



## PROPOSAL DETAILS

( CRG/2022/004512 )

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PRR & VS Government College

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### Technical Details :

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|--|--|---------------------------|---------------|
| <b>Scheme :</b>  | Core Research Grant                                  |                           |               |
| <b>Research Area :</b>                                       | Biomedical and Health Sciences (BHS) (Life Sciences) |                           |               |
| <b>Duration :</b>  | 36 Months  | <b>Contact No :</b>       | +919440079415 |
| <b>Date of Birth :</b>                                       | 28-May-1979  |                           |               |
| <b>Nationality :</b>   | INDIAN   | <b>Total Cost (INR) :</b> | 39,69,000     |
| <b>Is PI from National Laboratory/Research Institution ?</b> | No   |                           |               |

### Project Summary :

Most people infected with the virus will experience mild to moderate respiratory illness and recover without requiring special treatment. However, some will become seriously ill and require medical attention. Older people and those with underlying medical conditions like cardiovascular disease, diabetes, chronic respiratory disease, or cancer are more likely to develop serious illness. Anyone can get sick with CORONA and become seriously ill or die at any age. Till know 43,035,271 corona cases are reported worldwide out of this 521,695 corona patients are died and 42,502,454 patients are recovered. Hence there is need to study the viral related diseases. Newcastle disease virus (NDV) is a virus that causes a deadly infection in many kinds of birds. In humans, NDV causes mild flu-like symptoms or conjunctivitis. Like other viruses, NDV infects cells (called host cells) and then uses those cells to replicate (make copies of) itself. Researchers are interested in NDV because it replicates itself more quickly in human cancer cells than in most normal human cells and it can kill the host cells. For these reasons, the virus is being studied as a treatment for cancer. Significance of the Present Study : Despite the great progress made in the field of viral research, but no effective drugs has come in to the market to cure viral related diseases. Although a lot number of allopathic drugs made available in the market, but the use of these drugs have complicated effect on hepatic, renal, cardiac functions. So, herbal remedies are used to cure viral diseases. Therefore, more scientific research is needed to clarify the effects of many herbal drugs and its protective effects. Hence the present research study was designed for identification and evaluation of anti-viral activity, anti-oxidant and immunological effect of Indian spices bioactive compounds in NDV virus infected chicks. To Asses the anti-viral activity of Indian spices. To Study the pathological role of Indian spice bioactive compounds on Hepatic and Cardiac antioxidant enzymes To study the effect of ginger bioactive compounds on apoptotic markers Estimation of PCR markers To Monitor the some of the liver and cardiac marker enzymes To Exemplify the role of Indian spice bioactive compounds on oxidative stress markers in NDV virus infected chicks. Radical Estimation by Spintrop Method (ESR Technique) To see the impact of Indian spices on pathological profiles by Histopathological studies Drug discovery by BLAST.

### Objectives :

- To Asses the anti-viral activity of Indian spices in NDV virus infected chicks. To Study the pathological role of Indian spice bioactive compounds on Hepatic and Cardiac antioxidant enzymes in NDV virus infected chicks. To study the effect of ginger bioactive compounds on apoptotic markers in NDV virus infected chicks. Estimation of PCR markers in NDV virus infected chicks. To Monitor the some of the liver and cardiac marker enzymes in NDV virus infected chicks and also after treatment with Indian spice bioactive compounds. To Exemplify the role of Indian spice bioactive compounds on oxidative stress markers in NDV virus infected chicks. Radical Estimation by Spintrop Method (ESR Technique) To see the impact of Ginger on pathological profiles by Histopathological studies Drug discovery by BLAST.

### Keywords :

NDV Virus, Chicks, Immunological parameters, Antioxidant enzymes, PCR Markers,

### Expected Output and Outcome of the proposal :

Our findings would suggest that bioactive compounds of Indian spices like ginger, garlic and cinamonum will play thereaupatic potential against viral related diases like NDV in chicks and also it will be useful to treat virus related diseases in humans also. Overall, the current investigation would highlight a potential clinical utility of Indian spices bioactive compounds for inhibition of virus related disorders. The proposed research studies are expected to reveal the complications of NDV virus disease and the role of bioactive compounds of Indian spices. Our future studies will focus on the mechanism of the bioactive compounds of other medicinal plants in other viruses. The present work would be formed as a baseline data to help viral related diseases. This project mainly aims at exploring the effect of bioactive compounds of Indian spices with multidisciplinary approach, which may be used as template for the development of new drugs for the treatment of virus related diseases in humans.

### Any other relevant information:

None

### Suitability of the proposed work in major national initiatives of the Government:

Make in India, Innovate India

### Theme of Proposed Work:

Health, Environment

### Collaboration Details for last 5 Years :

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**Planned Collaboration for the proposed work with any foreign scientist/ institution ?**

**No**

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## Other Technical Details

### 1. Origin of the Proposal: *(Maximum 1 page)*

#### **Studies on the Therapeutic potential of Indian spices in Virus intoxicated chicks: A study with reference to immunological studies and drug discovery**

A virus is a submicroscopic infectious agent that replicates only inside the living cells of an organism. Viruses infect all life forms, from animals and plants to microorganisms. Common human diseases caused by viruses include the common cold, influenza, chickenpox and cold. Many serious diseases like Rabies, Ebola virus disease, AIDS (HIV), avian influenza, SARS, Newcastle disease virus (NDV) and CORONA are caused by viruses.

Most people infected with the virus will experience mild to moderate respiratory illness and recover without requiring special treatment. However, some will become seriously ill and require medical attention. Older people and those with underlying medical conditions like cardiovascular disease, diabetes, chronic respiratory disease, or cancer are more likely to develop serious illness. Anyone can get sick with CORONA and become seriously ill or die at any age. Till know 43,035,271 corona cases are reported worldwide out of this 521,695 corona patients are died and 42,502,454 patients are recovered. Hence there is need to study the viral related diseases.

