

A Mobile Cloudlet Assisted Architecture for Handling Multimedia Applications

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Abstract. Multimedia comprises of different types of data formats from various sources. Handling the task of processing complex multimedia data is a big challenge and requires offloading to the cloud. The result is subsequently passed back to the Smart Mobile Device (SMD). This processing activity requires substantial amount of processing power and large network bandwidth of the cloud. As the output on the SMD needs to be of superior quality, there is a need for having a robust architecture which can run these resource intensive multimedia applications in an efficient manner. This work proposes an architecture which is assisted by the cloud, and helps in processing the multimedia applications in a fast and efficient manner. Also, the cloudlet assisted architecture has been proposed, where a mobile device will select a cloudlet based on the Borda Scores Method (BSM) and based on the request, the selected cloudlet then acknowledges the multimedia sensor nodes and the results are sent back to the respective mobile device.

Keywords. Cloudlet, mobile device, public cloud, SMD, BSM.

1 Introduction

The growing popularity of mobile devices in the present world is indicative of the fact that in the future, the world would expect almost all different

types of applications on the mobile devices like SMDs, tablets, laptops, etc. This will help to bring all the control in the hands of the user via the mobile devices [1, 20, 21, 22]. In today's world, we find that every person in all parts of the world carries a mobile in their hand. There are close to $6.8 * 10^9$ mobile devices (connections / 100 citizens = 97 mobiles), and the connection speed will increase to 6.5 Mbps by 2020 [2].

Looking from the business perspective, it is estimated that the market of Mobile Cloud will touch around 46.90 Billion USD by 2019 [2]. Mobile devices come in very handy when you want to run any mobile application at any place and get instant service like m-commerce, checking price, paying for your services, GPS, medical or any other services [3, 23]. On the contrary, when using a mobile device, we need to compromise on the battery life, network connectivity quality using 3G / 4G and security concerns. Currently, we are experiencing a convergence of both the mobile devices and cloud computing. The cloudlet plays an important role in bringing both of these together [4].

Cloudlets comprise of a network of various mobile devices (example – SMD's, Tablets, laptops, etc.) which provide the user with the resources

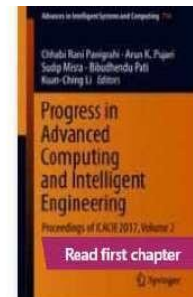
A Novel Approach to Minimize Energy Consumption in Cloud Using Task Consolidation Mechanism

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Abstract

Task consolidation is a process to increase usage of cloud computing resources. Maximizing the utilization of resources provides numerous advantages like the customization of IT services, quality of service, and candid services. However, increasing the utilization of resources does not mean optimal energy usage. Most of the researches indicate that the consumption of energy and the utilization of resources in clouds are exceptionally conjugated. The idea of performing the consolidation of tasks is to decrease the usage of resources in order to save energy, while another effort is to maintain a balance between the usage of energy and utilization of resources. In this work, we propose an architecture for minimizing energy consumption in cloud. We used an algorithm for task consolidation in the proposed architecture to minimize energy

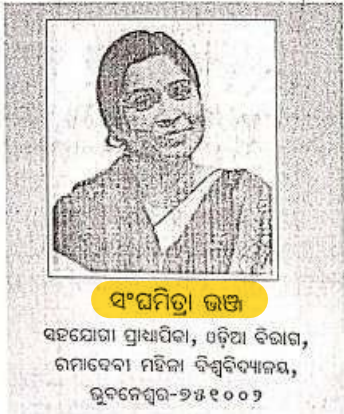


ଆଦିବାସୀ ପର୍ବପର୍ବାଣି

ଆଦିବାସୀ ଅଧିକ୍ଷିତ ରାଜ୍ୟ ଓଡ଼ିଶାର ସାଂସ୍କୃତିକ ମହନୀୟତାର ଅନ୍ୟତମ ବଳିଷ୍ଠ ରୂପ ହେଉଛି ଆଦିବାସୀଙ୍କ ପର୍ବପର୍ବାଣି । ସେମାନେ ଶିଶୁଜନ୍ମ, ନାମକରଣ, ଝିଅ ବତ୍ସହେବା, ବିବାହଉତ୍ସବ, ଶ୍ୟାମଭସ୍ମ, ଶୁଣ୍ଢିକୁଣ୍ଡାଳି ବିବିଧ କ୍ଷେତ୍ରରେ ଅସଂଖ୍ୟ ରୀତି-ନୀତି, ଲୋକନାଚ, ବିଶ୍ୱାସ ତଥା ପୂଜାକର୍ତ୍ତବ୍ୟ ମାନ୍ୟତା ପ୍ରଦାନ କରିଥାନ୍ତି । ଏ ସମସ୍ତ ବିଧିବିଧାନ ସହିତ ସାଙ୍ଗାତିକ ପରିବେଶଟିଏ ସଦାସର୍ବଦା ସଂଶ୍ଳିଷ୍ଠ ଥାଏ । ବିକଳିତ ଅଞ୍ଚଳର ଲୋକସଙ୍ଗୀତ ଓ ଲୋକନୃତ୍ୟ ସେମାନଙ୍କ ଗୋଷ୍ଠୀ ଜୀବନର ଅଭିନ୍ନ ଅଂଶବିଶେଷ । ତୋଳ, ବାଜା, ମାଦଳ, ମହୁରି, ଚାନ୍ଦ୍ର, କେନ୍ଦରା, ବଂଶୀ, ଟାମକ, ତେଜା, ପାଣିଲାଉଡ଼ି ଏବଂ ତ୍ରିବିତ୍ତ ଇତ୍ୟାଦି ବାଦ୍ୟଯନ୍ତ୍ରର ଜାତୀୟ ମୂର୍ତ୍ତିନା ସେମାନଙ୍କ କର୍ମକୃତ ଜୀବନକୁ ସଜ୍ଜିତ ପ୍ରଦାନ କରୁଥିବା ମନେହୁଏ । ବିଶେଷତଃ କୋରାପୁଟ, କନାରାଣ୍ଡି, ମୟୂରଭଞ୍ଜର ବାସୁନୃତ୍ୟ, ପୁମୁଣା, ଝର ନୃତ୍ୟାଦି ଏବଂ ସମ୍ବଲପୁର, ବନାଞ୍ଚାଳ, ପ୍ରସରଗଡ଼ଜାତ ଜର୍ମା ନାଚ, ଡାଲୁଖାଉ

ନାଚରେ ବ୍ୟବହୃତ ବାଦ୍ୟଯନ୍ତ୍ର ମୂର୍ତ୍ତିନା ବେଶ୍ ଶ୍ରୁତିମଧୁର ।

ନିୟତ ଅରଣ୍ୟାଳୟ ଯେଉଁ ଗିରିଗୁହାର ନୈସର୍ଗିକ ପ୍ରକୃତି ଭିତରେ ଆଦିବାସୀମାନଙ୍କ ଜୀବନଶୈଳୀ ସହରୀ ବାବଦକ୍ୟାଠାରୁ ବହୁ ଦୂରରେ ଥାଏ ।



