ANNEXURE-III
DEPARTMENT OF SCIENCE, TECHNOLOGY, ENVIRONMENT

Proforma for furnishing Research Project proposals to DSTE,

1. TITLE OF THE PROJECT: THE ANTI-MICROBIAL ACTIVITY OF LATEX AND AERIAL PARTS PLANT EXTRACT OF CALOTROPIS GIANTEA (L.) R.BR.

2. NAME OF THE PRINCIPAL INVESTIGATOR AND ADDRESS FOR COMMUNICATION WITH PHONE NUMBER/E-MAIL:

   Dr. K. RAMUDU, DEPARTMENT OF ZOOLOGY, TAGORE ARTS COLLEGE, LAWSPET, PUDUCHERRY-605008.
   TEL NO. 9843041810 (MOBILE), 0413-2257136 E-MAIL: drkademramudu@yahoo.com.

3. DESIGNATION AND NAME OF THE INSTITUTION IN WHICH WORKING:

   LECTURER IN ZOOLOGY, DEPARTMENT OF ZOOLOGY, TAGORE ARTS COLLEGE, LAWSPET, PUDUCHERRY-605008.

4. NAME OF THE CO-INVESTIGATOR (IF ANY) AND ADDRESS FOR COMMUNICATION WITH PHONE NUMBER/E-MAIL:

5. OBJECTIVES OF THE PROJECT (NOT MORE THAN 10 LINES):

   Residual pesticides in soil or on crops are transported from fields to surface and ground waters. The leaves and stems of Calotropis Gigantea (L.) R.BR. are used in agriculture for soil fertility & insecticidal activity. If they are released in environment in adequate before degradation, they kill non-target and other aquatic species, some toxic substances bio-accumulate in tissues of fish and other species thus posing health risks to human beings and others, who consume the fish and contaminated water. Due to which the nutritive value of fishes gets reduced; fish population gradually diminishes because of the toxicants. It is been known in medicinal importance in shrimps (SEMBV viral infection) and prevents viral white spot disease (Raman, 1997).

6. LIKELY BENEFITS OF THE PROJECT:

   Toxic pollutants rendered almost lifeless by a lethal combination of agricultural fertilizers, pesticides, industrial pollutants, sewage runoff. The process kills the food chain from the bottom up, rendering the area virtually lifeless. The interaction among various chemical pollutants in the aquatic system may be synergistic, antagonistic or additive, and may cause acute toxic effect on different species. Biopesticides of any type have been approved for use by producers in the developing world where chemical use is largely or totally uncontrolled. The bioactive chemical substances are found in plants species that show deleterious effects on fishes and other non-target organisms leading to death. Very less data is available on the biopestical effect on fishes. The hazards of biopesticides usage have awakened the modern man to realize the risk involved in constant use of pesticides.

Hence, an attempt is made to investigate the effects of latex, plant extract and the recovery of latex toxicity with the additive nutrients. Latex of C.Gigantea (L.) R.BR. and the extracts of aerial parts of the plant are used as arrow poison, infanticide, slows anti implantation activity, homicidal poison and fertilizer and also effective fish poison, insecticidal, good ovicidal and larvicidal in nature.
IT DESCRIBES THE STUDIES ON THE IMPACT OF LATEX AND PLANT EXTRACT OF CALOTROPIS GIGANTEA (L.)R.BR. ON FRESHWATER FISH, ANABAS TESTUDINEUS (BLOCH) A COMMONLY EATABLE FISH AND WIDELY CULTIVATED IN INDIA. THE IMPACT WAS ASSESSED IN TERMS OF MEDIAN LETHAL CONCENTRATION OF LATEX AND PLANT EXTRACT OF CALOTROPIS GIGANTEA (L.)R.BR. THE IMPACT WAS ASSESSED IN TERMS OF BEHAVIOURAL, NUMBER OF BIOCHEMICAL, HAEMATOLOGICAL PARAMETERS AND HISTOPATHOLOGICAL CHANGES IN THE FISH EXPOSED TO THE SUBLETHAL CONCENTRATIONS OF LATEX, PLANT EXTRACT AND THE RECOVERY OF LATEX TOXICITY WITH THE ADDITIVE NUTRIENTS STUDIED.

