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# Evaluation of Antioxidant and Antifungal Activity of the Whole Part of *Dactyloctenium aegyptium* Weed on Bengal Gram

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## ABSTRACT

**Background:** This study was conducted about the effectiveness of weed *Dactyloctenium aegyptium.* Weedsare familiar dominant, redundant, adverse and weed that contendwith sophisticated crop for water, nutrient and sunlight and another several reasons such as, high growth rate, high reproductive rate and produce harmful or beneficial allelopathical effect of cultivated crops. The stems of *Dactyloctenium aegyptium* are willowy, geniculate and leaves are found roughly.

**Methods:** This Investigation was done in 2018-19 to 2020-21. Different part of *Dactyloctenium aegyptium* as leaves and seed was taken from the near area of Sardar Vallabh Bhai Patel Agriculture and Technology University Modipuram Meerut. The samples were shade dry for 24 to 48 hours and then grind in the powder form. The extract were prepare in different organic solvent as Methanol, Ethyl acetate, Butyl alcohol, Benzene and Water at 1:10 ratio. Antioxidant activity of weed extracts by three methods named DPPH FRAP and ABTS methods.

**Result:** All part of this weed show effectiveness due to the presence of active compound, who responsible for the positive result. Extract mixed with media at a particular concentration *i.e.* 5%, 10% and 15% show effect on soil borne fungal phytopathogens and then over the surface of petriplate the growth was appear reduce when we increase the concentration of extract. At the end we conclude that the 15% extract concentration of both part of *Dactyloctenium* reduce the growth of all the soil borne fungal phytopathogens.

**Key words:** Antifungal, Antioxidant, *Dactyloctenium aegyptium*.

## INTRODUCTION

Jethro in 1731, apparentunusual time a term “Weed” as ‘a plant mounting where it is notdesired’ in his much revered book ‘Horse Hoeing Husbandry’. It is verycommon, prevailing and broaden in any cropfields. They widen like wildfire and developcopiously in the crop fields and impairment to thecore crop. These weeds are familiar dominant,redundant, adverse and weed that contendwith sophisticated crop for water, nutrient andsunlight and another several reasons such as,high growth rate, high reproductive rate andproduce harmful or beneficial allelopathicaleffect of cultivated crops (Qasem and Foy 2001).

Egyptian crowfoot grass (*Dactyloctenium aegyptium* (L.) is a short-lived and has different nature. It is 75 cm heights with ascending form stems,root are straight in lower node. The leaves are 3-25 cm long, 3-15 mm broad withroughly, succulent and crisp linear nature. At the apex, the stem isarranged in 2 to 6 unilateral, horizontal spikes.seed of *Dactyloctenium aegyptium are* angular andabout 1 mm long, wrinkled, brown in color. The shapes are look like crow’s foot, for this reason thename “Egyptian crowfoot grass” (Quattrocchi, 2006; Bogdan, 1977; Bartha, 1970). *Dactyloctenium aegyptium* is a multipurpose grass. It is a mainly used by all modules of ruminantsas silage. Inunproductive land it is valuable. (Bogdan, 1977; Bartha, 1970). The main utilization of *Dactyloctenium aegyptium*for the production of alcoholic beverages and also used by humans in periods of foodscarcity, fish toxin (Prota, 2013). *Dactyloctenium aegyptium* is native to Africa and widely distributed throughout the tropics, subtropics and warm temperateregions of the Old World (USDA, 2013; Manidool, 1992). It was initiated by Americas butin South America it isstretch as a weed inmaize and other crops (Bogdan, 1977). It usually occurs in disturbed areas (roadsides, fallows and wastelands), especially on sandy soils (beaches). It is found between sea level and an altitude of 2100 m, in areas with annualrainfall ranging from 400 to 1500 mm (Manidool, 1992; Skerman *et al*., 1990). In addition of N fertilizer *Dactyloctenium aegyptium* is adrought-resistant grasses, grow rapidly in alkaline, saline soils (Prota, 2013; Bogdan,1977), hastily alsoduring the wetseason (Skerman

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*et al.,* 1990). Plant extractsused to treat is therapeutic modality disease. Many pharmacological classes of drugs, as Aspirin, Atropine, Ephedrine, Dioxin, Morphine, Quinine, Reserpine and Tubocurarine are a few examples of drugs, originally discovered through traditional cures and folk knowledge of indigenous, citizens. It is scientifically proved that medicinal plants is of contain synergistic and/or side-effects neutralizing. Ethno pharmacology has already played an imperativerole in the development of predictable medicine and is likely to play more noteworthy role in the prospect (Hussan and Rahman 2005).

