



भाकृअनुप – राष्ट्रीय केला अनुसंधान केंद्र
(भारतीय कृषि अनुसंधान परिषद)
तोगमलै रोड, थायनूर पोस्ट,
तिरुच्चिरापक्कि. – ६२० १०२. तमिलनाडु

ICAR - National Research Centre for Banana
(Indian Council of Agricultural Research)
Thogamalai Road, Thayanur P.O.
Tiruchirappalli - 620 102, Tamil Nadu, India



F.No.28(1)/2019-2020-SP/ 3389

Dated : 22.01.2020

Bids Inviting Notice

Bids – Double (Technical and Financial) are invited by the Director, ICAR - NRC for Banana, Tiruchirappalli, for the **Research Services - “Transcriptome Analysis”** - as per specifications furnished in the tabular column in Annexure-A.

1. THE FIRM SHOULD INVARIABLY QUOTE THE GST Registration Number, if not the bid will be rejected.
2. Bidders should upload .pdf of copies of technical specification of similar research services undertaken, details of services executed so far, satisfactory work completion report of organizations.
3. Rate per unit should also be given precisely and delivery period clearly mentioned.
4. The bid should be F.O.R. destination and should be kept open for 24 months from the date of bid.
5. Delivery of the products should be made at the Institute premises of ICAR – NRCB Office cum Laboratory Building, Near Thayanur Santhai, Thogamalai Road, Tiruchirappalli-620102, Tamil Nadu.
6. The financial bids should be filled in (BoQ format) available in the e-Procurement of Central Public Procurement Portal on or before **14.02.2020 by 10.00AM**. The bids will be opened on **15.02.2020 at 10.00AM**.
7. Preference will be given to bids of research organizations (without any intermediary) involved in execution of the services.

No request in regard to clarification on any grounds would be entertained after 15 days from the opening of Technical / Financial bids.

The right to accept or to reject all or any of the bids in part or full is reserved.


Asst. Admn. Officer

Copy to:

1. The Nodal Officer- CPPP e-procurement for uploading in CPP – e-procurement Portal
2. Mr.R.Neela Mega Shyamala Kannan, Stenographer Gr.III - Tender Creator
3. Mrs.C.Gomathi, A.F.A.O. - Tender Publisher
4. Dr.I.Ravi & Dr.V.Kumar, Dr.D.Ramajayam, Bid Openers, Dr.M.Loganathan, Bid Evaluator

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Description of services

| Sl. No. | Description | Qty. |
|---------|--|------------|
| 1. | <p>Transcriptome sequencing and analysis of banana sample</p> <p>RNA Extraction and Quality control</p> <ul style="list-style-type: none"> Extraction of high quality total RNA from the banana sample followed by quality control using Bioanalyzer and QC reports RIN numbers should be provided before library preparation. Preparation of paired end RNA sequencing library using illumina adapters. Sequencing reads of 2 X 150 base pairs using Illumina HiSeq 2500/4000 sequencing platform should be generated, minimum no of good quality reads should be 60/100 million for each sample. <p>Transcriptome assembly and data analysis</p> <ul style="list-style-type: none"> Transcriptome data should be assembled against the reference genome. Comparative transcriptome analysis and prediction of differentially expressed genes and their expression levels should be done. Differential gene expression in terms of TPM (transcripts per million), RPKM (Reads per Kilobase of Exon per Million Fragments) and differential gene expression has to be carried out using Trinity-Cufflink suite or any equivalent tools and should be delivered in easily interpretable manner for all combinations of comparative datasets. Identification of differentially expressed genes and their GO enrichment among the samples and also isoform specific differential expression. Finding homologous genes and transcriptional factors, functional annotation (GO and KEGG analysis) non-redundant protein database (NR, NCBI), Gene Ontology (GO), and the Kyoto Encyclopedia of Genes and Genomes (KEGG) database. The output of these analyses should be given in all presentable formats – suitable graphical charts. Gene prediction, molecular pathway analysis, annotation of contigs for putative genes followed by discovery of SSRs, SNPs, long non-coding RNAs, COGs, transcription factors and miRNA information along with methodology and QC reports should be done. Advanced analysis - Digital gene expression, GC content identification and functional annotation to mRNA and proteins of related species. Submission of raw sequence data in FASTQ, annotated contigs, SSRs and SNPs information along with methodology and QC reports Functional classification of pathway terms for differentially expressed genes. The pathway annotations must be acquired with KAAS using an e-value threshold of $\leq 10^{-10}$. Total differentially expressed genes must be classified into pathway categories. The data for pathway categories that represented less than 1% of the differentially expressed genes should be included in other pathway categories. Alignment of reads across splice junctions to identify isoforms, novel transcripts, gene dosage and gene fusions. Identify and quantify both rare and common transcripts among the samples. Prediction of different classes of proteins (membrane proteins, secreted proteins, and other cellular localization) based on signal peptides using SignalP, TargetP, WolfPSORT, etc. Mapping of reads or overall transcript synteny with <i>Oryza sativa</i> and <i>Zea mays</i> genes, if required. Reference based assembly: High quality reads has to be mapped on the banana reference genome; mitochondrial and chloroplast genome for control and treated samples. Unmapped references should be given separately. Predicted transcripts have to be delivered based on their position in banana reference genome. Statistical validation of the gene expression data using standard methodologies. Prediction of significant changes in the metabolic and hormonal pathways among the samples and annotation using KEGG. | 06 samples |