ACTIVE PRINCIPLES

CALOTROPIS SPECIES CONTAINS THE PHYSIOLOGICALLY ACTIVE COMPONENTS NAMELY --


GLYCOSIDES ARE OFTEN THE CULPRIT, CAUSE GASTRO-INTESTINAL TOXICOSIS, INHIBIT CELLULAR MEMBRANE ATPASE ENZYME SYSTEM ACTIVITY. DURING EARLY COURSE OF POISONING, ANIMALS EXHIBIT RAPID BREATHING, CONVULSIONS, IRREGULAR HEART ACTIVITY, CATTLE AND HORSES CONSUMING CARDIAC GLYCOSIDE-CONTAINING PLANTS ARE OFTEN FOUND DEAD. POSTMORTEM FINDINGS INCLUDE HEMORRHAGES, CONGESTION, EDEMA AND CELL DEGENERATION OF THE ORGANS INCLUDING MULTIFOCAL MYOCARDIAL DEGENERATION AND NECROSIS (KNIGHT AND WALTER, 2002).

GOMPHOSIDONE

CHAPMAN HALL NO: 4018-61-0
CAS NO: 36597-51-0
COMPOUND CODE: VTO750XA2760 MOLECULAR FORMULA:
C28H40O8
MOLECULAR WEIGHT: 518.287

BIological SOURCE: CARDIAC GLYCOSIDE

PHYSICAL DESCRIPTION: CRYSTALLINE (MeOH)
MELTING POINT: 268-271
GAMPHOSIDE DERIVATIVES
CALACTIN

CHAPMAN&HALL NO: BZK24
CAS NO: 20304-47-6
COMPOUND CODE: AO750VTO750XA2760
MOLECULAR FORMULA: C29H40O9
MOLECULAR WEIGHT: 532.63
PHYSICAL DESCRIPTION: CRISTALLINE (MeOH)
MELTING POINT: 270-272

GOMPHOTOXIN (or) CALLOTROPIN

CHAPMAN&HALL NO: HDG2-E
CAS NO: 1986-70-5
COMPOUND CODE: AO750VTO750AJ5000
MOLECULAR FORMULA: C29H40O9
MOLECULAR WEIGHT: 532.63
USE: AFRICAN ARROW POISON
PHYSICAL DESCRIPTION: CRISTALLINE
TOXICITY (CAT): 0.1mg/Kg

CALOTOXIN
CHAPMAN&HALL NO: HDD88-M
CAS NO: 20304-49-8
COMPOUND CODE: AO750VTO750
MOLECULAR FORMULA: C29H40O10
MOLECULAR WEIGHT: 548.629
PHYSICAL DESCRIPTION: CRISTALLINE (MeOH)
MELTING POINT: 270-272

CHAPMAN&HALL NO: HGP48-D
CAS NO: 24211-64-1
COMPOUND CODE: AO750URO750
MOLECULAR FORMULA: C23H32O6
MOLECULAR WEIGHT: 404.502
BIological SOURCE: AGLYCONE
PHYSICAL DESCRIPTION: CRISTALLINE
MELTING POINT: 248-252

USCHARIN

CHAPMAN&HALL NO: HGK16-T
CAS NO: 24211-81-2
COMPOUND CODE: AF7700AO750VX6790VE7700VTO750
MOLECULAR FORMULA: C31H41NO8S
MOLECULAR WEIGHT: 587.733
BIological SOURCE: LATEX-ALKAIOLID
MELTING POINT: 270-271
TOXICITY: CARDIAC POISON

VORUSCHARIN (dihydrouscharin)
(DERIVATIVE OF USCHARIN)
<table>
<thead>
<tr>
<th>Neem</th>
<th>Azadirachta indica</th>
<th>Meliaceae</th>
<th>Insecticidal, repellant, antifeedant</th>
<th>All plant parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persian Lilac</td>
<td>Melia azedarach</td>
<td>Meliaceae</td>
<td>Contact and stomach poison, insecticidal, repellent,</td>
<td>Dried leaves</td>
</tr>
<tr>
<td>Pyrethrum</td>
<td>Chrysanthemum Cinerari</td>
<td>Compositae</td>
<td>Pure contact poison. Insecticidal,</td>
<td>Flowers</td>
</tr>
<tr>
<td>Quassia</td>
<td>Quassia amara</td>
<td>Simarubraceae</td>
<td>Contact and stomach poison. Insecticidal,</td>
<td>Stem &amp; leaves</td>
</tr>
<tr>
<td>Ryania</td>
<td>Ryania</td>
<td>Flacourti</td>
<td>Contact and</td>
<td>Dried roots, leaves</td>
</tr>
<tr>
<td>Sabadila</td>
<td>Schoenocaulon officinale</td>
<td>Lilaceae</td>
<td>Contact and stomach poison.</td>
<td>Seeds</td>
</tr>
<tr>
<td>Sweet flag</td>
<td>Acorus calamus</td>
<td>Araceae</td>
<td>Insecticidal repellent,</td>
<td>Dried rhizomes</td>
</tr>
<tr>
<td>Turmeric</td>
<td>Curcuma</td>
<td>Zingiber</td>
<td>Insecticidal and</td>
<td>Root</td>
</tr>
<tr>
<td>Andean lupin</td>
<td>Lupinus mutabilis</td>
<td>Lamiaceae</td>
<td>Antifeedant Nematicidal fungicidal</td>
<td>Seeds</td>
</tr>
</tbody>
</table>