The metabolic extract of *Dactyloctenium Aegyptium* infatuated antibacterial activity against *Staphylococcus aureus* (ATCC 25953) (pathogenic bacteria) with MIC of 7.6-7.7 mg/ml and *Escherichia coli* with MIC of 6.5-7 mg/ml (Khan *et al.,* 2013). Other extract like n-hexane, ethyl acetate and n-butanol fractions of *Dactyloctenium aegyptium* parts were investigated against Gram positive and Gramnegative bacteria, fungal strains as [*Staphylococcus aureus* (RCMB 010028) and *Bacillis subtilis* (RCMB 010067)], [*Escherichiacoli* (RCMB 010052), *Pseudomonas aeruginosa* (RCMB 010043)], [*Aspergillus fumigates* (RCMB 02568) and *Candida albicans* (RCMB 05031)]. Some solvent like ethyl acetate was the most active against *C. albicans* and *E. coli* compared to other solvent. Some solvents (n-hexane) are inactive against all tested microorganism (Kayed *et al.,* 2015). Different solventsof*Dactyloctenium* aegyptium were studiedagainst some pathogenic bacteria *i.e*., *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *E.coli, Klebsiella pneumoniae and Proteus vulgaris* by disc diffusion method. In ethanol extract the highest percentage was measured against *Pseudomonas aeruginosa* and lowest percentage against *Proteus vulgaris, E.coli, Klebsiella pneumonia* (Jebastella and Reginald 2015). It alsoillustrates theantiviral activity against HSV-2, HSV-1 and HAV-10. Aerial extract of *Dactyloctenium aegyptium* was considered in cytopathic effect inhibition assay.Ethyl Acetate Solvent Uttered Antiviral activity,n-butanol expressedmodest antiviral against HAV-10 and HSV-1 butn-hexane extract showed strong antiviral activity against all viruses tested (Kayed *et al.,* 2015).

In the phytochemical analysis of *Dactyloctenium aegyptium* showed that it contained carbohydrates, proteins, amino acids, terpenoids, alkaloids, saponins, tannins, flavonoids, steroids, fixed oils and phenols. *Dactyloctenium aegyptium* obsessed antimicrobial, antioxidant, reproductive, cytooxic, antidiabetic and gastointestinal effects (Al snafi 2017).

Different Solvent of *Dactyloctenium aegyptium* as methanol, acetone, ethanol, n-propanol and water show TPC and antioxidant activity assays, the best extraction conditions were 80 ml methanol/g, 1.00% HCl, 180 min and 60°C, as well as the results of TPC, TFC and DPPH were 32.38 mg GAE/g, 20.88 mg QE/g and 82.22%, respectively. The TPC was positively observed to be correlated with TFC, DPPH and ATBS (r=0.89, 70 and 0.66, respectively) of koreeb seeds flour (KSF) extracts, under influence of solvent type extraction, whereas TPC and TFC were significantly correlated with DPPH ($0.97 \geq r \geq 0.94$) and ABTS ($0.95 \geq r \geq 0.94$) under the effect of extraction temperature (Ahmed *et al.,* 2020).

The n-hexane, ethyl acetate and n-butanol fractions of *Dactyloctenium aegyptium* was evaluated against human hepatocellular carcinoma cells (HepG-2), colon carcinoma cells (HCT-116) and breast carcinoma cells (MCF-7). The ethyl acetate and nhexane extracts were the most active extracts as cytotoxic agents against the tested cell lines with IC50 values from 6.1 to 9.6 μg/ml compared to that of n-butanol ( Esmail- Snafi 2017).

