µg	0.379	61.56%
30 µL	70 µL	300 µg	0.373	62.06%
30 µL	60 µL	300 µg	0.369	62.57%
50 µL	50 µL	500 µg	0.362	63.28%
60 µL	30 µL	600 µg	0.357	63.79%
70 µL	30 µL	700 µg	0.351	63.30%
80 µL	20 µL	800 µg	0.333	65.21%
90 µL	10 µL	900 µg	0.338	65.72%
100 µL	---	1000µg	0.330	66.53%
100 µL	---	-----	0.293	70.18%
----	---	-----	0.986	-----

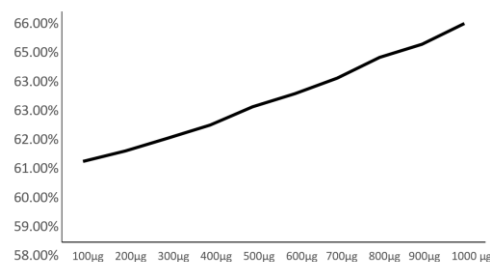


Fig. 12: Percentage of scavenging radicals.

MTT assay

MTT assay can measure the reduction of yellow 3-(3,5-dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide (MTT) by mitochondrial succinate dehydrogenase. The MTT assay measures cell viability based on the generation of reducing equivalents in metabolically active cells. Therefore, higher the absorbance measured the cell viability is higher. The percentage cell viability is calculated.

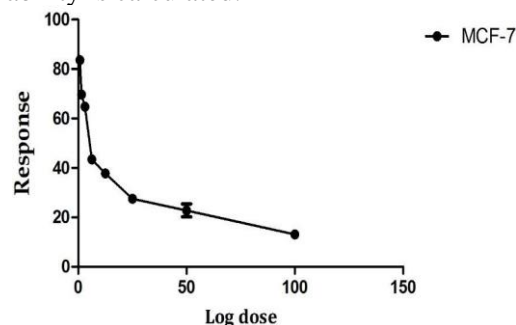


Fig. 13: MCF graph.

Table 12. Phytocomponents identified in the chloroform extract of *Dodonaea viscosa* by GC-MS.

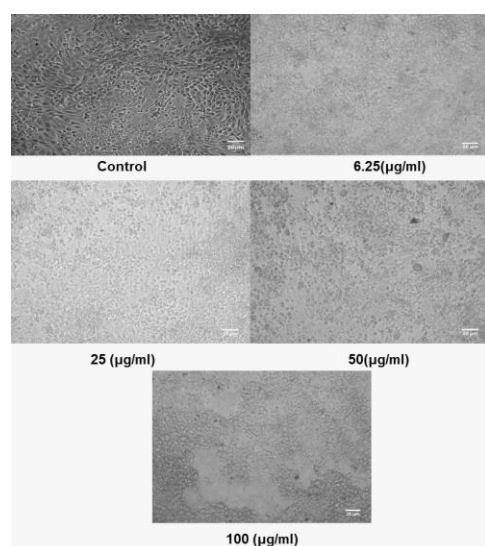
RT	Name of the compound	Molecular formula	MW	Peak area%
9.872	Quinoline, 1,2 di hydro 2,2,3-trimethyl-	C ₁₂ H ₁₅ N	173.259	5.73
10.367	1-Dodecanol	C ₁₂ H ₂₆ O	186.339	1.23
21.183	Dibutyl phthalate	C ₁₆ H ₂₂ O ₃	278.35	23.29
23.212	Phthalic acid, 6-ethyl- 3-octyl butyl ester	C ₂₂ H ₃₃ O ₃	362.51	3.25
31.982	Oxirane octanoic acid, 3-octyl-, methyl ester	C ₁₉ H ₃₆ O ₃	312.39	2.88
35.576	Phthalic acid, di (2- propyl pentyl) ester	C ₂₃ H ₃₈ O ₃	390.55	50.7

Table 13. Bioactivity of phytocomponents identified in the chloroform extract of *Dodonaea viscosa* by GC-MS.