Newcastle disease virus (NDV) is a virus that causes a deadly infection in many kinds of birds. In humans, NDV causes mild flu-like symptoms or conjunctivitis. Like other viruses, NDV infects cells and then uses those cells to replicate (make copies of) itself. Researchers are interested in NDV because it replicates itself more quickly in human cancer cells than in most normal human cells and it can kill the host cells.

**Significance of the Present Study :** Despite the great progress made in the field of viral research, but no effective drugs has come in to the market to cure viral related diseases. Although a lot number of allopathic drugs made available in the market, but the use of these drugs have complicated effect on hepatic, renal, cardiac functions. So, herbal remedies are used to cure viral

diseases. Therefore, more scientific research is needed to clarify the effects of many herbal drugs and its protective effects.

Hence the present research study was designed for identification and evaluation of anti-viral activity, anti-oxidant and immunological effect of Indian spices ginger, garlic and cinnamomum bioactive compounds in NDV virus infected chicks.

## 2. Review of status of Research and Development in the subject

### 2.1 International Status: *(Maximum 2 pages)*

- The new millennium has witnessed the emergence of a modern pandemic with frightful consequences to the health of humans worldwide.
- In recent years considerable progress has also been made in many countries towards identifying active factors from indigenous medicinal plants for different human ailments and documentation of propensity for antioxidant activity on virological studies.
- Medicinal plant-based drugs have the added advantage of being simple, effective, and offering a broad spectrum of activity with well-documented prophylactic or curative actions. Medicinal plant products have also proved useful in minimizing the adverse side effects of various viruses.
- The World Health Organization (WHO) has estimated that the present demand for medicinal plants is approximately US \$14 billion per year. The demand for medicinal plant-based raw materials is growing at the rate of 15 to 25% annually, and according to an estimate of WHO, the demand for medicinal plants is likely to increase more than US \$5 trillion in 2050.
- In recent years considerable progress has also been made in our country towards identifying active factors from Indian spices for different human ailments and viral studies.
- Experimental reports have indicated ginger, garlic and cinaamonum have protective effects against genotoxicants, chemical carcinogens, ischaemic cerebral injury, ischaemia-reperfusion. Moreover, Indian spices have hepato-protective, immuno-modulatory, antiulcer, anti-diabetic, anti-hypercholesterolaemic, chemoprotective, antitussive, anti-inflammatory, wound healing, anti-tumorigenesis, anti-helminthic, antibacterial, anti-viral and anti-stress effects.

- **The research literature reveals that NDV virus damages trachea, digestive system, respiratory system, liver and heart. Indian spices like ginger, garlic and cinamonmum have many pharmacological properties. But till date there were no clear cut studies on NDV infected chicks with reference to imuunumological studies, antioxidant enzymes oxidative stress markers, apoptosis markers and PCR Markers (Gene Expression Studies). Hence, the present proposal was initiated to screen the antiviral and antioxidant and immunological effect of Indian spices in NDV virus infected chicks.**

#### **National :**

- India also faced many problems with CORONA from 2020 to till date. So viral related studies are important to know the anti-viral properties of medicinal plants in animals and humans.
- Newcastle disease virus (NDV) is the causative agent of Newcastle disease (ND), which is one of the most highly contagious diseases in chickens, and result in severe economic losses to the poultry industry worldwide.
- Therapeutic applications of spices like ginger, garlic cinamonam are simple, effective, and offering a broad spectrum of activity with well-documented curative actions. Medicinal plant products have also proved useful in minimizing the adverse side effects of bacteria and viruses.
- **In our previous research investigations, we reported that protective effects of Indian spices against toxic agents. But with reference to viral toxicity there were no reports till date and also with reference to anti-viral studies on NDV virus intoxicated chicks. Hence, the current research proposal was designed to know the impact of Indian spices ginger, garlic and cinnamonom bioactive compounds in NDV virus infected chicks.**

### **2.3 Importance of the proposed project in the context of current status *(Maximum 1page)***

The reviewed literature reveals the effect of NDV virus on antioxidant enzymes system, immunological system and oxidative stress markers in chicks, The therapeutic role of ginger, garlic and cinnamomum in NDV viral intoxicated chicks, there were no reports and also with reference to bioactive compounds no studies till ate.

**Hence, in the present investigation the therapeutic role of bioactive compounds of ginger, garlic and cinnamomum on immunity system, antioxidant defense system and oxidative markers in NDV virus infected chicks.**

### **IMPORTANCE OF THE PRESENT RESEARCH PROPOSAL**

- **The present research investigation will also focus its attention on the effect of Indian spices like ginger, garlic and cinnamomum bioactive compounds of ginger in NDV virus infected chicks.**
- **This current study will also see the antioxidant effect of bioactive compounds of Indian spices like ginger, garlic and cinnamomum in NDV virus infected chicks.**
- **Our future studies will focus on the mechanism of the bioactive compounds of other medicinal plants in NDV virus infected chicks.**

**2.4 If the project is location specific, basis for selection of location be highlighted : No**

### 3. Work Plan:

#### 3.1 Methodology: (*Maximum of 5 pages*)

#### OBJECTIVES OF THE PRESENT STUDY:

- To Assess the **anti-viral activity** of Indian spices in NDV virus infected chicks.
- To **Study** the pathological role of Indian spice bioactive compounds on **Hepatic** and **Cardiac antioxidant enzymes** in NDV virus infected chicks.
- To **study** the effect of Indian spices bioactive compounds on **apoptotic markers** in NDV virus infected chicks.
- **Estimation** of **PCR markers** in NDV virus infected chicks.
- To **Monitor** the some of the **liver and cardiac marker enzymes** in NDV virus Infected chicks and also after treatment with Indian spice bioactive compounds.
- To **Exemplify** the role of Indian spices bioactive compounds **on oxidative stress markers** in NDV virus infected chicks.
- **Radical Estimation by Spintrop** Method (ESR Technique)
- To see the **impact of Indian spices** on pathological profiles by **Histopathological** studies
- Drug discovery by BLAST.

