Peer Reviewed Refereed Journal ISSN : 2278 – 5639
Global Online Electronic International Interdisciplinary Research Journal (GOEIIRJ)
{Bi-Monthly} Volume – XIII Issue –VI November – December 2024

Synthesis of10-[3-(4-Methyl-1-piperazinyl) propyl]-2-(trifluoro methyl)-10 H- phenothiazine and its effects on Plant GrowthProfile

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ABSTRACT

Antipsychotic drug Trifluoperazine have been synthesized from2-trifluromethyl phenothiazine.Effect of this synthesized compound and their complexes were studied on plant profile of Digera Muricata. Present investigation deals with the impact of heavy metals and their complexes on to improve the yield of economically important plant Digera Muricata.The seeds were immersed in Drug, complex and (III) ions, to study the germination and growth pattern and certain physiological processes.The data harvested indicates increased germinations in all seed treatments. The changes in growth pattern of roots and shoots are observed in the experimental plant Digera Muricata.

Key words: Trifluoperazine hydrochloride, Fe (III), Plant *Digera Muricata*.

Introduction

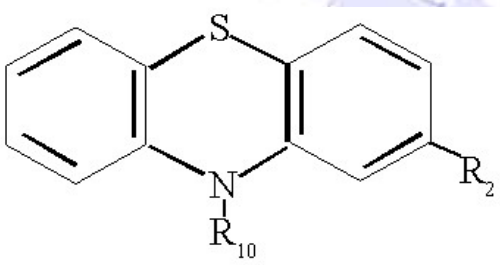
Pharmacology is the science that deals with drugs. Pharmacodynamics is the quantitative study of biological and therapeutic effects of drugs. It also elucidates the mechanism of action of drug and may correlate the drug actions with their chemical structure.Pharmacokinetics is the study of absorption, distribution, metabolism and excretion of drugs and their relationship or pharmacological response.

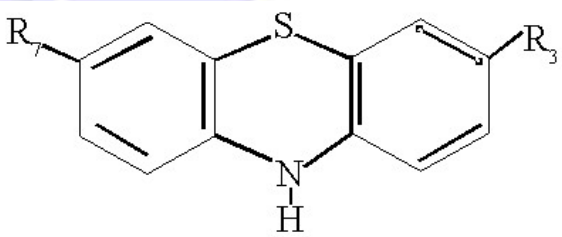
Drugs molecules act as signal transfer agent within the plant, among plants, or between plants and other organisms. They usually act at very low concentrations to regulate biochemical processes such as the formation of flowers, stems, and leaves; the shedding of leaves; and the development of fruits.

Drug action has been widely recognized to be the ultimate consequence of physicochemical

interactions between the drug and functionally important molecule in the living organism known as receptors. Drug action is related to drug interaction with receptor site of the living system, followed by the change in the biological process present before the drug administration. The physicochemical properties of the drugs are due to specific nature of the structure of the drugs which favor absorption and distribution to increase the drug concentration and specific orientation of the receptor site.

Phenothiazines is an organic compound that occurs in various antipsychotic and antihistaminic drugs. It plays a vital role owing to their wide range of biological activities. Phenothiazines belongs to a class of heterocyclic compounds characterized by tricyclic aromatic rings with sulphur and nitrogen atoms and substituent in 2- and 10 - or 3- and 7- positions. Phenothiazine derivatives substituted in 2-and 10-positions[1] are commonly used as psychotropic, anticholinergic and antihistaminic drugs.



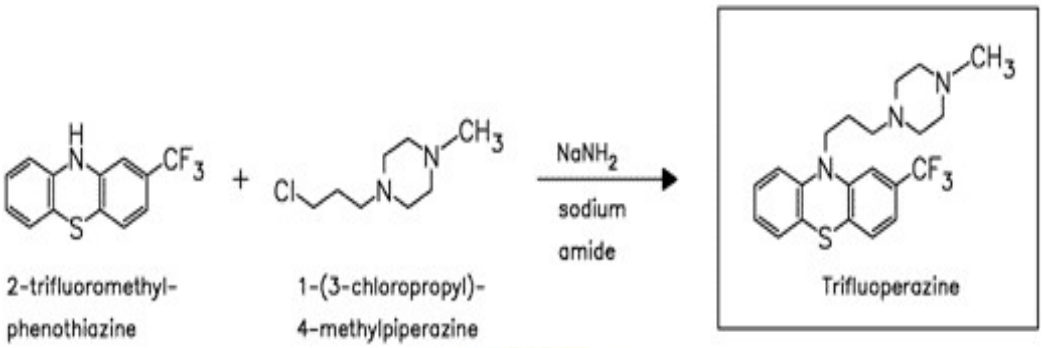


Phenothiazines are employed in pre-anaesthetic medication and are a useful muscle relaxant in the treatment of tetanus. Phenothiazines are also used in veterinary therapeutics as antiparasitic slow release tablets for the treatment of animal fascioliasis, respiratory and digestive strongylosis and cestodiasis.[2]

EXPERIMENTAL

Method of synthesis:

2-trifluoromethyl phenothiazine reacted with 1-(3-chloropropyl)-4- methyl piperazine in presence of sodium amide and solvent DMF, it was refluxed for the five hours, cooledand was added to ice cold water, extracted with ethyl acetate and passed over dry HCl gas and filtered. The product was recrystallized with water and methanol.