- Global analysis of transcriptome datasets of biological replicates. (a) Bar plot describing the number of expressed transcripts after filtering. (b) Principal component analysis (PCA) of transcriptome data with the principal component value.
- Prediction of candidate secreted effector proteins (CSEPs) and with their separate comparative expression data.
- Should provide the Venn diagram with the number of overlapping genes between and among the samples. Venn diagrams must represent the overlaps of induced and repressed genes across comparisons. Induced and repressed genes for each pairwise comparison. Heat map of the expression profiles must be provided.
- Hierarchically clustered heat map of differentially expressed genes/gene family as groups.

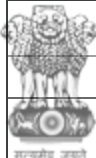

Additional post sequencing free support

- Lab and bioinformatics training should be provided for at least two person.
- The service provider may also provide publication quality data/ support for publishing the NGS data. Submission of raw sequence data in FASTQ format along with QC reports should be provided.
- Turnaround time should be 8 – 12 weeks from the samples pass to the QC.

Essential Terms and Conditions

- Participating companies (the service provider) should have their own Illumina HiSeq 2500/4000 platform (Should enclose a certificate for it). Two Dye system platform i.e. Illumina NextSeq 500 etc. shall not be entertained. If required committee can visit and check the facility of participating companies. The bidder should provide proof of in-house NGS facility and Bioinformatics analysis in India and price quoted must be valid for two years and DSIR certificate should be enclosed for the same. Service provider should be certified as per ISO Standards.
- Sample purification and QC check-up by Agilent Bio Analyzer should be performed by the service provider. Data generated from RNA quality check passed samples should be comparable to other samples, Firm must generate the comparable data (without any additional charges). If the generated data found to be deviating significantly from other samples, necessary actions should be taken to address them. Also, if there is any error in sequencing or bioinformatic analysis, it should be rectified without any additional charges.
- Price should be quoted as per sample cost (Price per transcriptome sample).
- Samples or data should not be outsourced outside India at any stage.
- Should maintain the confidentiality of the project
- The service provider should have well supported bioinformatics expertise to execute the given specifications.
- References of the previous work records and/or publications in high throughput comparative transcriptome analysis of more than 10 samples should be provided.
- **Validity of the quotation should be for at least 24 months.**
- Assistance should be provided for submission of transcriptome datasets to NCBI.
- Data analysis training for two persons must be provided at their site of analysis and participation of the trainees at any point of the study is required.
- **Further assistance on the part of data analysis, as and when required (at least for the period of 24 months from the date of handing over the analysed data).**