#### METHODOLOGY:

#### INDUCTION OF FLUORIDE TOXICITY:

(i). **Animal Care and Treatment Protocol:** Pathogen free, chicks were used in the present study.

#### Group 1

1. **Normal Control (NC)** : Control chicks will receive saline for the study period.
2. **Ginger Treatment (Gt-1)**: The chicks will receive the ginger bioactive compound during the study.
3. **NDV Virus control (NDV-1)**: The chicks receive the NDV virus Intramuscular for the induction intramuscular route (IM) to induce Newcastle disease.
4. **NDV Virus + Ginger Treatment (NDV+Gt)**: NDV virus infected chicks receive the ginger bioactive compound for the study period.
5. **NDV + Vitamin E Treatment (NDV+Vit E)** : The NDV virus infected chicks will receive Vitamin E.

#### Group 2

6. **Normal Control (NC)** : Control chicks will receive saline for the study period.

7. **Garlic Treatment (GR-1):** The chicks receive the garlic bioactive compound as standardized during the study for the study period.
8. **NDV Virus control (NDV-1):** The chicks receive the NDV virus Intramuscular for the induction intramuscular route (IM) to induce Newcastle disease.
9. **NDV Virus + Garlic Treatment (NDV+GRt):** NDV virus infected chicks receive the garlic bioactive compound via orogastric tube for the study period.
10. **NDV + Vitamin E Treatment (NDV+Vit E) :** NDV virus infected chicks will receive the Vitamin E study period.

### **Group 3**

11. **Normal Control (NC) :** Control chicks will receive saline for the study period.
12. **Cinnamomum Treatment (Ct-1):** The chicks will receive the cinnamomumbioactive compound as standardized during the study.
13. **NDV Virus control (NDV-1):** The chicks receive the NDV virus Intramuscular for the induction intramuscular route (IM) to induce Newcastle disease.
14. **NDV Virus + Cinnamomum Treatment (NDV+Ct):** NDV virus infected chicks will cinnamomumbioactive compound via orogastric tube for the study period.
15. **NDV + Vitamin E Treatment (NDV+Vit E) :** NDV virus infected chicks will receiveVitamin E.

### **Group 4**

16. **Normal Control (NC) :** Control rats will receive saline for the study period.
17. **Ginger, Garlic and Cinnamomum Treatment (GGCt):** The chicks will receive the Ginger, Garlic and cinnamomum bioactive compound as standardized during the study.
18. **NDV Virus control (NDV-1):** The chicks receive the NDV virus Intramuscular for the induction intramuscular route (IM) to induce Newcastle disease.
19. **NDV Virus + Cinnamomum Treatment (NDV+Gt):** NDV virus infected chicks will Ginger, Garlic and cinnamomum bioactive compound via orogastric tube for the study period.
20. **NDV + Vitamin E Treatment (NDV+Vit E) :** NDV virus infected chicks will receive Vitamin E.

Following biochemical analysis will be done in all the liver and heart tissues.

### **Phase I:**

- **Analysis of Anti-viral effect of Indian spices in NDV Virus infected chicks**

- **Evaluation of Immunological Parameters and Markers**

1. Immunoglobulin Isotypes (IgG, IgA, IgM)
2. Complement proteins (C3, C4)
3. Lymphocytes
4. Neutrophils
5. Leukocytes
6. T Cells
7. WBC
8. Monocytes
9. Eosinophils
10. B cells
11. NK Cells
12. Cytokines

- **Estimation of Antioxidant enzymes and Oxidative stress Markers in the Liver and Heart**

13. Superoxide Dismutase (SOD) - Misra and Fridovich 1972
14. Catalase (CAT) - Abei 1984
15. Glutathione Peroxidase (GPx) - Flohe and Gunzler 1984
16. Glutathione Reductase (GR) - Carlberg and Mannervik 1985
17. Glutathione (GSH and GSSG) by HPLC method - Mc Farris and Reed 1987
18. Lactate dehydrogenase (LDH) Nachlas *et. al.*, (1960) as suggested  
i. by Prameelamma and Swami (1975)
19. Succinate dehydrogenase (SDH) - Prameelamma and Swami (1975)
20. Estimation of various lipid profiles Total Cholesterol, Triglycerides and Phospholipids.
21. Xanthine oxidase activity

### **Phase II :**

#### **Evaluation of Apoptosis markers**

19. Caspase-3,

20. BAX

21. BcL-2

**Estimation of PCR Markers (Gene Expression Studies)**

22. IL-1 $\beta$ ,

23. IL-4,

24.IL-6,

25.IL-8,

26.IL-10 TNF- $\alpha$ .

27. Alkaline phosphatase (ALP)

28. Protein Carbonyls (PC)

29. Alanine amino transferase (ALAT)

30. Aspartate amino transferase (AST)

**Phase IV :**

**Estimation of Biochemical Markers**

**V. Radical Estimation by Spintrop Method (ESR Technique)**

**VI. Protein expression by using SDS PAGE**

**VII. Histopathological Studies**

**VIII. Drug design by BLAST**

**3.2 Time Schedule of activities giving milestones through BAR diagram.**  
(Maximum 1 page)

**YEAR WISE PLAN OF WORK AND TARGETS TO BE ACHIEVED:**

**First Year :** 1. Standardization of Indian Spices

2. Purchase of Equipment and Chemicals

3. Recruitment of Research Personnel

4. Administrative work

**Second Year :** 5. Developing Chicks colony

6. Treatment to Chicks

7. Estimation of Biochemical Parameters

8. Submission of Manuscripts

**Third year :** 9. Completion of remaining Biochemical estimations

10. Final analysis of the Data and Interpretation of the data

11. Submission of Manuscript to Reputed Journals

12. Preparation of the Project report

13. Submission of the Project report to SERB

### **3.3 Suggested Plan of action for utilization of research outcome expected from the project. (Maximum 1/2 page)**

Our findings would suggest that bioactive compounds of Indian spices like ginger, garlic and cinnamomum will play therapeutic potential against viral related diseases like NDV in chicks and also it will be useful to treat virus related diseases in humans also. Overall, the current investigation would highlight a potential clinical utility of Indian spices bioactive compounds for inhibition of virus related disorders.