7. METHODOLOGY

CALOTROPIS GIGANTEA

BELONGS TO FAMILY: ASCLEPIADACEA
DISTRIBUTED IN TROPICAL & SUB-TROPICAL ASIA AND AFRICA EXTENDING INTO ARABIA, WEST INDIES & TROPICAL SOUTH AND CENTRAL AMERICA. FOUND IN ALL PLAINS OF BLACK COTTON SOIL IN WASTE PLACES & ON ROAD SIDES. TALL LATICIFEROUS SHRUBS OR SMALL TREES, COMMONLY KNOWN AS THE SWALLOW WORT OR MILKWEED - 2 TO 3M HIGH

FLOWERS INODOROUS, PURPLISH OR WHITE IN UMBELLATE LATERAL CYMES.

THE PLANT EXTRACT SHOWS CYTOTOXIC ACTIVITY (SMITH ET AL., 1995)
ANTI PLASMODIAL AND LARVICIDAL (SHARMA AND SHARMA, 2001; MOURSY, 1997)
PROLONGED HIGH DOSES CAUSE HEADACHE, BURNING IN MICTURITION AND LEUCORRHOEA,
WIDE SPREAD TESTICULAR NECROSIS AND DAMAGE TO LIVER WHEN ADMINISTERED ORALLY TO DESERT GERBIL.
THE DRUG IS HIGHLY TOXIC.
HIGHER DOSES CAUSE VOMITING DIARRHEA, BRADYCARDIA AND CONVULSIONS.
THESE MEDICINAL PLANTS PRODUCE TOXIC EFFECTS ON THE ANIMAL SYSTEM, IF NOT USED CAREFULLY OR IN REGULATED AMOUNT. (KHARE, 2004).
OTHER USES:
*COCCAGNIA (L.) R. BR. LEAVES ARE USED AS GREEN MANURE FOR BETEL NUT, PADDY AND WHEAT; REPORTED TO CORRECT ALKALINITY IN SOIL. COMPOST CAN ALSO BE MADE OUT OF IT.*

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WATER QUALITY ANALYSIS
THE WATER QUALITY WAS DETERMINED PERIODICALLY ACCORDING TO STANDARD METHOD (APHA, 1998). TEMPERATURE, DISSOLVED OXYGEN, pH, CO₂, HARDNESS(CACO₃), TOTAL ALKALINITY.

3. BEHAVIORAL STUDIES

4. HAEMATOLOGICAL STUDIES
THE PRESENT STUDY WAS UNDERTAKEN TO TRACE THE EFFECTS OF SUB-LETHAL CONCENTRATIONS OF LATEX, LATEX WITH SUPPLEMENTS AND PLANT EXTRACT OF CALOTROPIS GIGANTEA(L.)R.BR. ON BLOOD OF ANABAS TESTUDINEUS.(BLOCH). THE PARAMETERS STUDIED INCLUDES HEMOGLOBIN CONTENT (HB) -SAHLIS METHOD, OXYGEN COMBINING CAPACITY (DECIE AND LEWIS, 1963), TOTAL RED BLOOD CORPUSCLES COUNT (RBCHAEMATOCRAT (HT) (SNIESZKO, 1960), MEAN CORPUSCULAR HEMOGLOBIN (MCH) (DECIE AND LEWIS, 1963), MEAN CORPUSCULAR VOLUME (MCV) (DECIE AND LEWIS, 1963), MEAN CORPUSCULAR HEMOGLOBIN CONCENTRATION (MCHC) (DECIE AND LEWIS, 1963), AND TOTAL WHITE BLOOD CELL COUNT, TO EXPLAIN HOW THE TEST COMPOUNDS PRODUCES CHANGES IN ERYTHROPOIETIC ACTIVITY.