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# RESEARCH PAPERS

2021-2022



## Department of Assamese



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**Department:** Assamese

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শিৱসাগৰ জিলাৰ গাৰো জনগোষ্ঠীৰ  
সমাজ আৰু সংস্কৃতি : এক ক্ষেত্ৰ ভিত্তিক অধ্যয়ন

□ প্ৰণৱ দুৱৰা

সহকাৰী অধ্যাপক, অসমীয়া বিভাগ, গড়গাঁও মহাবিদ্যালয়, শিমলুওদি, শিৱসাগৰ  
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**সংক্ষিপ্তসূচী :** অসমৰ নৃগোষ্ঠীসমূহৰ ভিতৰত গাৰোসকলে এটা উল্লেখনীয় জনগোষ্ঠী। ভাষাতাত্ত্বিক দৃষ্টিকোণৰ পৰা দেখা যায় যে, এই জনগোষ্ঠীটো উত্তৰ-পূৰ্বাঞ্চলৰ শিৱসাগৰ অংশ আৱৰি থকা বৃহৎ টিম-টীমৰ্চীয়া পৰিয়ালৰ অন্তৰ্গত। মুম্বাইত মেঘালয়ৰ গাৰো পাহাৰত বসবাস কৰা এই গাৰোসকলৰ একাংশ পৰৱৰ্তী সময়ত অসমলৈ বিভিন্ন ঠাইলৈ হাজিৰত হয়। তাৰে এটা অংশ শিৱসাগৰ জিলালৈ বক্ৰা মৌজালৈ হাজিৰত অহাৰ লক্ষ্যত বসবাস কৰিবলৈ লয়। বৰ্তমান তেওঁলোকৰ গাঁওখনক 'পশ্চিমবৰ্তী' গাৰো গাঁও বুলি জনা যায়। এইখন শিৱসাগৰ জিলালৈ একমাত্ৰ গাৰো গাঁও। তেওঁলোকে নিজকে 'আ-চিক-মাং' ('আ-চিক' মানে পৰ্বত আৰু 'মাং' মানে মনু) অৰ্থাৎ পৰ্বতৰ মনু বুলি পৰিচয় দিয়ে। গাৰোসকল মাতৃ ভাষা জনগোষ্ঠী আৰু তেওঁলোকৰ কৃষি ওপৰত নিৰ্ভৰশীল। অতীততে তেওঁলোকে বিভিন্ন বেচ-বেচী পুজা-পাতল কৰিছিল যদিও বৃষ্টিৰ বৰ প্ৰৱণত কৰণ শিহৰে পৰা তেওঁলোকৰ জীৱন-ধাৰণালৈ পৰিৱৰ্তন আহিল। সাংস্কৃতিকভাৱে তেওঁলোকে অতি চৰকাৰী। শিৱসাগৰ প্ৰান্তৰে তেওঁলোকৰ সমাজ আৰু সংস্কৃতিলৈ পৰিৱৰ্তন আহিল। তথাপিও তেওঁলোকে নিজ ঐতিহ্য ৰক্ষা কৰাৰ সচেতন। এই আলোচনাত ছেৰ অধ্যয়নৰ যোগেদি তেওঁলোকৰ সমাজ আৰু সংস্কৃতিৰ শ্বেটীয়া ছবিখন তুলি ৰখিবলৈ প্ৰয়াস কৰা হ'ব।

**কীৰ্ত্ত শব্দ :** নৃগোষ্ঠী, গাৰো, বক্ৰা মৌজা, পশ্চিমবৰ্তী গাঁও, সমাজ, সাংস্কৃতি।

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অসমত বসবাস কৰা জনগোষ্ঠী সমূহৰ ভিতৰত টিম-টীমৰ্চীয়া পৰিয়ালৰ আত্মিক গাৰোসকল অন্যতম জনগোষ্ঠী। বৃহত্তৰ অসমীয়া জাতি গঠনত গাৰো সকলৰ অৱদান অপৰিসীম। টিম দেশৰ ভিতৰত পৰ্বতমালাৰ পৰা প্ৰৱৰ্তন কৰা এই গাৰোসকল কোনো এক সময়ত মেঘালয়ৰ গাৰো পাহাৰত বসবাস কৰিছিল আৰু পৰৱৰ্তী সময়ত অসমলৈ বিভিন্ন ঠাইলৈ হাজিৰত মেদি কিছু সংখ্যক শিৱসাগৰ জিলালৈ বিহাৰি লয়। বৰ্তমান শিৱসাগৰ জিলালৈ একমাত্ৰ গাৰো গাঁওখন হাজিৰা বিহাৰসমূহা সমূহৰ প্ৰেপন সৰ্বাধিক বক্ৰা মৌজালৈ আত্মিক। শিৱসাগৰ নগৰৰ পৰা ডিঙিগড় সংযোগী ৩৭ নং ৰাষ্ট্ৰীয় ঘাই পথেৰে পূৰ্বলৈ প্ৰায় ৪০ কিঃ মিঃ আঁতৰত প্ৰেপন তিনিআলিৰ পৰা পশ্চিম দিশে প্ৰায় ছয় কিঃ মিঃ