The proposed research studies are expected to reveal the complications of NDV virus disease and the role of bioactive compounds of Indian spices. Our future studies will focus on the mechanism of the bioactive compounds of other medicinal plants in other viruses. The present work would be formed as a baseline data to help viral related diseases.

This project mainly aims at exploring the effect of bioactive compounds of Indian spices with multidisciplinary approach, which may be used as template for the development of new drugs for the treatment of virus related diseases in humans.

### **3.4 Environmental impact assessment and risk analysis. (Maximum 1/2 page)**

In the current research work there is no environmental impact and no risk analysis.

## **4. Expertise:**

### **4.1 Expertise available with the investigators in executing the project: ( Maximum 1 page)**

The Principal Investigator has experience in the areas of Diabetes, Alcohol Toxicology, Free Radical Biology, Biochemistry, Medicinal Plants, and Antioxidant defense system, ATPases, Neurotransmitters.

The Principal investigator and their team have been working oxidative stress and Pharmacology for the past 12 years.

All the methods and protocols to be adopted in the proposed studies have been standardized and already in use and therefore the investigators do not foresee any difficulty in completing the studies proposed.

The Principal investigator has published more than 50 manuscripts in free radical biology, oxidative stress, pharmacology, toxicology. He has good expertise in handing the present research proposal in nice manner.

#### 4.2 Summary of roles/responsibilities for all Investigators:

(If the proposal contains more than one Investigator, it is important to clearly mention the role of each Investigator in implementing the objectives of the proposal. The Board does not encourage Investigators who do not have specific scientific role in the proposal)

| Name of the Investigators | Roles/Responsibilities   |
|---------------------------|--|
| 1. Principal Investigator | All the Research work related to this Project                      |
| 2. Principal Investigator | Administrative work related to this Project                        |
| 3. Principal Investigator | Monitoring the Junior Research Personal in the Project             |
| 4. Principal Investigator | Data analysis and Interpretation of the Project                    |
| 5. Principal Investigator | Preparation of the Manuscripts and submission to Esteemed Journals |
| 6. Principal Investigator | Preparation of the Final Report                                    |
| 7. Principal Investigator | Submission of the Final Report to SERB                             |

#### 4.3 Key publications published by the Investigators pertaining to the theme of the Proposal during the last 5 years

1. **Kondeti Ramudu Shanmugam**, Bhasha Shanmugam, Ganjikunta Venkatasubbaiah, Sahukari Ravi and Kesireddy Sathyavelu Reddy. Recent updates on the Bioactive compounds of Ginger (*Zingiber officinale*) on Cancer : A study with special emphasis of Gingerol and its anticancer potential. **Handbook of Oxidative Stress in Cancer: Therapeutic Aspects. Handbook of Oxidative Stress in Cancer: Therapeutic Aspects. Springer Nature. BOOK Chapter. 2022. (Accepted)**
2. **Kondeti Ramudu Shanmugam**, Bhasha Shanmugam, Ganjikunta Venkatasubbaiah, Sahukari Ravi and Kesireddy Sathyavelu Reddy. Effect of Ocimum sanctum in Sodium fluoride (NaF) induced Fluorosis in Rats: A Study with Respect to Antioxidant Enzymes and Fluorosis Markers. Indian Journal of Pharmaceutical Education and Research , 2022; 56(1):0100175-183. (Impact Factor – 0.68). (ISSN NO : 0019-5464).  
Url : <https://www.ijper.org/article/1622>
3. **Kondeti Ramudu Shanmugam**, Bhasha Shanmugam, Ganjikunta Venkatasubbaiah, Sahukari Ravi and Kesireddy Sathyavelu Reddy. Medicinal Plants and Bioactive Compounds for Diabetes Management: Important Advances in Drug Discovery. **Current Pharmaceutical Design**, 2021, 27, 1-12. **(Impact Factor 2.1)**. (ISSN: 1873-4286 (Online).

Url : <https://pubmed.ncbi.nlm.nih.gov/32988345/>

4. Ravi Sahukari , Jyothi Punabaka , Shanmugam Bhasha, Venkata Subbaiah Ganjikunta, **Shanmugam Kondeti Ramudu**, Sathyavelu Reddy Kesireddy, Weibing Ye, Mallikarjuna Korivi. Phytochemical Profile, Free Radical Scavenging and Anti-Inflammatory Properties of *Acalypha Indica* Root Extract: Evidence from In Vitro and In Vivo Studies. *Molecules*. 2021 Oct 15;26(20):6251. doi: 10.3390/molecules26206251.

Url : <https://pubmed.ncbi.nlm.nih.gov/34684831/> (Impact Factor – 4.4). (ISSN NO : 1420-3049).

5. Bhasha Shanmugam, **Kondeti Ramudu Shanmugam**,Gangaraju Doraswamy, Shakuri Ravi, Gangigunta Venkata Subbaiah, Chilakala Ramakrishna, korivi Mallikarjuna, Kesireddy Sathyavelu Reddy. Exploratory Studies of (-)-Epicatechin, a Bioactive Compound of *Phyllanthus niruri*, on the Antioxidant Enzymes and Oxidative Stress Markers in D-galactosamine-induced Hepatitis in Rats: A Study with Reference to Clinical Prospective. *Pharmacognosy Magazine*. 2017;13:56-62.