ସଂପାଦିତା ଭଞ୍ଜ

ସହଯୋଗୀ ପ୍ରାଧ୍ୟାପିକା, ଓଡ଼ିଆ ବିଭାଗ,
 ରାମାଦେବୀ ମହିଳା ବିଶ୍ୱବିଦ୍ୟାଳୟ,
 ଭୁବନେଶ୍ୱର-୭୫୧୦୦୨

ସେମାନଙ୍କ ପାଇଁ ଅରଣ୍ୟାଳୟ ହିଁ ସେମାନଙ୍କ ସଂସ୍କୃତିର କେନ୍ଦ୍ରସ୍ଥଳ ଏବଂ ସାଧନାପୀଠ । ବିଶ୍ୱାସ-ଅନ୍ଧବିଶ୍ୱାସକୁ ନେଇ ଯେତେବେଳେ ଚର୍ଚ୍ଚ-ବିବାଦର ବହୁ ଉର୍ଦ୍ଧ୍ୱରେ ଆଦିବାସୀମାନେ ଅତି ସରଳ-ନିରାତ୍ମକ-ଦାର୍ଶନିକ ଭାବମୂଳ୍ୟକୁ ନେଇ ବେଶ୍ ପ୍ରମତ୍ତଭାବେ ପ୍ରକୃତି ସେମାନଙ୍କ ଆତ୍ମାକୁ ଆହୁରଣ କରିଥାଏ । ପ୍ରାକୃତିକ ପରିବେଶନା ଭିତରେ ସେମାନେ ଅତ୍ୟନ୍ତ ସୁନ୍ଦର ଏବଂ ସବୁଷ୍ଟ ଥାଆନ୍ତି । ସେମାନେ ପ୍ରକୃତି ଉପାସକ । ଅଗ୍ନି, ଜଳ, ପବନ, ଚନ୍ଦ୍ର, ସୂର୍ଯ୍ୟ ଇତ୍ୟାଦିକୁ ଦେବତା ଭାବରେ ପୂଜା କରନ୍ତି, ପୁନଶ୍ଚ ପୂର୍ବପୁରୁଷଙ୍କ ପ୍ରେରାଣା, ଭୂତ, ପିତାତ, ରାକ୍ଷସ, ତାହାଣୀ ଭଳି ଭୌତିକ ସରା ସେମାନଙ୍କର ପୂଜ୍ୟ । ସେମାନଙ୍କ ପରମ୍ପରାରେ ବୃକ୍ଷ, ଶ୍ୟାମାଦି ଦେବତା ରୂପେ ଉପାସ୍ୟ । ଏମିତିକି ମହୁଳ, ଖୋପା, ଗୋହରା ଇତ୍ୟାଦି ବୃକ୍ଷକୁ ପୂଜାର୍ଚ୍ଚନା କରିବା ସହିତ ସେମାନେ ନିଜ ବାଦ୍ୟଯନ୍ତ୍ରମାନଙ୍କୁ ମଧ୍ୟ ଦେବାତ୍ମକ୍ୟ ପୂଜା କରିଥାନ୍ତି ।

ଓଡ଼ିଶାରେ ପ୍ରାୟତଃ ୧୨ ଗୋଷ୍ଠୀର ଆଦିବାସୀ ଚିହ୍ନିତ ଯୋଗ୍ୟ । ଆଦିବାସୀମାନଙ୍କ ମଧ୍ୟରେ ମୁଖ୍ୟତଃ

Saigheer Bhujia

DATALET: An approach to manage big volume of data in cyber foraged environment

Chhabi Rani Panigrahi^a , Joy Lal Sarkar^b , Mayank Tiwary^c , Bibudhendu Pati^d ,
Prasant Mohapatra^d 

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Abstract

In the new era of cloud computing, the users get various services from the cloud. In recent years, the increasing volume of data specially from pervasive devices has become a great matter of concern. In mobile computing, cloudlets act as a shadow image of the data centers and provide low latency cloud environment. In this work, the authors have proposed an approach called *DATALET* that deals with distribution of data by utilizing the processing and storage resources of big intermittent networks. In *DATALET*, the cloudlets act as central managers for data management. *DATALET* provides a robust architecture which is fault-tolerant and also has a cloudlet job scheduler. The cloudlets maintain the information based on the availability of the user at a particular location and also utilize their computational resources. The model is simulated using NS-3 and will also provide the service in an environment where the network does not exist. The results indicate that *DATALET* approach has higher performance in terms of latency, Internet outgoing bandwidth for the users and resource utilization of the user devices.

Design and Development of Secured Framework for Efficient Routing in Vehicular Ad-Hoc Network

Authors:  [Mamata Rath](#),  [Bibudhendu Pati](#),  [Binod Kumar Pattanayak](#) [Authors Info & Claims](#)

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Abstract

Due to many challenging issues in vehicular ad-hoc networks (VANETs), such as high mobility and network instability, this has led to insecurity and vulnerability to attacks. Due to dynamic network topology changes and frequent network re-configuration, security is a major target in VANET research domains. VANETs have gained significant attention in the current wireless network scenario, due to their exclusive characteristics which are different from other wireless networks such as rapid link failure and high vehicle mobility. In this are, the authors present a Secured and Safety Protocol for VANET (STVAN), as an intelligent Ad-Hoc On Demand Distance Vector (AODV)-based routing mechanism that prevents the Denial of Service attack (DoS) and improves the quality of service for secured communications in a VANET. In order to build a STVAN, the authors have considered a smart traffic environment in a smart city and introduced the concept of load balancing over VANET vehicles in a best effort manner. Simulation results reveal that the proposed STVAN accomplishes enhanced performance when compared with other similar protocols in terms of reduced delay, better packet delivery ratio, reasonable energy efficiency, increased network throughput and decreased data drop compared to other similar approach.

Development of a colloidal gold strip-based immunochromatographic assay for rapid detection of *Fusarium oxysporum* in ginger

Monalisa Ray, K Gopinath Achary, Sanghamitra Nayak, Shikha Singh

First published: 17 June 2019 | <https://doi.org/10.1002/jsfa.9859> | Citations: 4

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Abstract

BACKGROUND

Rhizome rot, caused primarily by *Fusarium oxysporum*, is one of the most destructive diseases leading to significant loss in ginger worldwide. The loss can be greatly reduced by proper disease management practices steered by accurate and early diagnosis of pathogens. Pathogen detection at an early stage of infection can also reduce the incidence of disease epidemics. Classical methods are often time consuming, relying on culturing the putative pathogens and the availability of expert taxonomic skills for accurate identification, which leads to the delayed application of control measures. The development of a simple, rapid, sensitive and cost-effective point-of-care diagnostic tool is thus one of the major research priorities for rhizome rot.