Antidiarrheal and antihyperglycemic activities of *Dactyloctenium* was also evaluated using castor oil-induced diarrhea and oral glucose tolerance test, respectively. In acetic acid-induced writhing test, the extract showed 52.18% and 62.40% inhibition of writhing at the doses of 200-400 mg/kg body weight, respectively while standard aspirin at the dose of 50 mg/kg bw showed 58.12% writhing inhibition. In anti-hyperglycemic test, the extract revealed its activity in a dose dependent manner. In antidiarrheal activity test, the extract exhibited 48.54% and 72.92% inhibition of defecation at the doses of 250-500 mg/kg bw, respectively whereas the standard loperamide (3 mg/kg bw) displayed 70.24% inhibition of defecation (Hoque *et al.,* 2019).

The antifungal and antioxidant effects of *Dactyloctenium aegyptium* was determine through extracts different concentration in basic media by applying radial methods. Whereas antioxidant activity of *Dactyloctenium aegyptium* was evaluated through different techniques, *i.e.,* DPPH assay, FRAP assay and ABTS aasay. In this research we are try to conclude that all parts showed good to satisfactory antifungal and antioxidant results and in future we try to replace chemical fungicides from natural fungicides made from weeds

## MATERIALS AND METHODS

This experiment was conducted 2018-19 to year 2020-21. Most of the work as isolation and culturing of fungal phypathogens, extract preparation, antifungal activity was performed in Shobhit Deemed University Meerut. In the near area of Sardar Vallabh Bhai Patel Agriculture and Technology University Modipuram Meerut. *Dactyloctenium aegyptium* is growing along with legume crops in a huge amount and this area is not so far from Shobhit University because of that we collect the different part of *Dactyloctenium aegyptium* as leaves and seed was taken from the Meerut region near (U.P.). The samples were wash property and surface sterilized, shade dry for 24 to 48 hours and then grind in the fine particle for further uses. Collected weed sample (converted as fine particle) used to convert in extract form by performing Soxhlet apparatus in different organic solvent at perticular boiling point The organic solvent we choose form extract preparation was Methanol(64.7°C), Ethyle acetate (77.1°C), Butyl alcohol(117.7°C), Benzene (80.1°C) and water (100°C) at a appropriate ratio *i.e* 1:10.

Bengal gram is a leguminous crop mainly grow in winter seasons. This crop not grow properly because of some disease as *Fusarium* wilt, color rot, root rot *etc* by the cause of some soil borne fungal phytopathogens. For this study we collect some infectious Bengal gram plant who show symptoms of these infectious disease from the near village of S.V.B.P.U.A and T. Modpuram Meerut with all proper precautions. After collection we cut the infected parts, take a small part and place on the upper solidify surface of PDA agar medium (basic medium for fungal growth). Incubate all the culture plate at well growth temperature *i.e.* 27°C for 24-72 hours. When the fungus was isolated on PDA medium, we identified these fungus under microscope on the basis of morphological characterstics and other properties and conclude that these isolated funguses were *Fusarium oxysporium, Rhizoctonia solani and Sclerotium rolfsii*. After that we culture these fungus in a pure form (slant) for future use.

The antifungal activity was resolute by radial methods (food poisoning). It is very effortless and usual method to resolve the effectiveness of fungal growth at different concentration The weed extracts at different concentration (5%.10% and 15%) were used beside the fungal phytopathogens *Fusarium oxysporium, Rhizoctonia solani and Sclerotium rolfsii*. Set up the PDA media including 5%, 10% and 15% extracts concentration of *Dactyloctenium aegyptium* leaves and seed respectively except control and then pour in the well labelled glass pertiplate and allow them to solidify each at room temperature. After solidification 5mm part of fungal pathogens from culture plate cut with cork borer and put in the surface of PDA medium plate (at inverted position for easily and fast growth) for further reaction. This process will occur in all plates in which weed extracts of different organic solvent as methanol, ethyl acetate, butyl alcohol, benzene and water and control also. After that incubate at plates 27°C for 24-72 hours and evaluate the fungal growth and compare with control.