[Url:http://www.phcog.com/article.asp?issn=0973-](http://www.phcog.com/article.asp?issn=0973-1296;year=2017;volume=13;issue=49;spage=56;epage=62;aulast=Shanmugam;type=0)

[1296;year=2017;volume=13;issue=49;spage=56;epage=62;aulast=Shanmugam;type=0](http://www.phcog.com/article.asp?issn=0973-1296;year=2017;volume=13;issue=49;spage=56;epage=62;aulast=Shanmugam;type=0)

## Budget Details

### Institution wise Budget Breakup :

| Budget Head        | PRR & VS Government College | Total            |
|--------------------|-----------------------------|------------------|
| Research Personnel | 9,84,000                    | <b>9,84,000</b>  |
| Consumables        | 8,00,000                    | <b>8,00,000</b>  |
| Travel             | 2,50,000                    | <b>2,50,000</b>  |
| Equipment          | 6,85,000                    | <b>6,85,000</b>  |
| Contingencies      | 5,00,000                    | <b>5,00,000</b>  |
| Other cost         | 2,50,000                    | <b>2,50,000</b>  |
| Overhead           | 5,00,000                    | <b>5,00,000</b>  |
| <b>Total</b>       | <b>39,69,000</b>            | <b>39,69,000</b> |

### Institute Name : *PRR & VS Government College*

#### Year Wise Budget Summary (Amount in INR) :

| Budget Head        | Year-1           | Year-2           | Year-3           | Total            |
|--------------------|------------------|------------------|------------------|------------------|
| Research Personnel | 3,00,000         | 3,00,000         | 3,84,000         | <b>9,84,000</b>  |
| Consumables        | 2,00,000         | 3,00,000         | 3,00,000         | <b>8,00,000</b>  |
| Travel             | 50,000           | 1,00,000         | 1,00,000         | <b>2,50,000</b>  |
| Equipments         | 6,85,000         | 0                | 0                | <b>6,85,000</b>  |
| Contingencies      | 2,00,000         | 2,00,000         | 1,00,000         | <b>5,00,000</b>  |
| Other cost         | 1,00,000         | 1,00,000         | 50,000           | <b>2,50,000</b>  |
| Overhead           | 2,00,000         | 2,00,000         | 1,00,000         | <b>5,00,000</b>  |
| <b>Grand Total</b> | <b>17,35,000</b> | <b>12,00,000</b> | <b>10,34,000</b> | <b>39,69,000</b> |

#### Research Personnel Budget Detail (Amount in INR) :

| Designation  | Year-1   | Year-2   | Year-3   | Total           |
|--|----------|----------|----------|-----------------|
| <b>Junior Research Fellow</b><br><i>JRF is required for the Project to carry out all the research related activities</i> | 3,00,000 | 3,00,000 | 3,84,000 | <b>9,84,000</b> |

#### Consumable Budget Detail (Amount in INR) :

| Justification  | Year-1   | Year-2   | Year-3   | Total           |
|--|----------|----------|----------|-----------------|
| <i>For attending the National and International conferences. Also visiting near Laboratories for analysis of the biochemical estimations and data collection</i> | 2,00,000 | 3,00,000 | 3,00,000 | <b>8,00,000</b> |

#### Travel Budget Detail (Amount in INR) :

| Justification (Inland Travel)  | Year-1 | Year-2   | Year-3   | Total           |
|--|--------|----------|----------|-----------------|
| <i>For attending the National and International conferences. Also visiting near Laboratories for analysis of the biochemical estimations and data collection</i> | 50,000 | 1,00,000 | 1,00,000 | <b>2,50,000</b> |

#### Equipment Budget Detail (Amount in INR) :

| Generic Name ,Model No. , (Make)/ Justification   | Quantity | Spare time | Estimated Cost  |
|---|----------|------------|-----------------|
| <b>Weighing Balance</b><br>shimadzu (shimadzu )<br><i>For estimation of samples</i>           | 1        | 25 %       | <b>1,00,000</b> |
| <b>Remi Centrifuge</b><br>2022 (REMI)<br><i>For smooth operation of the project</i>           | 2        | 25 %       | <b>60,000</b>   |
| <b>Ph Meters</b><br>Systronics (Systronics)<br><i>For analysis of biochemical parameters</i>  | 1        | 25 %       | <b>25,000</b>   |
| <b>Cooling Centrifuge</b><br>REMI (REMI)<br><i>For estimations of biochemical estimations</i> | 1        | 25 %       | <b>2,00,000</b> |
| <b>SDS PAGE Electrophoresis Unit</b><br>GENI (GENI)<br><i>For PCR Markers</i>                 | 1        | 25 %       | <b>2,00,000</b> |
| <b>Homoziniger</b><br>REMI (REMI)<br><i>For estimation of Biochemical parameters</i>          | 1        | 25 %       | <b>1,00,000</b> |

#### Contingency Budget Detail (Amount in INR) :

| Justification  | Year-1   | Year-2   | Year-3   | Total           |
|--|----------|----------|----------|-----------------|
| <i>Purchase of Books, journals and xerox documents. Payment of memberships of professional organizations. Purchase of Laptops, also purchase of computer software peripherals.</i> | 2,00,000 | 2,00,000 | 1,00,000 | <b>5,00,000</b> |

#### Overhead Budget Detail (Amount in INR) :

| Justification  | Year-1   | Year-2   | Year-3   | Total           |
|--|----------|----------|----------|-----------------|
| <i>For providing all the facilities for sooth operation of the project</i> | 2,00,000 | 2,00,000 | 1,00,000 | <b>5,00,000</b> |

#### Other Budget Detail (Amount in INR) :

| Description/Justification   | Year-1   | Year-2   | Year-3 | Total           |
|---|----------|----------|--------|-----------------|
| Other expenses which are not covered in above<br><i>For completion of the Project</i> | 1,00,000 | 1,00,000 | 50,000 | <b>2,50,000</b> |

## PROFORMA FOR BIO-DATA

1. Name and full correspondence address : **Dr.K.R.SHANMUGAM**  
**Assistant Professor**  
**Department of Zoology,**  
**PRR & VS Government Degree College**  
**Vidavalur**  
**SPSR Nellore District**  
**Andhra Pradesh 524318**

2. Email(s) and contact number(s) : [krshanmugamphd@gmail.com](mailto:krshanmugamphd@gmail.com)  
**Mobile : 91 9440079415**

3. Institution : **PRR & VS Government Degree College**  
**Vidavalur**  
**SPSR Nellore District**  
**Andhra Pradesh, 524318**

