

# Study the effect of Microwave Assisted Synthesized 2-(substitutedphenyl)-3-phenylthiazolidin-4-one Derivative on various seeds.

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## ABSTRACT

*The microwave assisted synthesized 2-(substitutedphenyl)-3-phenylthiazolidin-4-one (IIa-IIe) derivatives have been screened for Seed germination activities on Vigna aconitifolia (matki), Glycine max (Soyabean), Cicer arietinum (Chana), Pisum sativum (Pea). At preliminary biological studies the synthesized compounds have shown growth stimulant properties on Vigna aconitifolia (matki), Glycine max (Soyabean), Cicer arietinum (Chana), Pisum sativum (Pea). The synthesized compounds show significant effect on seed germination activities. It also shows observable effect on the size of radicle and plumule.*

**Keyword - Condensation, Microwave irradiation, Growth stimulant properties, Seed germination, Growth Stimulant Activity.**

## 1. INTRODUCTION

Thiazoles are a class of organic compounds related to azoles with a common thiazole functional group. Thiazole is an aromatic, heterocyclic organic compound that has five membered molecular rings structure C<sub>3</sub>H<sub>3</sub>NS. Thiazoles are also important class of heterocyclic compounds, found in many potent biologically active molecules such as Sulfathiazol (antimicrobial drug), Ritonavir (antiretroviral drug), Abafungin (antifungal drug) with trade name of Abasol cream and Bleomycine and Tiazofurin (antineoplastic drug). P. V. Raut and et al<sup>2</sup> reported the effect some sulphur and nitrogen containing heterocyclic compounds on germination pattern of jowar and chickpea. C.M. Dwivedi and et al<sup>3</sup> reported *in-vitro* screening effect of potential anticancer chemical (purine and pyrimidine analogues) on *Cicer arietinum* seed germination. Dipesh P. Mahajan<sup>4</sup> reported synthesis, characterization and plant growth regulator activities of thiourea derivatives of substituted 2-aminothiazoles. V.A. Pivazyan and et al<sup>5</sup> reported synthesis and study of growth stimulant properties of 2-Acetyl-3,7-dimethyl-5H-thiazolo[3,2-a]pyrimidin-5-one derivatives. Irina-Claudia Alexa and et al<sup>6</sup> reported study of effect of two heterocyclic compounds like chromanone and thiazole on growth and development of *Ocimumbasilicum* L. and *Echinacea purpurea* L. species. The infusion of growth regulators in solvent through seed coats and into the cotyledons of various seeds was demonstrated quantitatively by Tao and Kahn<sup>7</sup>.

## 1.1 Materials and Methods

### Experimental method of preparation of 2-(substitutedphenyl)-3-phenylthiazolidin-4-one (II<sub>a</sub>-II<sub>b</sub>):-

A Target compounds have been synthesized by microwave irradiation of the mixture of substituted aniline (0.01M), aldehyde (0.01M), and thioglycolic acid (0.01M) in presence of catalyst on medium power for appropriate time. After irradiation of the reaction mixture was cooled to room temperature and poured over crushed ice, filtered out and crystallized in ethanol as a solid with maximum yield and appropriate melting point<sup>1</sup>.



Ph: - C<sub>6</sub>H<sub>5</sub> [II<sub>a</sub>], C<sub>6</sub>H<sub>4</sub>NO<sub>2</sub> [II<sub>b</sub>], C<sub>6</sub>H<sub>4</sub>Cl [II<sub>c</sub>], C<sub>6</sub>H<sub>3</sub>Cl<sub>2</sub> [II<sub>d</sub>], C<sub>6</sub>H<sub>5</sub>O [II<sub>e</sub>]

## 2. GROWTH STIMULANT PROPERTIES

### 2.1 Seed infusion

For seed infusion, five dry seeds of each *Vigna aconitifolia* (Matki), *Glycine max* (Soyabean), *Cicer arietinum* (Chana), *Pisum sativum* (Pea) were immersed for 30 minutes in water then mixed with powdered form of synthesized compounds II<sub>a</sub> and II<sub>b</sub> which were designated as treated. Similarly, five dry seeds of each *Vigna aconitifolia* (Matki), *Glycine max* (Soyabean), and *Cicer arietinum* (Chana), *Pisum sativum* (Pea) were immersed for 30 minutes in water respectively (control seeds). Compound required to treated seeds were 10mg.