Effect of different extraction techniques on total phenolic and flavonoid contents, and antioxidant activity of betelvine and quantification of its phenolic constituents by validated HPTLC method

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Abstract

The objective of the study is to analyze the effect of different extracting methods on the polyphenolic content and antioxidant activities in *Piper betle* leaves. In the present research, *P. betle* leaf extract was prepared by sonication, Soxhlet and maceration methods using acetone (100%, v/v). The efficiency of the extraction methods was estimated by quantifying the total phenolic content (TPC) by the Folin–Ciocalteu method and total flavonoid content (TFC) by AlCl₃ colorimetric methods, and antioxidant power of the various extracts was determined by DPPH (2,2-diphenyl-1-picrylhydrazyl) and ABTS 2,2'-azino-bis(3-ethylbenzthiazoline-6-sulfonic acid) radical scavenging assay. Thin-layer chromatography (TLC) bioautography was carried out to identify antioxidants, and their amount was determined by the newly developed high-performance thin-layer chromatography (HPTLC) method. DPPH free radical scavenging capacity of the different extracts from strongest to weakest was as follows: ascorbic acid (4.27 µg/mL) > sonication (5.35 µg/mL) > , maceration (5.53 µg/mL) > , soxhlet extraction (5.83 µg/mL). Same trend was also observed for the ABTS radical scavenging capacity. Similarly, findings of this study also showed that sonication extract possessed highest phenolic and flavonoid contents followed by maceration and Soxhlet extraction. In addition, important bioactive phenolic constituents which contribute largely towards antioxidant potential such as eugenol and eugenol acetate were quantified using HPTLC (high-performance thin-layer chromatography) method. The average percent recovery of eugenol and eugenol acetate was found to be 97.28% and 98.04%, respectively. The LOD (limit of detection) and LOQ (limit of quantification) for eugenol were 5 and 15 ng/spot, whereas that of eugenol acetate were 10 and 30 ng/spot. The HPTLC densitometric determination also supported the results of antioxidant assays by revealing the presence of higher amount of identified antioxidants in sonication followed by maceration and Soxhlet extraction. The developed HPTLC chromatogram profile may be used as a reference for the standardization of *P. betle* leaf extracts.

Keywords HPTLC · DPPH · Eugenol · Phenolic · Flavonoid

Introduction

Piper betle belongs to the Piperaceae family which has been considered to be one of the most important plants having a significant medicinal value and has a variety of applications

from a variety of pharmacological activities. This plant is widely distributed throughout East Africa and the tropical regions of Asia which is originated in central and eastern peninsular Malaysia (Pin et al. 2010; Jaganath 2000). Betelvine being a commercial crop is cultivated in many regions of India and Sri Lanka (Guha 2006). Betel leaves are known to consist of fat 0.8, carbohydrate 6.1, moisture 85.4, fiber 2.3, calcium 230 mg, protein 3.1, phosphorous 40 mg, iron 7 mg, carotene (as vitamin A) 9600 IU, vitamin C 5 mg/100 g, riboflavin 30 µg, iodine 3.4 µg, nicotinic acid 0.7 mg and thiamine 70 µg (Periyannayagam et al. 2012). The leaf extract of *Piper betle* contains substantial quantities of bioactive compounds such as polyphenols,

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Endophyte-Mediated Host Stress Tolerance as a Means for Crop Improvement

Satyabrata Nanda, Bijayalaxmi Mohanty & Raj Kumar Joshi 

Reference work entry | [First Online: 12 June 2019](#)

Part of the [Reference Series in Phytochemistry](#) book series (RSP)

Abstract

Plants being sessile are continuously exposed to a wide range of biotic and abiotic stresses that exert adverse effect in their growth and development. Various physiological, biochemical, and molecular machineries are employed by the plants to overcome these stresses. Endophytes are mostly the symbiotic fungi and bacteria that reside inside the plant tissue and stimulate plant growth during stress conditions. Endophyte-mediated plant stress tolerance holds significant role in the analysis of plant-microbe interactions. Although still at its infancy, the endophyte-mediated host stress tolerance including drought, salinity, high-temperature stresses, and pathogenic infection has been well described in the recent times. The molecular mechanism governing the endophyte-mediated stress response includes the induction of plant stress genes and regulation of reactive oxygen species. In the present review, we discuss the evidences for bacterial and fungal endophyte-mediated stress tolerance and associated mechanisms. This information from this review will help the scientific community in the development of suitable biotechnological approaches toward usage of endophyte microbes in the improvement of crop yield under multiple stress conditions.

Keywords

Symbiosis

Endophyte

Biotic stress

Abiotic stress

Stress-related genes

Fungi



ଗଚ୍ଛହୀନ ଗଚ୍ଛସୂତା : ଶ୍ରୀ ଆଭାସ ବରାଳ

ଡ. ସଂପତ୍ତିତ୍ରା ଭଞ୍ଜ

ଆଦିତ୍ୟ ପ୍ରଦେସର
ଜନାଦେବା ମହିଳା ବିଶ୍ୱବିଦ୍ୟାଳୟ

‘ଜାଳା ହେଉଛି ଜୀବନର ଛାୟାଚିତ୍ର । ଜୀବନର ଛାୟାକୁ ପରିମଣକର ଚିତ୍ର ଅଙ୍କନ କରେ କଳା । କଳାର ତୀର୍ଥରୁ ରହିଛି ଜିଉଁଥିବା ମଣିଷର ନିଦା ଜୀବନ ପରିଧି ଭିତରେ । ଜୀବନର ବାହାରେ କୌଣସି କଳା ନାହିଁ କି ସତ୍ୟ ନାହିଁ ।’ (୧) ମଣିଷର ଏହି ନିଦା ଜୀବନ ପରିଧିକୁ ଅତି ଅଭିନବ ପରିପାଟୀରେ କଳାତ୍ମକ କରି ଗଢ଼ି ତୋଳିଥିବା ସର୍ବତ୍ର କଥାକାର ଶ୍ରୀ ଆଭାସ କୁମାର ବରାଳ ଚଳଚ୍ଚିତ୍ର ସମୟର ଜଣେ ବହୁଧାରିତ ଚଳଚ୍ଚିତ୍ର କଥାକାର । କଥାକାରୀତ୍ୱରେ ନୂତନ ଆର୍ତ୍ତନୈତିକ ସୌକୁମାର୍ଯ୍ୟ ସହିତ କଥାକଥୁରେ ନିରୁତା ଅଣପାରମ୍ପରିକ ମୂଲ୍ୟବୋଧର ଉପସ୍ଥାପକ ଶ୍ରୀ ଆଭାସ କୁମାର ବରାଳ ୧୯୮୦ ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ କଥାକାରୀତ୍ୱକୁ ଦେଇଛନ୍ତି ଏକ ନୂତନ ପରିଚୟ । ୧୯୮୦ ପରବର୍ତ୍ତୀ ଅନ୍ୟାନ୍ୟ ବିଶିଷ୍ଟ କଥାକାରମାନଙ୍କ ପରି ସେ ମଧ୍ୟ ଜୀବନ-ଜଗତର ବାସ୍ତବ ସତ୍ୟ, ସଂପର୍କ, ମଣିଷର ସ୍ୱେଦ-ଶ୍ରଦ୍ଧା, ମାନବ ସୂକ୍ଷ୍ମ ବିଶ୍ଳେଷଣ, ଶିକ୍ଷିତ ମଧ୍ୟବିତ୍ତ ବ୍ୟକ୍ତିଚେତନାର ଅନୁଭୂତି, ସ୍ୱାମୀ-ସ୍ତ୍ରୀ ମଧ୍ୟରେ ବିଭିନ୍ନତାବୋଧ, ଅବିଶ୍ୱାସ, ମାଟି, ପାଣି, ପତନ, ବାହ୍ୟ ପ୍ରକୃତିରୁ ଅର୍ତ୍ତପ୍ରକୃତି, କାହାଣୀ ସହିତ କାହାଣୀହୀନତା, ମୁକ୍ତ ରାଜନୀତି, ଅଚରାସ୍ତ୍ରୀୟ