4. Date of Birth : 28/05/1979

5. Gender (M/F/T) : Male

6. Category Gen/SC/ST/OBC : OBC

7. Whether differently abled (Yes/No) : No

8. Academic Qualification (Undergraduate Onwards)

|    | Degree | Year | Subject                          | University/Institution                    | % of marks |
|----|--------|------|----------------------------------|---|------------|
| 1  | B.Sc   | 2001 | Botany,<br>Zoology,<br>Chemistry | Sri Venkateswara<br>University - Tirupati | 68         |
| 2  | M.Sc   | 2003 | Zoology                          | Sri Venkateswara<br>University - Tirupati | 72         |
| 3. | PhD    | 2008 | Zoology                          | Sri Venkateswara<br>University - Tirupati | -          |

9. Ph.D thesis title : **“Modulation of Antioxidant and Oxidative Enzymes system by Ginger in induced Alcoholic-diabetic rat kidney”**

Guide’s Name : **Prof K.Sathyavelu Reddy**  
Institute/Organization/University : **Department of Zoology**  
**Sri Venkateswara University – Tirupati**

Year of Award : August 2008

10. Work experience (in chronological order).

| S.No. | Positions Held                | Name of the Institute   | From           | To                     | Pay Scale                              |
|-------|-------------------------------|---|----------------|------------------------|--|
| 1.    | <b>Assistant Professor</b>    | PRR & VS Government Degree College Vidavalur SPSR Nellore District A.P., 524318 | October 2021   | Till date              | 95600 (7 <sup>th</sup> Pay Commission) |
| 2.    | <b>Assistant Professor</b>    | T.R.R. Government Degree College Kandukur Prakasam District A.P., 523105        | September 2013 | Till date (04-03-2020) | 87300 (7 <sup>th</sup> Pay Commission) |
| 3.    | <b>Assistant Professor</b>    | Government Degree College- Siddipet   | December 2011  | September 2013         | 24600                                  |
| 4.    | <b>Post-Doctoral Position</b> | University of Malaya, Kuala Lumpur,   | September 2011 | November 2011          | 6000RM                                 |
| 5     | <b>Post-Doctoral Position</b> | University of Kebangsaan Malaysia   | August 2010    | September 2011         | 5000RM                                 |

11. Professional Recognition/ Award/ Prize/ Certificate, Fellowship received by the applicant.

| S.No | Name of Award   | Awarding Agency                                 | Year |
|------|---|---|------|
| 1.   | Award of <b>Postdoctoral Fellowship (PDF)</b> by USA, Year 2011 (Not Utilized the Fellowship)   | Tulane University, Neworelans,                  | 2011 |
| 2    | Award of Postdoctoral Fellowship (PDF) by University of Kebangsaan Malaysia   | University of Malaysia, Kuala Lumpur, Malaysia, | 2010 |
| 3.   | Visiting Scientist  | Daejon Medical College, Daejeon, South Korea,   | 2009 |
| 4.   | Jr. SCIENTIST AWARD FOR THE YEAR 2009   | National Environmental Science Academy (NESA)   | 2009 |
| 5.   | <b>BEST POSTER PRESENTATION AWARD (2008)</b> at International symposium and Conference of Gerontology and Geriatrics and 14th Biannual meeting of the association of Gerontontology (India) held at | S.V.University, Tirupati                        | 2008 |

|    |   |                                |      |
|----|---|--------------------------------|------|
|    | Tirupati  |                                |      |
| 6. | <b>BEST POSTER PRESENTATION AWARD (2008) at 95th INDIAN SCIENCE CONGRESS (ISCA)</b> | <b>INDIAN SCIENCE CONGRESS</b> | 2008 |
|    |   |                                |      |

12. Publications (*List of papers published in SCI Journals, in year wise descending order*).

| S.N o. | Author(s)   | Title   | Name of Journal   | Volume               | Year        |
|--------|---|---|---|----------------------|-------------|
| 1.     | <b>Kondeti Ramudu Shanmugam</b> , Bhasha Shanmugam, Ganjikunta Venkatasubbaiah, Sahukari Ravi and Kesireddy Sathyavelu Reddy.   | Effect of Ocimum sanctum in Sodium fluoride (NaF) induced Fluorosis in Rats: A Study with Respect to Antioxidant Enzymes and Fluorosis Markers.                                 | Indian Journal of Pharmaceutical Education and Research     | 56(1):010-183.       | <b>2022</b> |
| 2.     | <b>Kondeti Ramudu Shanmugam</b> , Bhasha Shanmugam, Ganjikunta Venkatasubbaiah, Sahukari Ravi and Kesireddy Sathyavelu Reddy.   | Medicinal Plants and Bioactive Compounds for Diabetes Management: Important Advances in Drug Discovery  | Current Pharmaceutical Design,                              | 27, 1-12.            | <b>2021</b> |
| 3.     | Ravi Sahukari , Jyothi Punabaka , Shanmugam Bhasha, Venkata Subbaiah Ganjikunta, <b>Shanmugam Kondeti Ramudu</b> , Sathyavelu Reddy Kesireddy, Weibing Ye, Mallikarjuna Korivi. | Phytochemical Profile, Free Radical Scavenging and Anti-Inflammatory Properties of Acalypha Indica Root Extract: Oct 15;26(20):6251. Evidence from In Vitro and In Vivo Studies | Molecules   | Oct 15;26(20):6251.  | <b>2021</b> |
| 4.     | <b>K. R. Shanmugam</b> , M. Siva, Shakuri Ravi, Bhasha Shanmugam, Kesireddy Sathyavelu Reddy.   | Bioactive compound of Ocimum sanctum Carvacrol supplementation attenuates Fluoride toxicity in Sodium fluoride intoxicated rats : A study with respect to clinical aspect.      | Pharmacognosy Magazine. (Impact Factor : 1.52).             | Volume 15, Issue 62, | 2019        |
| 5.     | <b>K.R. Shanmugam</b> , M. Siva, Ravi .S , Shanmugam .B, Venkata Subbaiah.G, Sathyavelu Reddy. K.   | A Review of Concentration of Fluoride in World and India: Effects of Fluoride on Human Body.  | International E Publication. (ISBN: ISBN 978-93-86675-60-6) | 1-43:                | 2018.       |