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**DDOI/link to paper:** <https://doi.org/10.2166/wh.2021.267>

**Title of paper:** Nature of sorption of trivalent arsenic on novel iron oxyhydroxide stabilized starch/OMMT composite: A mechanistic approach

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**In this Issue**

**Editorial**

136 © 2021 The Authors Journal of Water and Health

### Nature of sorption of trivalent arsenic on novel iron oxyhydroxide stabilized starch/OMMT composite: A mechanistic approach

P. Gogoi, M. Das, P. Begum and T. K. Maji

#### ABSTRACT

Materials which are chemically, energetically and operationally acceptable for arsenic water treatment are highly required. In this study a hybrid material (SiCC) of aminated starch, oxyhydroxide of iron and OMMT clay has been demonstrated for arsenic treatment. This new material was highly efficient in arsenic water treatment which could reduce arsenic concentration far below detection limits. All binding interactions during material preparation and arsenic sorption were exclusively characterized with FT-IR, XRD and other spectroscopic tools. A molecular modeling on the basis of density functional theory was carried out to verify the above findings. Influence of material dose, treatment time, initial ion concentration, varying temperatures, etc., on extent of sorption was studied in detail. The thermodynamic parameters viz.  $\Delta G$  ( $-11$  kJ/mol),  $\Delta H$  ( $42.48$  kJ/mol),  $\Delta S$  ( $177.6$  J K $^{-1}$  mol $^{-1}$ ) and  $E_a$  ( $59.14$  kJ/mol) determined the feasibility of the process, its endothermic behavior and most importantly the chemical nature of the sorption accompanied by ion-exchange to some extent. The sorption followed a monolayer chemisorption pattern as determined by the Langmuir model ( $R^2 = 0.973$ ,  $R_L = 0.081$ ) with a  $q_{max} = 2.04$  at 303 K. The binding of As(III) on the material was governed by a pseudo second order kinetic model.

**Key words** | chemisorption, endothermic, feasibility, hybrid material, molecular modeling

#### HIGHLIGHTS

- Properties of the hybrid material were enhanced synergistically.
- Suspended materials were negligibly small in hybrid material.
- Material with 10% clay loading accompanied by iron(III) oxyhydroxide stabilization was found best in all respects.
- Arsenic on SiCC was predominantly chemisorbed accompanied by ion exchange to some extent.
- The sorption process was spontaneous and endothermic in nature.

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**Title of paper:** Problems and Prospects of Marketing of Assam Tea

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**Anil Tanti**

Turkish Online Journal of Qualitative Inquiry (TOJQI)  
Volume 11, Issue 4, October 2020: 1174-1183

Research Article

### **Problems and prospects of Marketing of Assam Tea**

**Anil Tanti**

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#### **ABSTRACT**

Tea is considered one of the key export commodities for India. The state of Assam produces more than 50% tea in India. Tea Industry is played vital role in the economy of the Assam and contributing about 15 per cent of the state's total income and 3% GDP. Along with the organized sector, the production of small tea cultivation in Assam has created vast employment opportunities in the rural areas giving economic movement as well as employment generation. About three to four million people engaged in this industry and approximately 6000 crores rupees deposited into national exchequer. The consumption of tea in India in the domestic market has increased at a faster rate compared to its production. It is known from auction market official that most of the good quality tea dose not enters into the auction market and owing to this reason the price setting of tea has been low at the auction market. The study covered to evaluate the present scenario of tea market in India Including Assam and its problems and prospects in Assam.

**Key Words:** Export, Economy, Market, Employment, Price, Consumption

**Introduction:** Tea is such type of beverage which is most popular in the world and drink next to water. It plays a vital role in improving the socioeconomic condition of the state of Assam as well as India. "Assam has the largest tea growing area in the world, accounting for around one-seventh of global tea production and over 53 per cent of India's overall tea production. The tea industry of Assam is about 190 years old. According to Tea Board of India, there are 765 big tea growers with covering 232399.35 areas in hect. and 101085 numbers small tea growers with covering 10529135 area in hect. that total covers 337690.35 an area in hectares of land in Assam. It has been producing some of the finest teas in the world. Indian tea industry has recorded the highest ever production as well as exports in the financial year 2018. The total tea production was 1325.05 million kgs, – an increase of 74.56 million kgs as compared to 2016-17. In percentage terms the increase is around 6%. The total quantity of tea exported during the financial year 2017-18 stood at 256.57 million kgs, while the foreign exchange realized from exports of Indian tea was \$ 785.92 million. In rupee terms, the total value of the exports was pegged at Rs. 5064.88 crores during 2017-18,( Indian Chamber of Commerce). Thus, Assam contributes a remarkable





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**Analyzing the impact of COVID-19 induced lockdown on thermal stress and comfort level of 17 major cities of India (2019–2020)**

Rituraj Neog

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HUMAN AND ECOLOGICAL RISK ASSESSMENT  
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**Analyzing the impact of COVID-19 induced lockdown on thermal stress and comfort level of 17 major cities of India (2019–2020)**