The structure of synthesized compound has been confirmed by elemental analysis, IR and ^{1}H NMR spectral data.Trifluoperazine dihydrochloride also known as Espazine and is one of the most potent phenothiazine tranquillizers.Worldwide use has proved its efficiency in the treatment of psychoses, especially chronic and acute schizophrenia.

AGRICULTURAL STUDIES:

Plant physiology assume an increasingly important role in agricultural research problems. As world population increases, mankind faces enormously complex problems. Their solutions will require input from many sources- social, economic, technological and agricultural. One of the primary task of the future will be to increase food, forage, fiber, and wood production substantially throughout the world. Future agricultural research programme will continue, as in the present, to have as their major goals the production of new and better varieties and strains of crop plants, the improvement of plant protection against insects, diseases and weeds, the control of soil fertility and an increase in mechanization efficiency. But in addition, there will be a sharp intensification of demands of plant physiologists not only to supply basic information regarding how plants grow and develop but also to undertake research programmes designed specifically to increase yields of plants product.

One of the important contributions of the nineteenth century experimental plant physiology to agriculture was to improve the soil fertility and adding several nutrients to the soil could increase crop yields. Agricultural scientists realize that crop plants grow in production to the amounts of various nutrients present in soils. Today the application of various salts to soils is a basic future of agricultural practice. In modern agricultural practice, various chemicals in solution or aqueous suspension are sprayed on the crop plants within the object of accelerating and modifying the plant growth and development.

Since Trifluoperazine hydrochloride has intense biological activities and no work is

reported on the biological application of binary complexes of Fe (III) with TFPand comparing with pure Drug, metal and control solution to study the effect of Drug, complex, metal and control solution on germination, survival seedlings height etc, on *Kunjar* (*Digera Muricata*) plant in order to make suggestion whether Drug, complex and metal can be used as a plant growth regulator. *D. muricata*is considered as a famine food[3] because ofrich source of nutrients[4].The leaves are used for treatment of diabetic[5].The flowerandseeds are usedto treaturinarydischarges[6].

MATERIAL AND EXPERIMENTAL METHODS:

The solution of Fe (III) in the form of nitrate and TFP of the concentration of 0.01 M was prepared in double distilled water.The applications of Drug, complex and metal solution are studied by dissolving it in proper solvent at 4.00, 7.00 and 10.5 pH and at constant ionic strength of 0.01 M potassium nitrate solution.

Fertilized soil was collected from agricultural land. It was then grinded and filtered. This soil was filled in two wooden trays and tray was moistened with water. Sowing of seeds was done in the soil after one hour.

EXPERIMENTS PERFORMED:

In general practice various chemicals are used in agriculture as an ingredient of various pesticides, insecticides, fertilizers etc, to improve the crop yield. Amongst several economical important plants *Kunjar*(*DigeraMuricata*) are selected as a plant system.

50 healthy seeds of *Digera Muricata*were taken and soaked in 4.00, 7.00 and 10.5 for about five hours. These soaked seeds were taken out of each solution and sowed in the wooden tray in a row, the wooden tray was kept under atmospheric pressure at room temperature.

PARAMETERS:

Plant growth is decided on the basis of parameter such as percentage of germination, survival, seedling height, shoot length; root length and thickness of young leaf having high values compare to control systems. Germination was noted after fourdays and survival were noted after 10 days. After noting the survival of plant, they were taken out of soil. The seedling height and thickness of leaves of survived plants were measured.

Table 1.1

Effect of Drug, Complex and Metal ion on Germination, Survival, Seedling height etc. on *Digera Muricata* Test System.

Test System	Effect of	pH	Parameters						
			% Germination after 4days	% Survival after 10 days	Seedling height (cm)	Root length (cm)	Shoot length (cm)	Root / Shoot	Width of young leaf (cm)
DigeraMuricataTest System	Water (Control)	4.00	62.25	74.00	23.172	8.624	13.586	0.6347	2.121
		7.00	66.66	77.66	22.920	8.548	13.756	0.6214	2.162
		10.5	69.33	79.00	22.980	8.710	13.882	0.6274	2.201
	Drug-TFP	4.00	72.25	80.00	24.984	8.410	13.926	0.6039	2.244
		7.00	74.00	86.66	25.240	8.625	13.956	0.6180	2.286
		10.5	80.20	82.00	25.640	8.824	13.970	0.6316	2.304
	Complex	4.00	63.00	66.25	23.550	8.204	13.112	0.6256	2.310
		7.00	63.25	67.00	23.920	8.220	13.325	0.6268	2.342
		10.5	64.50	67.00	23.980	8.305	13.540	0.6133	2.356
	Metal Fe (III)	4.00	80.00	80.25	25.112	8.360	13.840	0.6040	2.358
		7.00	80.50	84.66	25.250	8.410	13.880	0.6059	2.372
		10.5	83.00	84.66	25.740	8.450	13.910	0.6074	2.384

RESULTS AND DISCUSSION:

Germination starts when the seed shows emergence phase of growth, which, begins, with penetration of embryo from the seed coat and end with the development of root and shoot system. Elongation of shoot axis follows emergence of radical.

The rate and extent of elongation is subjected to the variety of controls, including nutrition, hormones and environmental factors. Though the root and shoot development start within a fraction of time but the further developments may vary according to the nutrients required for the development of root and shoot independently. Therefore, root and shoot length differs. The observation table clearly indicates that the seedling height is increased at all pH in control as compared to metal,drug (TFP)and complex. Also, the average root and shoot length in Drug,

complex and metal at all pH shows variations over control for *Digera Muricata* plant system.

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