RT	Name of the compound	Nature of the compound	Activity
9.872	Quinoline, 1,2-dihydro-2,2,3- trimethyl-	Acetone compound	Antioxidant activity
10.367	1-Dodecanol	Alcoholic compound	Cytotoxicity activity
21.183	Dibutylphthalate	Plasticizer compound	Antimicrobial activity
23.212	Phthalic acid, 6-ethyl-3-octyl butylester	Plasticizer compound	Antimicrobial activity
31.982	Oxirane octanoic acid, 3-octyl-, methyl ester	Fatty acid compound	Antimicrobial activity
35.576	Phthalic acid, di(2-propylpentyl) ester	Plasticizer compound	Antimicrobial activity

Table 14. MCF calculation.

Concentration ($\mu\text{g/ml}$)	% of cell death			Mean	SD	SEM	% Live cell
100	86.35	86.30	87.82	86.86	0.83	0.38	13.13
50	78.69	78.69	73.12	77.17	2.63	1.52	22.83
25	72.91	73.06	71.53	72.50	0.83	0.38	27.50
12.5	62.86	62.86	61.03	62.25	1.05	0.61	37.75
6.25	56.01	55.86	57.69	56.52	1.01	0.59	33.38
3.125	33.25	37.29	33.09	35.21	1.80	1.03	63.79
1.562	30.75	29.07	31.05	30.29	1.07	0.62	69.71
0.781	13.61	17.35	17.20	16.39	1.53	0.89	83.61
	IC₅₀	8.571					

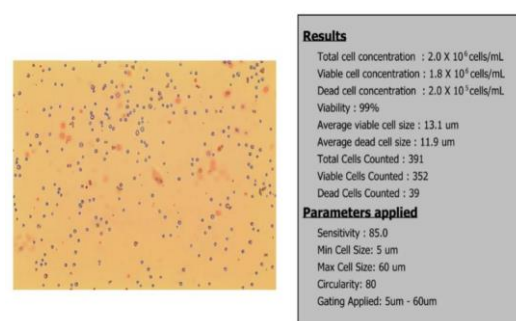
**Fig. 14:** Cytotoxicity of *Dodonaea viscosa* chloroform extract on Breast cancer cell line (MCF-7).

The IC₅₀ value is 8.571. The IC₅₀ value is most important value for anticancer activity and it can be denoted as viability of Breast cancer cell (MCF-7) by used *Dodonaea viscosa* chloroform extract. The graph can be plotted concentration vs % live cell as follows:

Trypanblue assay

Trypanblue assay used to determine the number of viable cells present in a cell suspension. This assay is used to count the MCF cell against the plant extract. This is major method used for cytotoxic activity against cancer cell.

The trypan blue dye exclusion can determine the cell viability and the viable cells counted with the help of Haemo cytometer. From the above result the total cell counted as 391 and the viable cell range is 352 while dead cell range is 39.

**Fig. 15:** Trypanblue viability test.

Conclusions

Cancer is most dangerous disease and it is an abnormal cell growth to invade the body tissues. *Dodonaea viscosa* has lot of medicinal property and it is used for traditional medicine. In this current study plant leaves were successfully collected and extracted with the help of Methanol and Chloroform. The chloroform extract showed maximum and major number of bioactive compounds in phytochemical analysis such as flavonoids, terpenoids, saponins, tannins, phenols. The chemical constituents have been identified from chloroform leaf extract of *Dodonaea viscosa* by Gas Chromatogram Mass spectrometry (GC-MS) analysis revealed the bioactive metabolites such as Quinoline, 1,2-dihydro-2,2,3-trimethyl- 1, 1-Dodecanol, Dibutyl phthalate, Phthalic acid, 6-ethyl-3-octyl butyl ester, Phthalic acid, di(2-propylpentyl) ester, Oxirane octanoic acid, 3-octyl-, methyl ester. The presence of various bioactive compounds justifies the use of leaf extract for various ailments by traditional practitioners. From the antibacterial assay it is confirmed that *Dodonaea viscosa* extract was very effective against *E.coli* and *Staphylococcus aureus* with their values >32. Antioxidant capacities were shown highest scavenging radicals in the concentration of chloroform extract based on the test performed is 100 μl . The MTT assay of *D.*

viscosa against MCF-7 cell line attained the IC50 value is 8.571. The trypan blue assay of cell viabilities of MCF-7 cell line was tested and 50% of dead cells was counted. The results of this study implied that *Dodonaea viscosa* has shown better antibacterial, antioxidant and anticancer activities which could be used in various therapeutic applications.

Conflict of interest statement

Authors declare that they have no conflict of interest.

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