 Asst. Admn. Officer

|  Government eProcurement System | | eProcurement System Government of India | | | |
|---|---|---|------------------------|------------------------------|---------------------|
| Tender Details | | | | | |
| Date : 22-Jan-2020 03:15 PM | | | | | |
|  Print | | | | | |
| Basic Details | | | | | |
| Organisation Chain | Department of Agricultural Research and Education Indian Council of Agricultural Research,DoARE,MoA National Research Centre for Banana-Tamil Naidu | | | | |
| Tender Reference Number | F.No.28(1)/2018-2019-SP/ | | | | |
| Tender ID | 2020_DARE_538154_1 | | | | |
| Tender Type | Open Tender | Form of contract | Piece-work | | |
| Tender Category | Services | No. of Covers | 2 | | |
| General Technical Evaluation Allowed | No | ItemWise Technical Evaluation Allowed | No | | |
| Payment Mode | Not Applicable | Is Multi Currency Allowed For BOQ | No | | |
| Is Multi Currency Allowed For Fee | No | Allow Two Stage Bidding | No | | |
| Cover Details, No. Of Covers - 2 | | | | | |
| Cover No | Cover | Document Type | Description | | |
| 1 | Fee/PreQual/Technical | .pdf | Transcriptome Analysis | | |
| 2 | Finance | .xls | Transcriptome Analysis | | |
| Tender Fee Details, [Total Fee in ₹ * - 0.00] | | | | EMD Fee Details | |
| Tender Fee in ₹ | 0.00 | Fee Payable To | Nil | Fee Payable At | Nil |
| Tender Fee Exemption Allowed | No | | | | |
| EMD Amount in ₹ | 0.00 | EMD through BG/ST or EMD Exemption Allowed | No | | |
| EMD Fee Type | fixed | EMD Percentage | NA | | |
| EMD Payable To | Nil | EMD Payable At | Nil | | |
| Work /Item(s) | | | | | |
| Title | F.No.28(1)/2019-2020-SP/3389 | | | | |
| Work Description | Transcriptome Analysis | | | | |
| Pre Qualification Details | Please refer Tender documents. | | | | |
| Independent External Monitor/Remarks | NA | | | | |
| Show Tender Value in Public Domain | Yes | | | | |
| Tender Value in ₹ | 4,20,000 | Product Category | Miscellaneous Services | Sub category | NA |
| Contract Type | Tender | Bid Validity(Days) | 720 | Period Of Work (Days) | 45 |
| Location | ICAR-NRC for Banana | Pincode | 620102 | Pre Bid Meeting Place | NA |
| Pre Bid Meeting Address | NA | Pre Bid Meeting Date | NA | Bid Opening Place | ICAR-NRC for Banana |
| Should Allow NDA Tender | No | Allow Preferential Bidder | No | | |
| Critical Dates | | | | | |
| Publish Date | 22-Jan-2020 05:00 PM | Bid Opening Date | 15-Feb-2020 10:00 AM | | |

| | | | |
|--|----------------------|--|----------------------|
| Document Download / Sale Start Date | 22-Jan-2020 05:00 PM | Document Download / Sale End Date | 14-Feb-2020 10:00 AM |
| Clarification Start Date | 22-Jan-2020 05:00 PM | Clarification End Date | 14-Feb-2020 10:00 AM |
| Bid Submission Start Date | 22-Jan-2020 05:00 PM | Bid Submission End Date | 14-Feb-2020 10:00 AM |

Tender Documents

| NIT Document | S.No | Document Name | Description | Document Size (in KB) |
|---------------------|-------------|----------------------|------------------------|------------------------------|
| | 1 | Tendernotice_1.pdf | Transcriptome Analysis | 1836.70 |

| Work Item Documents | S.No | Document Type | Document Name | Description | Document Size (in KB) |
|----------------------------|-------------|----------------------|----------------------|------------------------|------------------------------|
| | 1 | BOQ | BOQ_563666.xls | Transcriptome Analysis | 275.50 |

Bid Openers List

| S.No | Bid Opener Login Id | Bid Opener Name | Certificate Name |
|-------------|----------------------------|------------------------|-------------------------|
| 1. | iravi24@gmail.com | Ravi I | IYYAKUTTY RAVI |
| 2. | kumarnrcb@gmail.com | Kumar V | VADIVEL KUMAR |
| 3. | ramajayamd@gmail.com | Ramajayam Devarajan | RAMAJAYAM D |

Tender Inviting Authority

| | |
|----------------|---|
| Name | Director |
| Address | ICAR-NRC for Banana, Thogamalai Road, Thayanur Post, Tiruchirappalli Tamil Nadu |

Tender Creator Details

| | |
|---------------------|---------------------------------------|
| Created By | Neela Mega Shyamala Kannan Ramalingam |
| Designation | Stenographer |
| Created Date | 22-Jan-2020 12:44 PM |