ଭାବଧାରା, ଜଗତାକରଣ, ମୁକ୍ତ ବ୍ୟାବସାୟିକ ପରିଧି ତଥା ନିର୍ଦ୍ଦିଷ୍ଟ ବିନ୍ଦୁରେ ସ୍ଥିର ନ ରହି ଅଚରାସ୍ତ୍ରୀୟ ଆଡ଼କୁ ଉନ୍ମୁଖ ଜଗତର ବିବିଧ ରୂପରଙ୍ଗକୁ ନେଇ ଶ୍ରୀ ବରାଳ ଶକରାଗ ତୋଳିଛନ୍ତି । ସମୟର ଶାଣିତ-ବାସ୍ତବସ୍ୱର ତାଙ୍କ ଶୈଳୀର ଏକ ବିଶିଷ୍ଟ ବିଗଳ ନିର୍ଦ୍ଦେଶ କରେ । ତାଙ୍କ ଶବ୍ଦରେ - “ଶିଳ୍ପୀ କରୁଣା ନୁହେଁ- ଶିଳ୍ପକଳାକାର କରୁଣା ନୁହେଁ କଳା ହିଁ ମୁଖ୍ୟ କଥା । କାରଣ ଶିଳ୍ପ-ଶିଳ୍ପୀକୁ ତଥା କଳା-କଳାକାରକୁ ସ୍ୱତଃସିଦ୍ଧ ଭାବରେ ଆତ୍ମପରିଚିତି ପ୍ରଦାନ କରିବାରେ ସମର୍ଥ ।” ଓଡ଼ିଶାର ବିଶିଷ୍ଟ ଶିକ୍ଷାବିତ୍ର ଶ୍ରୀ ଅବନୀ କୁମାର ବରାଳ ଏବଂ ଅଧ୍ୟାପିକା ମାତା ଶ୍ରୀମତୀ ଆଦରମଣି ଦେବୀଙ୍କ ଯୋଗ୍ୟ ଦାୟାଦ ଭାବରେ ଗାନ୍ଧିକ ଶ୍ରୀ ଆଭାସ କୁମାର ବରାଳ ୧୯୭୦ ମସିହା ଅକ୍ଟୋବର ୩୦ରେ କଟକ ଜିଲ୍ଲାର ତରରପଡ଼ାରେ ଜନ୍ମଗ୍ରହଣ କରିଥିଲେ । ୧୯୭୭ ମସିହାରେ ଭୁବନେଶ୍ୱର ସରକାରୀ ଉଚ୍ଚ ବିଦ୍ୟାଳୟ ଯୁନିଟ ୧ରୁ ମ୍ୟାଟ୍ରିକ, ୧୯୭୯ ମସିହାରେ ବିଜେବି କଲେଜରୁ ଇଂରେଜି-ଏସ୍, ୧୯୮୧ ମସିହାରେ ପ୍ରାଣନାଥ ମହାବିଦ୍ୟାଳୟ, ଖୋର୍ଦ୍ଧାରୁ ସ୍ନାତକ, ୧୯୮୩ ମସିହାରେ ରେଭେନ୍ସାରୁ ସ୍ନାତକୋତ୍ତର ତଥା ୧୯୮୬ ମସିହାରେ

ବନାରସ ବିଶ୍ୱବିଦ୍ୟାଳୟରୁ ଇଂରାଜୀରେ ଏମ୍.ଫିଲ ଡିଗ୍ରୀ ପ୍ରାପ୍ତ କରି ସଂପୂର୍ଣ୍ଣ ପ୍ରାଣନାଥ ମହାବିଦ୍ୟାଳୟ ଖୋର୍ଦ୍ଧାରେ ଅଧ୍ୟାପନାରେ ଅଛନ୍ତି । ସେ ଜଣେ ପ୍ରତିଭା ସଂପନ୍ନ ବ୍ୟକ୍ତି । ସେ ଏକାଧାରରେ ଜଣେ କବି, ଗାଳ୍ପିକ, ଔପନ୍ୟାସିକ, ପେଣ୍ଡର, ଉତ୍ପାଦନ ଏବଂ ସର୍ବୋପରି ଇଂରାଜୀ ଭାଷା ସାହିତ୍ୟର ଜଣେ ନିଆରା ଅଧ୍ୟାପକ । ଜୀବନକୁ କଳାତ୍ମକ ଭାବରେ ଛିଣ୍ଟିବା ସତେ ଯେମିତି ତାଙ୍କର ଏକ ସ୍ୱାଭାବିକ କର୍ମ । ଜୀବନକୁ କେନ୍ଦ୍ର କରି ଜିଣିବା ଓ ଦେଖିବାର ଦୃଷ୍ଟିନିକ ଆଭିମୁଖ୍ୟଟି ଯେମିତି ତାଙ୍କ ବ୍ୟକ୍ତିତ୍ୱ ଭିତରୁ ଉଦ୍ଧୃତ ଉଠେ, ସେମିତି ଅନ୍ୟ କାହାପାଖରେ ମିଳିବା ଦୁଷ୍ପର । ତାଙ୍କ ଭିତରେ ଅହରହ ଦୁଇଟି ସଭାର ସମ୍ମୁଖିତ ଅବସ୍ଥାକୁ ପାଠକ ଉପକ୍ରମ କରିପାରେ । ଜଣେ ଅଧ୍ୟାପକ ରୂପେ ଅନ୍ୟତ୍ର ଜଣେ କଳାକାର ରୂପେ ସେ ନିଜକୁ ବେଶ୍ ଏକ ପରିଧି ଭିତରେ ସାଉଁଟି ଧରିଥାନ୍ତି । ଗୋଟିଏ ସଭା ଅନ୍ୟତ୍ରକୁ ଅତିକ୍ରମ ନକରି ବରଂ ଆଦରି ନେଇଥିବା ମନେହୁଏ । ତାଙ୍କ ପେଣ୍ଡା-ନିଶାନ ସମନ୍ୱୟ ଏବଂ ଆର୍ତ୍ତିଷ୍ଟିକ ମାନସିକତା ତାଙ୍କୁ ଓଡ଼ିଆ ପାଠକଙ୍କ ନିକଟରେ ସ୍ୱତନ୍ତ୍ର କରି ଗଢ଼ିତୋଳିଛି ।

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Green Synthesis of Silver Nanoparticles using Azadirachta Indica and Ocimum Sanctum Leaf Extract

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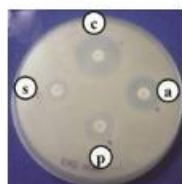
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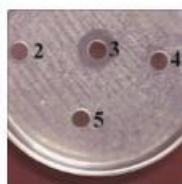
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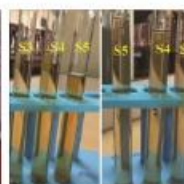
Figures



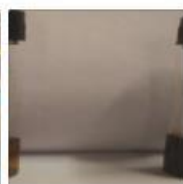
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Isolation and Identification of Lead (Pb) Solubilizing Bacteria from Automobile Waste and Its Potential for Recovery of Lead from End of Life Waste Batteries