The antioxidant activity of weed extracts was determined by three different methods different methods *i.e* DPPH, FRAP and ABTS. This objective was done in Defense Research and Development Organization (DRDO) Chandigarh in 2019. In DPPH methods- DPPH (2, 2-diphenyl-1-picryl-hydrazyl-hydrate) free radical manner is an antioxidant on electron-transfer based process that produces a violet way out in ethanol. This free radical, firm at room temperature, is compact in the existence of an antioxidant molecule, giving rise to colorless ethanol solution. Uses of the DPPH assay provide an effortless way to estimate antioxidants by spectrophotometer, so it can be constructive to assess various goods at a time.

Antioxidant activity percentage of (AA%) of each substance was assess by DPPH free radical assay. DPPH radical measurement scavenging activity was performed described by methodology Brand-Williams. The samples were reacted with the stable DPPH radical in an ethanol solution. The reaction mixture consisted of adding 0.5 ml of sample, 3 ml of absolute ethanol and 0.3 ml of DPPH radical solution 0.5 mm in ethanol. When DPPH reacts with an antioxidant compound, which can donate hydrogen, it is reduced. Color turn (from deep violet to light yellow) was recorded at 517 nm Absorbance after 100 min of reaction using a UV-VIS spectrophotometer (Brand-Williams *et al.,* 1995). By FRAP methods- The ferric reducing ability of studied plant materials was assessed following the method described by Benzie and Strain (Benzie *et al*., 1996). The final results were articulated and having ferric reducing ability equivalent to that of 1 mm $FeSO_4$, particularly expressed as mol Fe(II) equivalent/g sample in dry weight. In ABTS methods-Free radical scavenging activity of plant samples was determined by ABTS radical cation decolorization assay ABTS·+ cation radical was produced by the reaction between 7 mM ABTS in water and 2.45 mM potassium persulfate (1:1), stored in the dark at room temperature for 12-16 h before use. ABTS·+ solution was then diluted with methanol to obtain an absorbance of 0.700 at 734 nm. After the addition of 5µl of plant extract to 3.995 ml of diluted ABTS·+ solution, the absorbance was measured at 30 min after the initial mixing. An appropriate solvent blank was run in each assay (Pellegrini *et al.,* 1999).

## RESULTS AND DISCUSSION

*Dactyloctenium aegyptium* is a multi property weedy plant. All part of this weed show effectiveness due to the presence of active compound, who responsible for the positive result.

### Antioxidant test

Antioxidant activity measure by respectively methods like-FRAP, DPPH and ABTS patters. The overall result of antioxidant of all parts show in the given Table 1. *Dactyloctenium* stem show 67.10% antioxidant activity by FRAP method. *Dactyloctenium* root show 64.15% antioxidant activity by FRAP methods. *Dactyloctenium* seed show 59.71% antioxidant activity by FRAP method and

**Table 1:** Antioxidant activity of *Dactyloctenium aegyptium* by FRAP DPPH and ABTS (%) methods.

| Abbreviation of Samples | Full form of samples | FRAP (%) | DPPH (%) | ABTS (%) |
|---|---|---|---|---|
| DSt | *Dactyloctenium* Stem | 67.10 | 22.44 | 10.52 |
| DR | *Dactyloctenium* Root | 64.15 | 37.45 | 7.69 |
| DS | *Dactyloctenium* Seed | 59.71 | 39.97 | 9.87 |
| DL | *Dactyloctenium* Leaf | 41.17 | 44.55 | 9.35 |

FRAP- Ferric reducing ability of plasma, DPPH- Diphenylpicrylhydrazyl, ABTS 2,2'-Azino-bis(3-ethylbenzothiazoline-6-sulfonic acid.

*Dactyloctenium* leaf show 44.55% antioxidant activity by DPPH methods. Comparative analysis of seed, stem, root and leaf by FRAP, DPPH and ABTS was shown in Fig 1.