|     |   |  |   |                                 |      |
|-----|---|--|---|---------------------------------|------|
| 6.  | <b>Shanmugam.K.R.</b> Siva .M, Ravi .S , Shanmugam .B, Venkata Subbaiah.G, Sathyavelu Reddy. K. (Impact Factor : 1.5).  | Phytochemical Screening And Antimicrobial Evaluation Of <i>Ocimum Sanctum</i> : A Study With Reference To Pharmacological Aspect.  | International Journal of Pharmaceutical Research. (ISSN 0975-2366).         | Apr-June Vol 10; Issue 2;61-65. | 2018 |
| 7.  | Bhasha Shanmugam, <b>Kondeti Ramudu Shanmugam</b> ,Gangaraju Doraswamy, Shakuri Ravi, Gangigunta Venkata Subbaiah, Chilakala Ramakrishna, korivi Mallikarjuna, Kesireddy Sathyavelu Reddy | Exploratory Studies of (-)-Epicatechin, a Bioactive Compound of <i>Phyllanthus niruri</i> , on the Antioxidant Enzymes and Oxidative Stress Markers in D-galactosamine-induced Hepatitis in Rats: A Study with Reference to Clinical Prospective | Pharmacognosy Magazine. (Impact Factor : 1.52).                             | 13                              | 2017 |
| 8.  | Siva M, <b>Shanmugam KR</b> , Shanmugam B, Venkata SG, Ravi S, Sathyavelu RK, Mallikarjuna K.   | <i>Ocimum sanctum</i> : a review on the pharmacological properties   | Int J Basic ClinPharmacol (Impact Factor : 0.786)                           | 5                               | 2016 |
| 9.  | K. Sathyavelu Reddy G. Venkata Subbaiah, <b>K. R. Shanmugam</b> ,B. Shanmugam, S.Ravi   | Diabetes review  | Global Meet of Biologists Proceedings. (National Journal of Life Sciences ) | 12(3 )                          | 2015 |
| 10  | <b>Shanmugam K.R</b> , Srinivas Reddy A   | Protective Effect of Vitamin C in Sodium Fluoride (Naf) Induced Toxicity in Fishes: A Study with Reference to Lipid Metabolic Profiles and Liver Markers   | Indian Journal of Fundamental and Applied Life Sciences                     | 5(4)                            | 2015 |
| 11. | <b>K.R. Shanmugam</b> , Ch. Ramakrishna, K. Mallikarjuna, K. Sathyavelu Reddy   | Preclinical studies on the effect of ethanolic extract of ginger on renal antioxidant enzymes in diabetic male albino rats   | Indian Journal of Comparative Animal Physiology                             | 31                              | 2013 |
| 12. | Pandanaboina Sahitya Chetan, <b>Kondeti Shanmugam Ramudu</b> , Rajbanshi Sangeetha Lakshmi Anshul, Kunala Pavan Nagavenkata, Pandanaboina Saritha, Pandanaboina                           | Alterations in antioxidant enzyme activities and oxidative damage in alcoholic rat tissues: Protective role of <i>Thespesiapopulnea</i> .  | Food Chemistry. (Impact factor : 3.5691)                                    | 132                             | 2012 |

|     |   |   |  |        |      |
|-----|---|---|--|--------|------|
|     | Murali Mohan,<br>Wudayagiri Rajendra  |   |  |        |      |
| 13  | <b>Kondeti Ramudu Shanmugam, K.</b><br>Mallikarjuna, Kesireddy Nishanth, Chien Wen Hou, Chia HuaKuo K. Sathyavelu Reddy             | Ginger Feeding Protects Against Renal Oxidative Damage Caused by Alcohol Drinking in Rats                                     | Journal of Renal Nutrition<br>(Impact factor : 1.56).            | 21     | 2011 |
| .14 | <b>Shanmugam KondetiRamudu,</b><br>Mallikarjuna Korivi, Kesireddy Nishanth, Sathyavelu Reddy Kesireddy                              | Neuroprotective effect of ginger on antioxidant enzymes in streptozotocin induced diabetic rats                               | Food and chemical Toxicology Journal.<br>(Impact factor : 2.691) | 49(4)  | 2011 |
| 15  | <b>Kondeti Ramudu Shanmugam, Korivi</b><br>Mallikarjuna, Kesireddy Nishanth, Chien Wen Hou, Chia HuaKuo, Kesireddy Sathyavelu Reddy | Protective effect of dietary ginger on antioxidant enzymes and oxidative damage in experimental diabetic rat tissues          | Food Chemistry Journal.<br>(Impact factor : 3.691)               | 124(4) | 2011 |
| 16  | <b>K.R. Shanmugam, K.</b><br>Mallikarjuna, K, Nishanth K, I-S Cheng, Li-Chen Lee, Chia-HuaKuo, K. Sathyavelu Reddy                  | Nephro-protective effects of Ginger on Cytosolic and Mitochondrial Enzymes against STZ-induced Diabetic Complications in Rats | The Chinese Journal of Physiology (CJP)<br>(Impact factor : 091) | 54(2)  | 2011 |
|     |   |   |  |        |      |

### 13. Detail of patents

| S.No | Patent Title | Name of Applicant(s) | Patent No | Award Date | Agency/Country | Status |
|------|--------------|----------------------|-----------|------------|----------------|--------|
| -    | -            | -                    | -         | -          | -              | -      |
|      |              |                      |           |            |                |        |