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ABSTRACT

End of life waste Lead (Pb) acid batteries are one of the largest sources of secondary lead production globally. Recycling lead by melting down used batteries is a commercial trade all over the world; but, regrettably, reprocessing lead from end of life batteries is reported for anthropogenic lead exposures causing harsh human health consequence and environmental pollution. The current research intends to isolate and identify Lead (Pb) solubilizing bacteria from automobile waste deposits from Agartala city in Tripura state of India. Scanning Electron Microscope equipped with energy-dispersive X-ray characterization of the grounded lead sample was carried out, and the micrographs demonstrated scattered structures across the matrix. The X-ray diffraction (XRD) spectrum indicates the presence of Lead Oxide (PbO), Lead dioxide (PbO₂), and Lead sulfate (PbSO₄) in the collected samples. A single bacterium viewing observable growth on Pb supplemented plates was isolated and its Pb recovering capability was estimated through ICP AES analysis. Molecular characterization of the bacterium was investigated using 16S rRNA sequencing along with isolated culture was taxonomically grouped as *Cupriavidus* sp. The genomic DNA sequences were submitted in NCBI GenBank with the accession number MG171197. In the present case of inspection, the ability of the bacterial strain to recover Pb from end life battery waste was carried out in laboratory scale on a shake flask for 20 days. The experiment conducted under optimum bioleaching parameters with initial pH 6, 5% w/v of microbial culture, 2% pulp density and 2 g/100 mL dextrose concentration at 30 °C temperature with a speed of 200 RPM resulted in 67% Pb recovery from the battery sample. This investigation emphasizes the significance of Pb recycling ability of native bacterial isolate for efficient Pb bio-recovery from end of life waste batteries.

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KEYWORDS

Bacteria; bioremediation;
lead (Pb); pollution;
waste batteries

Introduction

Today, with our escalating dependency on technology, our needs for electronic and automobile batteries are also increasing. The production of different kinds of batteries hiked over the years considering the immense demand from industrial sector as well as the end users (Patricio et al. 2015). From electronic gadgets to automotive division and domestic inverters, rechargeable batteries are everywhere. Batteries are classified into two main streams like primary batteries then secondary batteries. Alkaline batteries and primary lithium batteries which depend on the principle of electric current generation according to irreversible chemical reactions are primary batteries which are also known as non-rechargeable batteries. But the later streams of batteries are rechargeable ones like Ni-metal hybrid (Ni-MH), Lead acid batteries and Ni-Cd batteries. Lead acid batteries have huge number of applications and continuous requirement in automobile sector and domestic electrification systems. The universal lead battery market is anticipated to reach \$58.5 billion by 2020 at an approximate compound yearly increase rate of 4.6% during the estimated time. According to

reports, as of 2014, Asia Pacific governs the market with an approximate 34.2% of the worldwide market, followed by America and Europe. The lead acid battery market in Asia was estimated at \$15.2 billion in 2014 and is anticipated to attain \$19.8 billion by 2020. In India alone, the quantity of automobiles has increased from 55 million in 2001 to 160 million in 2012 (MoRTH 2013), accordingly rising the demand for lead acid batteries. The ever-increasing concentration of heavy metals in the environment with above permissible limits has become an emerging problem all over the world (Korrapati et al. 2017). Toxicity of heavy metals includes attaching, blocking and disturbing the conformational structure of the essential biomolecules such as carbohydrates, lipids, proteins, and enzymes. Lead is one of the most known metal for the mankind, which is mainly used in ammunition, pigments, cables and storage cells due to the properties like malleability and low melting point. Lead, an extremely valued metal and the major constituent of lead acid batteries, is known to be toxic to human health (Chatham-Stephens et al. 2013). Lead is released into the environment by various anthropogenic activities and enters the food chain affecting both plant and animal. Lead is one

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Review

Marine microfiber pollution: A review on present status and future challenges

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ARTICLE INFO

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Generation
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ABSTRACT

Microfibers are emerging pollutants with widespread distribution in the environment and have adverse ecological impacts. Approximately 2 million tonnes of microfibers are released into the ocean every year from various sources, of which 700,000 micro fleeces are released from each garment through domestic laundry. Microfibers are the major marine pollutant throughout the world estimating 13 million tonnes of coastal synthetic fabric waste entering the ocean each year, out of which 2.5 million tonnes enter through adjoining rivers. It is anticipated that, to date, 1.5 million trillion of microfibers are present in the ocean. Microfibers are mistakenly ingested by marine animals and cause hazardous effects to aquatic species. Microfiber treatment techniques are under progress for efficient control of this pollutant. This article focuses on global microfiber generation and its sources, pathway of its entry into the environment and food chain, potential threat to aquatic animals and humans, present treatment technologies, and future challenges.

1. Introduction

Microfibers, which are tiny threads of polyester, nylon, acrylic, and other synthetic textiles (Henry et al., 2018) released from the process of laundering, of diameter less than 10 μm and approximately 1/100th of the diameter of the human hair was first reported by the ecologist Mark Browne (Cole et al., 2011). Microfibers are secondary microplastics that are mainly released from synthetic garments during washing but do not have any other use. These microfibers are typically made up of nylon, polyethylene terephthalate, and polypropylene (Gago et al., 2018). The amount of microfibers in nature is increasing with time because of the lack of their disintegration or degradation. Several recent studies revealed the omnipresence of microfibers in various parts of the atmosphere including various water sources, sludge, sediments of rivers, oceans, and top soil. Most of the microfibers found in the ocean are released from textile industries, with other key sources including indoor and outdoor laundering, domestic drainages, direct dumping off of waste garments inside the rivers (Almroth et al., 2017). A schematic diagram of various sources of microfiber pollution (Carr, 2017) is represented in Fig. 1.

Polyester is the dominant microfiber pollutant among all marine environment pollutants. The amount of polyester production increased annually from 5.3 million tonnes in 1980 to 70 million tonnes in 2018. The rate of microfibers released into the marine environment increased

by 15% in 2 years (Browne et al., 2011). Almost 700,000 micro fleeces are shed per garment through domestic laundering and 1900 fleeces per every wash. Approximately 2 million tonnes of microfibers are released into the ocean every year (Boucher and Friot, 2017). As per the reports of International Union for Conservation of Nature (IUCN) 2017, approximately 2 g of microfibers are released whenever synthetic jackets are washed, and of that, 40% microfibers enter into the water bodies. Table 1 represents different fractions of synthetic fabrics in the ocean. Europe and Central Asia alone are throwing away, which is equal to microplastics from 54 plastic bags per person weekly, into the ocean (Brodde, 2017). Asia has the most remarkable synthetic fiber production for clothes. Approximately 69% of total polyester fiber production is from China, and more than 80% are jointly produced by China, India, and South East Asia (Henry et al., 2018). It is estimated that globally 8 million metric tonnes of plastics per annum are directly thrown into the ocean. China, Indonesia, Philippines, Vietnam, and Sri Lanka together contribute 60% of the plastic pollution in the ocean (Johnston and Ketkar, 2017). The amounts of microfibers produced by different countries are mentioned in Table 2, and the schematic representation is provided in (Henry et al., 2018) Fig. 2.