**Antifungal activeness**

Antifungal activity of *Dactyloctenium aegyptium* weed extract was measure by radial methods by using different parts, applying many organic solvent extract in different concentrations (5%, 10% and 15%). The observation revealed that the different extracts in the various solvent shows that all the extract inhibits the growth of the soil borne fungal phytopathogens. In case of *Dactyloctenium aegyptium* leaves the methanol extract at maximum concentration 15% howed up fungal growth 1.12E-01 of *Rhizoctonia solani* as compare to control 2.64E+00. Along with that ethyl acetate extract in increase concentration 15% showed up the fungal growth 4.11E-01 growth of *Sclerotium rolfsii* as compare to control 2.56E+00. Benzene extract of *Dactyloctenium aegyptium* leaves at 15% concentration showed up the growth 1.02E+00 growth of *Fusarium. oxysporium* as compare to control2.07E+00. Butyl alcohol extract of *Dactyloctenium* showed up the growth 0.00E+00 growth of *Sclerotium rolfsii*as compare to control 2.62E+00. Water extract of *Dactyloctenium* showed up the growth 1.32 E+00 Growth of *Sclerotium rolfsii* as compare to control *i.e.,* 2.45E+00 Table 2.

When we investigate the study about *Dactyloctenium* seed extract at different concentration (*i.e*., 5%, 10%, 15%). The methanol extract of *Dactyloctenium*seed at 15% concentration showed up the growth1.09E+00 growth of *Fusarium oxysporium as* compare to control *i.e.,* 2.67E+00. Ethyl acetate extract of *Dactyloctenium* showed up the

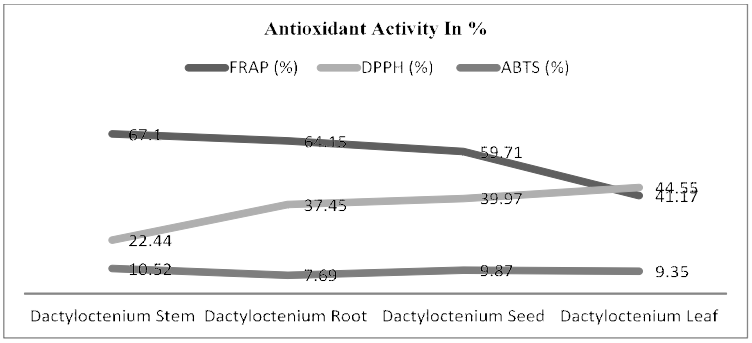


**Fig 1:** Graphical represent of antioxidant activity of *Dactyloctenium aegyptium.*

**Table 2:** Antifungal activity of *Dactyloctenium aegyptium* leaves extracts on fungal phytopathogens.

| Extracts | Concentration | Fungal phytopathogens (FP) | | |
|---|---|---|---|---|
| | | FP I- | FP II | FP III- |
| ME | 5% | 1.13E+00 | 3.53E-01 | 1.55E+00 |
| | 10% | 1.27E+00 | 1.75E-01 | 1.43E+00 |
| | 15% | 9.61E-01 | 1.12E-01 | 1.47E+00 |
| | C% | 2.61E+00 | 2.64E+00 | 2.57E+00 |
| EA | 5% | 1.02E+00 | 9.31E-01 | 7.25E-01 |
| | 10% | 9.69E-01 | 8.27E-01 | 5.93E-01 |
| | 15% | 8.84E-01 | 8.26E-01 | 4.11E-01 |
| | C% | 2.56E+00 | 2.69E+00 | 2.56E+00 |
| BA | 5% | 6.68E-01 | 5.86E-01 | 2.82E-01 |
| | 10% | 3.70E-01 | 4.60E-01 | 2.91E-01 |
| | 15% | 1.12E-01 | 1.12E-01 | 0.00E+00 |
| | C% | 2.41E+00 | 2.86E+00 | 2.62E+00 |
| BE | 5% | 9.26E-01 | 1.89E+00 | 1.32E+00 |
| | 10% | 1.12E+00 | 2.09E+00 | 1.17E+00 |
| | 15% | 1.02E+00 | 1.79E+00 | 1.12E+00 |
| | C% | 2.07E+00 | 2.32E+00 | 2.59E+00 |
| WA | 5% | 7.84E-01 | 2.51E+00 | 1.18E+00 |
| | 10% | 9.91E-01 | 2.55E+00 | 1.17E+00 |
| | 15% | 9.65E-01 | 2.52E+00 | 1.32E+00 |
| | C% | 1.63E+00 | 2.43E+00 | 2.45E+00 |