### 2.2 Lab experiments

The Procedure used for seed germination was petri plate method. These methods carry out at room temperature with the help of blotting paper, cotton and petri dish. Take germination paper (blotting paper) and prepare round pieces as per inner diameter of petri dishes. Place a cotton wool at the bottom of the dish and cover the piece of blotting paper, add water till paper become wet and removes excess of water from the dish. Put fives treated seeds of *Vigna aconitifolia* (Matki) in one petri dish and cover petri dish with the lid, place it in incubator at appropriate temperature. Make two more replication of this petri dish to avoid any consequences. Put five untreated seeds of *Vigna aconitifolia* (Matki) in another petri dish as a control and place in incubator. Same procedure repeated with the remaining sample of *Glycine max* (Soyabean), *Cicer arietinum* (Chana), *Pisum sativum* (Pea). Average length of radicles and plumules were observed after 24hrs, 48hrs, 72hrs, 96hrs, 120hrs. Observed data were recorded. The data obtained was subjected to analysis of percentage germination and growth parameters.

## 3. RESULT AND DISCUSSION

### Growth Stimulant Activity:-

Growth stimulant activities of newly synthesized 2,3-diphenylthiazolidin-4-one (II<sub>a</sub>) and 2-(4-nitrophenyl)-3-phenylthiazolidin-4-one (II<sub>b</sub>) derivatives on *Vigna aconitifolia* (Matki), *Glycine max* (Soyabean), *Cicer arietinum* (Chana), *Pisum sativum* (Pea) seeds have been determined by seed infusion method and the percentage of seeds germination and growth of plumule and radicle have been mentioned in table. Thiazole derivatives 2,3-diphenylthiazolidin-4-one (II<sub>a</sub>) and 2-(4-nitrophenyl)-3-phenylthiazolidin-4-one (II<sub>b</sub>) have been stimulated growth of plumule, radicle and also improved germination percentage of seed as mentioned in table 1.

**Table-1** Effect of newly synthesized compound on seed Germination *Vigna aconitifolia* (Matki), *Glycine max* (Soyabean), *Cicer arietinum* (Chana), *Pisum sativum* (Pea)

Compounds	Control % Germination	Treated seeds % Germination	Avg. radicle length (cm)	Avg. plumule length (cm)
Effect of newly synthesized compound on seed germination (Matki)				
IIa	75	81	5.5	4.9
IIb		90	5.6	7.9
Effect of newly synthesized compound on seed germination (Soyabean)				
IIa	70	86	5.4	6.8
IIb		90	3.4	5.7
Effect of newly synthesized compound on seed germination Cicer arietinum (Chana)				
IIa	75	85	5.3	4.3
IIb		94	5.5	4.5
Effect of newly synthesized compound on seed germination Pisum sativum (Pea)				
IIa	75	84	5.2	4.7
IIb		87	5.4	4.4

#### 4. CONCLUSIONS

The compound 2, 3-substitutedphenylthiazolodin-4-one(IIa-IIb) of high medicinal value have been synthesized with green protocol under microwave in maximum yield. Newly synthesized 2, 3-substitutedphenylthiazolodin-4-one (IIa) and 2-(4-nitrophenyl)-3-phenylthiazolidin -4-one (IIb) derivatives have been successfully shows growth stimulant properties on *Vigna aconitifolia* (Matki), *Glycine max* (Soyabean), *Cicer arietinum* (Chana), *Pisum sativum* (Pea) seeds. The percentage of seeds germination has been increased along with the average size of plumule and radicle. 2-(4-nitrophenyl)-3-phenylthiazolidin -4-one (IIb) shows more prominent growth stimulant activities as compared to 2, 3-substitutedphenylthiazolodin-4-one because of the nitro group substituent in the structure of thiazolidinone skeleton.

#### 5. REFERENCES

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