Despite many advantages, synthetic fabrics are nonrenewable and nonbiodegradable. When these synthetic fibers are washed off, tiny fragments of fabrics are released into drains and end up on the coastlines of densely populated areas (Tran, 2017). The main sources of


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MBA: Mobile Cloud Computing Approach for Handling Big Data Applications

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Conference paper | [First Online: 10 July 2018](#)

802 Accesses | **1** Citations

Part of the [Advances in Intelligent Systems and Computing](#) book series (AISC, volume 714)

Abstract

MBA is an efficient approach for handling big data applications using MCC, which also takes care of handling the offloading mechanism as may be required, based on the degree of computation and utilization of resources. Big data processing using Map-Reduce framework is very useful for several applications like pattern-based searching, sorting, log analysis, etc. A robust architecture which is cheap and viable at the same time has been proposed here using MCC, in which first offloading is done to the local cloud or cloudlet and subsequently, also offloads to the public cloud on a need basis for highly compute-intensive jobs.

Keywords

Mobile cloud computing

Big data

Offloading



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Background & Objective: Multimedia aggregates various types of media such as audio, video, images, animations, etc., to form a rich media content which produces an everlasting effect in the minds of the people.

Methods: In order to process multimedia applications using mobile devices, we encounter a big challenge as these devices have limited resources and power. To address these limitations, in this work, we have proposed an efficient approach named as mMedia, wherein multimedia applications will utilize the multi cloud environment using Mobile Cloud Computing (MCC), for faster processing. The proposed approach selects the best available network. The authors have also considered using the Lyapunov optimization technique for efficient transmission between the mobile device and the cloud.

Results: The simulation results indicate that mMedia can be useful for various multimedia applications by considering the energy delay tradeoff decision.

Conclusion: The results have been compared alongside the base algorithm SALSA on the basis of different parameters like time average queue backlog, delay and time average utility and indicate that the mMedia outperforms in all the aspects.

Keywords: Lyapunov optimization; MCC; highresolution graphics; multimedia; new algorithms; smart mobile devices

Molecular identification of native lactic acid bacteria isolated from curd samples with probiotic potential

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ABSTRACT

Fermented foods are high in nutrient content than any other category of foods due to the presence of live microorganisms called probiotics. Its application in manufacturing of dairy foods and role in different types of disease prevention ranks it as the most exuberant. The aim of the present study was to isolate and identify lactic acid bacteria from native curd samples collected from dairy farms of Odisha state of India and explore its probiotic potential. Three morphologically distinct bacterial strains were isolated using MRS agar plates. The biochemical study confirmed that all the isolates were gram-positive. The molecular approaches were used to analyze the taxonomical diversity of isolates. 16 S rRNA sequencing was carried out and the bacterial isolates were taxonomically classified as *Lactobacillus* sp., *Lactobacillus plantarum*, *Lactobacillus casei* with NCBI Gene bank accession number [MG573071], [MG573072] and [MG573073] respectively. Further, the isolated bacterial strains were screened for their acid and bile tolerance competence as a principal criterion for probiotic. Among the isolates *Lactobacillus casei* (MG573073) was found to be highly tolerant of low pH and bile salts, posed strongest cell surface hydrophobicity of 75%. However, the maximum zone of inhibition was observed against Amoxicillin/clavulanic acid 44mm. The cell growth was found higher in presence of 2% imlin with cell viability 9.11 log₁₀ CFU/ml. In conclusion, based on the obtained results, *Lactobacillus casei* can act as a suitable probiotic candidate.

Keywords: Fermented foods; Molecular identification; Lactic acid bacteria; Probiotics.

1. INTRODUCTION

Fermented foods are the oldest known and the most dominantly consuming food worldwide. The application of fermentation in the preparation of food and beverage is most exuberant due to the involvement of cost-effective techniques and Lactic acid bacteria. Fermented foods reinforce the strong bioavailability and nutritional value compare to other foods, because of the association of fermentation technique which has greater impact on bio-processing, bio-preservation, pathogen biocontrol and advanced product quality [1,2,3]. At present, the gross economic values of fermented food products are rising to encounter the market demand, with more than 5000 different fermented foods being served to the mankind worldwide [4]. Fermented food products associated with dairy sector have an annual economic growth of \$54.2 billion of global turnover alone. By the end of 2022, the worldwide sales of fermented goods are expected to generate greater revenue approximately US\$ 40 Billion, according to Persistence Market Research. India is the world's biggest dairy producer and producing nearly 163.6 million tonnes a year which is approximately 16% of world's total dairy production and with largest consumer of dairy products according to the survey report of financial express magazine. While the country is expecting bigger production level of more than 163.6 million tonne by 2019, the estimated demand for dairy fermented food products by 2021-22 is 185 million tonne which implies that production has to be doubled in coming future.

Curd is globally the best known of all fermented dairy products and the most popularly consumed nutritive food with rich source of riboflavin, thiamine, niacin, zinc, magnesium, calcium

and proteins [3]. It is beneficial for serving people with lactose intolerance, low gastric juice secretion problems and also reduces risk of pathogen transit [5] Lactic acid bacteria (LAB) are the most diverse groups of bacteria on earth crust and a major source of natural curd fermentation. Due to well documentation fermentative and to be useful as a health adjunct, LAB has high demand in various fermented food producing industries [6]. Basically, they are added to foods as the delivery mechanism and feed raw material, where they can contribute to refining the flavour, texture while relaying on nutritional values and pharmacological ethics of the fermented food products. Typically, LAB is long been used as starter cultures for manufacturing of a different dairy foods that may lead to lesser chance of fermentation failure and higher productivity [7,8,9] *Lactobacillus fermentum*, *Lactobacillus plantarum*, *Lactobacillus helveticus*, *Leuconostoc mesenteroides* were characteristically reported starter cultures used in industrial fermentation process. While many varieties of microbes can be found in different types of fermented foods, *Lactobacillus* is by far so common such as *Lactobacillus* species obtained from various legume based fermented foods, *Propionibacterium* and *Bifidobacterium* from cheese and *Hafnia* species in fermented meats were reported [10,11].

Moreover, fermented foods are highly healthy than any other foods, because of the presence of live microorganism called probiotics. According to food and agriculture organization (FAO) of United Nations Probiotics are defined as "live micro-organisms that provide promotional health aid towards the host when administered in appropriate quantities". *Lactobacillus* species are

MSA: a task scheduling algorithm for cloud computing

Subhashree Mohapatra, Chhabi Rani Panigrahi, Bibudhendu Pati and Manohar Mishra

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Abstract

Cloud computing is an effective technology to perform huge-scale and complex computing. Achieving a minimum makespan is the prime motto of any task scheduling algorithm for a cloud computing environment. This paper aims to propose a new task scheduling algorithm named as Min-sufferage scheduling. While selecting a task for execution, the Min-sufferage picks up the task with minimum Sufferage value. The proposed method has been tested on numerous set of tasks and resources. The experimental results indicate that the proposed Min-sufferage algorithm results in less makespan as compared to Sufferage algorithm.