ME- Methanol, EA- Ethyl acetate, BA- Butyl alcohol, BE- Benzene, WA-W ater FP I- *Fusarium oxysporium,* FPII- *Rhizoctonia solani,* FPIII- *Sclerotium rolfsi.*

**Table 3:** Antifungal activity of *Dactyloctenium aegyptium*seedextracts on fungal phytopathogens.

| Extracts | Concentration | Fungal phytopathogens (FP) | | |
|---|---|---|---|---|
| | | FP I | FP II | FPIII |
| ME | 5% | 1.00E+00 | 2.20E+00 | 1.05E+00 |
| | 10% | 1.01E+00 | 2.12E+00 | 8.09E-01 |
| | 15% | 1.09E+00 | 2.05E+00 | 5.93E-01 |
| | C% | 2.67E+00 | 2.41E+00 | 2.49E+00 |
| EA | 5% | 7.75E-01 | 2.46E+00 | 1.54E+00 |
| | 10% | 8.23E-01 | 2.43E+00 | 1.54E+00 |
| | 15% | 9.02E-01 | 2.44E+00 | 1.17E+00 |
| | C% | 2.57E+00 | 2.30E+00 | 2.54E+00 |
| BA | 5% | 8.47E-01 | 2.31E+00 | 2.31E+00 |
| | 10% | 6.66E-01 | 2.29E+00 | 2.31E+00 |
| | 15% | 7.36E-01 | 2.26E+00 | 2.31E+00 |
| | C% | 1.94E+00 | 2.12E+00 | 2.26E+00 |
| BE | 5% | 8.68E-01 | 1.05E+00 | 1.51E+00 |
| | 10% | 7.82E-01 | 7.66E-01 | 8.39E-01 |
| | 15% | 7.75E-01 | 8.91E-01 | 7.66E-01 |
| | C% | 2.32E+00 | 2.23E+00 | 2.42E+00 |
| WA | 5% | 7.97E-01 | 1.90E+00 | 7.12E-01 |
| | 10% | 8.58E-01 | 1.93E+00 | 7.85E-01 |
| | 15% | 1.16E+00 | 1.83E+00 | 7.85E-01 |
| | C% | 2.20E+00 | 2.29E+00 | 2.08E+00 |

M- Methanol, EA- Ethyl acetate, BA- Butyl alcohol, BE- Benzene, W-W ater FP I- *Fusarium oxysporium,* FPII- *Rhizoctonia solani,* FPIII- *Sclerotium rolfsi.*

growth 1.17E+00 growth of *Sclerotium rolfsi* as compare to control *i.e.,* 2.54E+00. Butyl alcohol extract of *Dactyloctenium* showed up the growth 2.26E+00 growth of *Rhizoctonia solani* as compare to control *i.e.* 2.86E+00. Benzene extract of *Dactyloctenium* showed up the growth 7.66E-01 growth of *Sclerotium rolfsii* as compare to *i.e.*, 2.42E+00. Water extract of *Dactyloctenium* showed up the growth 1.16 E+00 growth of *Fusarium oxysporium* as compare to control *i.e.,* 2.20E+00 Table 3.

The data showed that we increase the concentration of every or all extract in a particular ration, the fungal growth was reduce but in some cases it increase the fungal growth as compare to control in culture plate. Extract mixed with media at a particular concentration *i.e*., 5%, 10% and 15% show effect on soil borne fungal phytopathogens and then over the surface of Petri plate the growth was appear reduce when we increase the concentration of extract. Along with that some other weeds extracts *viz., Salix sp., Achyranthus aspera, Solanum nigrum, Parthenium hysterophorus, Datura fastusa, Melilotis alba, Lantana camara* and *Achyranthus aspera, Datura, Parthenium, Achyranthus, Salix sp. and Physallis minima* were found most effective against phytopathogenic fungus (Jaskaran Singh *et al.,* 2017).

## CONCLUSION

On the behalf of overall result and discussion we conclude that not only *Dactyloctenium aegyptium,* but also some more weeds can also effect or reduce the growth of fungal phytopathogen at an appropriate concentration.

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