## 14. Books/Reports/Chapters/General articles etc.

| <b>S.No</b> | <b>Title</b>  | <b>Author's Name</b>  | <b>Publisher</b>   | <b>Year of Publication</b> |
|-------------|---|---|--|----------------------------|
| 1.          | Recent updates on the Bioactive compounds of Ginger ( <i>Zingiber officinale</i> ) on Cancer : A study with special emphasis of Gingerol and its anticancer potential.  | <b>Kondeti Ramudu Shanmugam</b> , Bhasha Shanmugam, Ganjikunta Venkatasubbaiah, Sahukari Ravi and Kesireddy Sathyavelu Reddy. | Handbook of Oxidative Stress in Cancer: Therapeutic Aspects. Handbook of Oxidative Stress in Cancer: Therapeutic Aspects. Springer Nature. | 2022-May                   |
| 2.          | The Importance of Natural products in the Modern Drug Discovery and Development (Inter National Conference Proceedings). 2021. RECENT ADVANCES IN GENETIC ENGINEERING AND BIOTECHNOLOGY (Proceedings of the INTERNATIONAL WEBINAR). | <b>K. R. Shanmugam</b> , M Guru Sekhar  | JUPITOR PUBLICATIONS, CHENNAI,   | 2021                       |
|             |   |   |  |                            |

15. Any other Information (maximum 500 words) : ---

## CERTIFICATE FROM THE INVESTIGATOR

**Project Title: "Studies on the Therapeutic potential of Indian spices in Virus intoxicated chicks: A study with reference to immunological studies and drug discovery"**

It is certified that

1. The same project proposal has not been submitted elsewhere for financial support.
2. I undertake that spare time on equipment procured in the project will be made available to other users.
3. I agree to submit a certificate from Institutional Biosafety Committee, if the project involves the utilization of genetically engineered organisms. We/I also declare that while conducting experiments, the Biosafety Guidelines of Department of Biotechnology, Department of Health Research, GOI would be followed in toto.
4. I agree to submit ethical clearance certificate from the concerned ethical committee, if the project involves field trails/experiments/exchange of specimens, human & animal materials etc.
5. The research work proposed in the scheme/project does not in any way duplicate the work already done or being carried out elsewhere on the subject.
6. I agree to abide by the terms and conditions of SERB grant.

  
(DR.K.R.SHANMUGAM)

Name and signature of Principal Investigator:

Date : 21-04-2022

Place: VIDAVALUR, SPSR NELLORE District

**Dr. K.R. SHANMUGAM**  
Assistant Professor  
Department of Zoology  
PRR & VS GOVERNMENT DEGREE COLLEGE  
VIDAVALUR, SPSR Nellore Dist.  
Andhra Pradesh-524 319.



**PRR & VS GOVERNMENT COLLEGE : VIDAVALUR, SPSR NELLORE Distirct - ANDHRA PRADESH**

**Endorsement from the Head of the Institution**

(To be given on University/ Institute/Organisation/College Letter head)

This is to certify that:

1. Institute welcomes participation of Name : **Dr. K.R.SHANMUGAM** Designation : **ASSISTANT PROFESSOR** as the Principal Investigator and .....as the Co- Investigator/s for the project titled **“Studies on the Therapeutic potential of Indian spices in Virus intoxicated chicks: A study with reference to immunological studies and drug discovery “**and that in the unforeseen event of discontinuance by the Principal Investigator, the Co-Investigator will assume the responsibility of the fruitful completion of the project with the approval of SERB.
2. The PI, **DR. K.R.SHANMUGAM** is a permanent or regular employee of this Institute/University/Organization and has **20** years of regular service left before superannuation
3. The project starts from the date on which the University/Institute/ Organization/College receives the grant from **SCIENCE & ENGINEERING RESEARCH BOARD (SERB)**, New Delhi.
4. The investigator will be governed by the rules and regulations of University/ Institute/Organization/College and will be under administrative control of the University/ Institute/Organization/College for the duration of the project.
5. The grant-in-aid by the **SCIENCE & ENGINEERING RESEARCH BOARD (SERB)**, New Delhi will be used to meet the expenditure on the project and for the period for which the project has been sanctioned as mentioned in the sanction order.
6. No administrative or other liability will be attached to **SCIENCE & ENGINEERING RESEARCH BOARD (SERB)**, New Delhi at the end of the project.
7. The University/Institute/Organization/College will provide basic infrastructure and other required facilities to the investigator for undertaking the research project.
8. The University/ Institute/Organization/College will take into its books all assets created in the above project and its disposal would be at the discretion of **SCIENCE & ENGINEERING RESEARCH BOARD (SERB)**, New Delhi.
9. The University/ Institute/Organization/College assumes to undertake the financial and other management responsibilities of the project.

Seal of Signature  
University/ Institute/Organisation/College

Date :



B. S. 28/4/22  
 Registrar of University/Head of the  
 Institute/Head of Organisation/Principal of College  
**PRR & VS GOVT. COLLEGE**  
 VIDAVALUR - 524318,  
 SPSR NELLORE DT.

Undertaking by the Principal Investigator

To  
The Secretary  
SERB, New Delhi

Sir

I **Dr. K.R.SHANMUGAM**, Lecturer in Zoology, Assistant Professor, PRR & VS Government college, Vidavalur, SPSR Nellore, A.P. hereby certify that the research proposal titled Studies on the Therapeutic potential of Indian spices in Virus intoxicated chicks: A study with reference to immunological studies and drug discovery submitted for possible funding by SERB, New Delhi is my original idea and has not been copied/taken verbatim from anyone or from any other sources. I further certify that this proposal has been checked for plagiarism through a plagiarism detection tool i.e. **Dr. K.R.SHANMUGAM**, approved by the Institute and the contents are original and not copied/taken from any one or many other sources. I am aware of the UGCs Regulations on prevention of Plagiarism i.e. University Grant Commission (Promotion of Academic Integrity and Prevention of Plagiarism in Higher Educational Institutions) Regulation, 2018. I also declare that there are no plagiarism charges established or pending against me in the last five years. If the funding agency notices any plagiarism or any other discrepancies in the above proposal of mine, I would abide by whatsoever action taken against me by SERB, as deemed necessary.

  
Signature of PI with date

Name / designation

**Dr. K.R. SHANMUGAM**

Assistant Professor

Department of Zoology

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Andhra Pradesh-524 310;