Keywords

Sufferage, makespan, cloud computing

Multiple microRNAs Regulate the Floral Development and Sex Differentiation in the Dioecious Cucurbit *Coccinia grandis* (L.) Voigt

[Jatindra Nath Mohanty](#), [Subodh Kumar Chand](#) & [Raj Kumar Joshi](#) 

[Plant Molecular Biology Reporter](#) 37, 111–128 (2019) | [Cite this article](#)

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Abstract

Despite having a small genome and heteromorphic sex chromosomes, the molecular basis of sex differentiation in the dioecious cucurbit, *Coccinia grandis*, largely remains unclear. Increasing evidences indicate a vital regulatory role of microRNAs in the reproductive development of plants. In this study, we used a combination of high-throughput small RNA sequencing and computational analysis to identify sex-specific miRNAs from male and female buds of *C. grandis*. Ninety-eight conserved miRNAs from 22 families and 44 novel miRNAs specific to *C. grandis* were detected. Comparative profiling together with Northern blot and qRT-PCR analysis revealed 41 significantly differentially expressed (DE) miRNAs, of which 16 could be fundamental to the regulation of sexual dimorphism. One hundred six target genes were predicted for 35 DE miRNAs that were significantly involved in flower organogenesis, phytohormone signaling, metabolism, transcription regulation, and DNA methylation. Temporal analysis of a set of 16 target genes at three stages of the bud development revealed a reciprocal alteration in their expression pattern with the complementary miRNAs. Further, the miR167a-1, miR393a, miR398b, and miRn9 mediated down-regulation of four predicted targets associated with reproductive organ development in *C. grandis* was confirmed through transient co-expression in *Nicotiana benthamiana*. Taken together, the present study represents the first report suggesting that multiple miRNA-mediated gene silencing cascade could be involved in regulating the molecular basis of sex differentiation in *C. grandis*.

**Prejudice In Times Of Natural Disasters: An Assessment Of Caste
Discrimination During Cyclone Fani In Odisha**

Mr. Suprit Panigrahi¹, Dr. Sayantani Behura², Ms. Devisree Mohapatra³, Ms. Smitarani Swain⁴

Abstract

In the 21st century, where man is making expeditions to the moon and even planets, some people have not been able to rise above the irrational notions of purity and pollution based on the Indian traditional system of caste. Untouchability is still prevalent in parts of the country and people continue to ostracize fellow human beings based on their caste. It is indeed shocking that even at the wake of a disaster, people do not forget to discriminate the lower caste groups. In developing Odisha casteism has its own flavour. The severe cyclonic storms have not been able to change people's perception towards untouchability and discrimination. The present study is an attempt to map the aftermath of Cyclone Fani and also to understand the experiences of the locals regarding the same. While numerous reports have focused on the physical damage and on traumatic condition of the people, the caste based discriminatory practices have found a place in this paper.

Keywords

Caste, untouchability, discrimination, cyclone

Introduction

Thirteen coastal districts, three hundred miles of long coastline and over forty-one million people is what constitutes Odisha. [1] The geographic location makes the Bay of Bengal coastline prone to severe tropical cyclones which cause widespread destruction often accompanied by storm surges, high winds and extreme rainfall that results in the riverine flooding. [2] As many as 26 of the 35 deadliest tropical cyclones in history have been the Bay of Bengal storms while Odisha has battled over 98 cyclonic storms since 1981 till date. [3] While the east coast of India is one of the most cyclone-prone areas in the world, Odisha is twice as vulnerable as compared to the other eastern States. [4] The latest report of the State Government on 'Vulnerability to Cyclone' reveals that while Odisha is only 17 per cent of the Indian east coast, it has been affected by nearly 35 per cent of all cyclone and Severe Cyclones that have crossed the east coast. [4] As per the Wind and Cyclone Hard Zones Map of Odisha, out of the State's 30 districts, 14 are categorized as "High Damage Risk Zones" either partially or fully. [4]

QTM: A QoS Task Monitoring System for Mobile Ad hoc Networks

Mamata Rath , Bibudhendu Pati, Chhabi Rani Panigrahi & Joy Lal Sarkar

Conference paper | [First Online: 04 November 2018](#)

774 Accesses | 25 Citations

Part of the [Advances in Intelligent Systems and Computing](#) book series (AISC, volume 707)

Abstract

This paper presents monitoring system for Quality of Service (QoS) based task module called QoS Task Monitoring (QTM) in Mobile Adhoc Networks (MANET) using mobile agent as basic element. Currently MANET is one of the most promising and advanced solution for wireless networks due its significant performance in resuming connectivity in drastic situations. In such environment, there is maximum chance of network disconnection and possibility of immediate set up of network is almost impossible. The fundamental routing process in a MANET involves facilitating uninterrupted communication in the network system between two mobile stations at any point of time and the basic key concern being selection of the most suitable forwarding node to advance the real-time packets from source towards destination so that the optimization of the network can be achieved by maximum utilization of available resources. Transmission of real-time applications is one of the most challenging issue in MANET due to transportation of high volume of data including audio, video, images, animation, and graphics. This paper presents a monitoring approach for checking the Quality of Service (QoS) task modules during competent routing with the use of mobile agents. An intelligent mobile agent is proposed in QTM System which has been designed in the QoS-based platform for checking and controlling the processing tasks using longest critical path method at the forwarding node to select it as the best option out of all neighbor nodes. Simulation result shows higher packet delivery ratio and uniform jitter variation which suits favorably to multimedia and real time applications.

Keywords

MANET

QoS

Real-time applications

Mobile agent

AODV protocol

Sequence-tagged site-based diagnostic markers linked to a novel anthracnose resistance gene *RCt1* in chili pepper (*Capsicum annuum* L.)

Rukmini Mishra, Ellojita Rout, Jatindra Nath Mohanty & Raj Kumar Joshi 

3 *Biotech* 9, Article number: 9 (2019) | [Cite this article](#)

346 Accesses | 8 Citations | [Metrics](#)

Abstract

Anthracnose, caused by *Colletotrichum* spp. is the most devastating disease of chili (*Capsicum annuum*) in the tropical and subtropical regions of the world. The present study aimed at molecular mapping and development of markers linked to a new gene for anthracnose resistance in the chili cultivar ‘Punjab Lal’. Phenotypic evaluation of F_1 , F_2 , and BC_1F_1 populations derived from a cross between ‘Punjab Lal’ and susceptible cultivar ‘Arka Lohit’ against a virulent isolate of *C. truncatum* revealed that anthracnose resistance in Punjab Lal is governed by a monogenic-dominant gene designated as *RCt1*. Forty-four (28 ISSRs and 16 AFLPs) out of 201 markers exhibited parental polymorphism and were used in bulk segregant analysis. Three ISSRs (ISSR_{41,493}, ISSR_{58,485}, and ISSR_{112,857}) and one AFLP marker (E-ACA/M-CTG₅₁₆) showed precise polymorphism between resistant and susceptible bulks, and were used for genotyping F_2 and BC_1 populations. The four putative fragments were converted into sequence-tagged site (STS) markers and southern blotting confirmed their association with the resistance locus. Molecular mapping revealed that the STS markers CtR-431 and CtR-594 were closely linked to the *RCt1* locus in coupling at distances of 1.8 and 2.3 cM, respectively. Furthermore, both of these markers showed the presence of resistance-linked allele in seven genotypes including the highly resistant *C. chinense* ‘PBC932’ and *C. baccatum* ‘PBC80’ while negatively validated in 32 susceptible genotypes. Therefore, CtR431 and CtR-594 could be recommended as efficient diagnostic markers to facilitate the introgression of *RCt1* locus into susceptible chili variants towards the development of high-yielding anthracnose resistance genotypes in *C. annuum* background.

Solar photovoltaic panels as next generation waste: a review

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ABSTRACT

Photovoltaic energy manufacturing has developed at an extraordinary rate since the last decade which globally has reached 225 giga watts by 2018 and is anticipated to augment to 920 giga watts by 2022 and 5000 giga watts by 2050. Still now the abundant quantity of produced solid waste which comes from the end of life panels are not calculated yet but in future it can be a challenging aspect in terms of photovoltaic energy. Harmful waste from end of life solar panels poses a global ecological menace and is capable of creating 300 times more toxic waste than nuclear plants. This review represents an overview of global scenario on different types of solar panels production with their composition, applications, solid waste generation, loss of precious metals (rare earth metals, metals), utilization of metals in different industries and different toxicological effects on the environment and the requirement of recycling of used solar panels. The recycling of these solar panels after life can be an economic alternative source of natural resources.

Keywords: Solar Cells; Solid waste; Toxicological effect; Precious metals; Recycling.

1. INTRODUCTION

Solar energy is one of the readily available renewable energy sources used in existing knowledge development in every region. In between 2010 to 2040, energy use is predicted to mount by 57% from 520-810 quadrillion British thermal units (Btu) [31]. Even though varied substitute energy resources are present including wind energy, geothermal energy, biomass and many more, the potentiality of solar energy is highest in nature [21]. In the year 2017 the usage of solar energy is 0.008TW which almost 0.5% of total potential energy [1]. The steady declination of conventional energy and their unsafe effect on nature redirects mankind for a renewable source of energy like solar, geothermal, wind and biomass etc. A Schematic diagram representing the most appropriate source between fossil or green energy is provided in Figure 1.

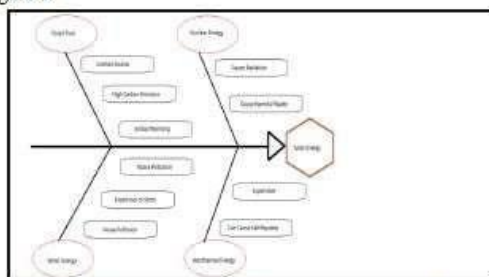


Figure 1. Fishbone diagram for different energy sources and their effects on environment.

Renewable energy contributors have their own potentiality but unluckily till date 10-15% of the resources have been employed. A list of non-conventional energy sources and their quantity of usages till 2017 is provided in Table 1. Each year about 5.4 million EJ of solar radiation reaches on earth surface Figure 2[38]. According to International Energy Agency report, 2017 solar energy becomes world's fastest rising energy source rather than all

other renewable fuels [31]. Regarding the most uses of solar energy, China is in the top position. According to the IEA data China previously surpassed its 2020 solar PV objective and contribute half of the global solar energy claim[40]. United States occupies the second largest growth market for solar energy with their multi-year federal tax incentives which are shared with the renewable portfolio standards for distributed solar PV. In the solar energy sector for the first time the growth forecast is superior as compared to the European Union [31]. In association with the International Solar Alliance, India promotes some most important projects on solar energy like off-grid power supply hubs, street lights, irrigation, green buildings and generate a respectable position among the other developed countries. An original graphical analysis of country wise production and utilization of solar cell is represented in Figure 3. This scenario shows that the current worldwide consumption of photovoltaic panels and till 2017 it is estimated that 870 tons of waste solar panels are accumulated as solid waste in nature. In the present rate it is expected that by the year 2038 at near about 1957099 tons of waste panels will be dumped all over the world[23]. Regular life of a solar panel is 25 years and the total amount of solar panel is increasing gradually in global market. The residue or the chemicals produced from the waste can literally effect the flora and fauna of the earth[10-11], which causes many diseases like lung fibrosis, fast aging etc [18]. The secondary components like ammonia, arsenic during the production are also hazardous for nature [8], [18-19]. These ends of life (EOL) panels should be recycled properly or it will create a massive amount of solid waste generation which can be the genesis of many environmental effects. The main objective of this review is to analyze those harmful effects and try to minimize it from now on or in future solar cells will be a major problem for global extinction like the fossil fuel in present days.

RESEARCH

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The histone methyltransferase DOT1L is required for proper DNA damage response, DNA repair, and modulates chemotherapy responsiveness

Vijayalakshmi Kari^{1†}, Sanjay Kumar Raul^{1,2†}, Jana Maria Henck¹, Julia Kitz³, Frank Kramer^{4,5}, Robyn Laura Kosinsky¹, Nadine Übelmesser⁶, Wael Yassin Mansour^{7,8}, Jessica Eggert¹, Melanie Spitzner¹, Zeynab Najafova¹, Holger Bastians⁶, Marian Grade¹, Jochen Gaedcke¹, Florian Wegwitz¹ and Steven A. Johnsen^{1*}

Abstract

Background: Disruptor of telomeric silencing 1-like (DOT1L) is a non-SET domain containing methyltransferase known to catalyze mono-, di-, and tri-methylation of histone 3 on lysine 79 (H3K79me). DOT1L-mediated H3K79me has been implicated in chromatin-associated functions including gene transcription, heterochromatin formation, and DNA repair. Recent studies have uncovered a role for DOT1L in the initiation and progression of leukemia and other solid tumors. The development and availability of small molecule inhibitors of DOT1L may provide new and unique therapeutic options for certain types or subgroups of cancer.

Methods: In this study, we examined the role of DOT1L in DNA double-strand break (DSB) response and repair by depleting DOT1L using siRNA or inhibiting its methyltransferase activity using small molecule inhibitors in colorectal cancer cells. Cells were treated with different agents to induce DNA damage in DOT1L-depleted or -inhibited cells and analyzed for DNA repair efficiency and survival. Further, rectal cancer patient samples were analyzed for H3K79me3 levels in order to determine whether it may serve as a potential marker for personalized therapy.

Results: Our results indicate that DOT1L is required for a proper DNA damage response following DNA double-strand breaks by regulating the phosphorylation of the variant histone H2AX (γH2AX) and repair via homologous recombination (HR). Importantly, we show that small molecule inhibitors of DOT1L combined with chemotherapeutic agents that are used to treat colorectal cancers show additive effects. Furthermore, examination of H3K79me3 levels in rectal cancer patients demonstrates that lower levels correlate with a poorer prognosis.

Conclusions: In this study, we conclude that DOT1L plays an important role in an early DNA damage response and repair of DNA double-strand breaks via the HR pathway. Moreover, DOT1L inhibition leads to increased sensitivity to chemotherapeutic agents and PARP inhibition, which further highlights its potential clinical utility. Our results further suggest that H3K79me3 can be useful as a predictive and/or prognostic marker for rectal cancer patients.

Keywords: DOT1L, H3K79me, γH2AX, DNA damage, DNA double-strand breaks, Homologous recombination, PARP inhibition, FOLFIRI, Colorectal cancer

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