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**ABSTRACT**  
The objective of the study is to evaluate the level of thermal stress/comfort experienced by 17 major cities of India during lockdown period (2020) and its comparison with the year 2019. The experiment incorporates daily air temperature and relative humidity data for a period of 6 months accessed from [power.larc.nasa.gov](http://power.larc.nasa.gov). The thermal condition of the cities has been computed with thermo-hygrometric index (THI) and Relative Strain Index (RSI). Almost all cities portray decreasing air temperature with ascending relative humidity from the year 2019 to 2020. Changing air temperature with relative humidity modified the thermal condition of the cities. Most of the cities experienced increasing number of bio-climatic comfortable days in 2020 such as in Kolkata, Bangalore, Lucknow, Patna, Hyderabad, Delhi, Jodhpur, Bikaner, and Chandigarh. And on the contrary descending number of Torrid and Heat stroke risk days notably over Kolkata, Ahmadabad, Nagpur, Bhopal, Patna, and Lucknow. Overall, there is a sharp decline in the number of days with torrid climate in cities from 1386 to 9037 (based on THI) and risk of heat stroke from 200 to 103 (based on RSI) from the year 2019 to 2020. Further, the cities also experienced growing number of bio-climatic comfortable days (based on RSI) from 530 to 621. The decreasing trend of thermal stress over the cities has considerably reduced the vulnerable population to extreme urban climate.

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**KEYWORDS**  
Air temperature; relative humidity; thermal stress; bio-climatic comfort; bio-climatic discomfort

**Introduction**  
The origin of Covid-19 during the later part of December 2019 in Wuhan city of China developed a situation of global emergency during January 30, 2020 (Hui et al. 2020; Sohrabi et al. 2020). This is followed by an outbreak of disease globally, which is popularly known as Covid-19, which soon became a pandemic. During May 21, 2020, more than 5 million people have reported the cases of Covid-19 with global coverage of about 188 countries (Basu et al. 2020). Due to the rapid rate of transmission, different nations have adopted strict rules and regulation pertaining to impose restriction on the spread of Covid-19. Government of different nations introduced various health related interventions to reduce the spread of Covid-19 disease such as nationwide lockdown, closing

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## Understanding the influence of COVID-19 induced lockdown on urban thermal environment of Ranchi city, India

Rituraj Neog

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## Understanding the influence of COVID-19 induced lockdown on urban thermal environment of Ranchi city, India

Rituraj Neog

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### ABSTRACT

The objective of the study is to understand the pattern of land surface temperature (LST) and normalized difference vegetation index (NDVI) developed in Ranchi city during Covid-19-induced lockdown (2020) and its comparison with previous years. The study incorporated Landsat 8 (Operational land imager) data from United States Geological Survey and air temperature and relative humidity data from [pwwer.larc.nasa.gov](http://pwwer.larc.nasa.gov) for the years 2017, 2019 and 2020. The results exposed a drastic change in the LST and NDVI pattern of the city. The mean LST of the city during April has declined from 39.80°C in 2017 to 32.38°C in 2020. Similarly, the mean LST of May also declined from 38.41°C in 2017 to 34.84°C in 2020. On the contrary, the city experienced an ascending growth of NDVI from 0.24 to 0.26 in April and May 2017 to 0.349 and 0.37 in 2020, respectively. Additionally, the city portrays declining air temperature with enhanced relative humidity. Ranchi city also exhibited relatively maximum area under ecologically excellent category in the year 2020 and reduced area under ecologically the worst category based on urban thermal field variance index. Thus, reduced temperature with augmented humidity and NDVI developed a healthy urban environment.

### ARTICLE HISTORY

Received 17 July 2021

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### KEYWORDS

LST; NDVI; air temperature; relative humidity; UTMV

### Introduction

Climate change is considered the most highly discussed issue in the contemporary world (Pal et al., 2021). Since 1850, the primary concern has been temperature change and its effects on the environment (IPCC, 2013). According to the IPCC, the temperature change is greater on land than in the oceans (Parishwad and Shinker, 2017). Climate change has adverse effects on urban areas, as cities are continuously experiencing rising temperature, which ultimately lead to the urban heat island effect. Currently, about 50% of the world's population resides in urban areas (Mohanta & Sharma, 2017). These effects of climate change have become more prominent during the last 50 years as a result of rapid urbanization, innovative technologies, and materials for development (Parishwad and Shinker, 2017). Cities are the house of all kinds of socio-economic activities that lead to climate change (Livingstone, 2006). The trend of climate change was preceded by urbanization and industrialization, which ultimately paved the way for the alteration of land surface temperature (LST) and atmospheric components (Grimm et al., 2006). Rapid urbanization, land use change and LST make the urban thermal environment unsuitable and uncomfortable for healthy human habitation. LST is the key indicator to understand urban thermal environment (Yao et al., 2020). The urban thermal

environment is the heat related physical environment of the city that potentially influences the urban atmosphere, level of energy consumption, sense of well-being by the human body, human health and survival and development (Ma et al., 2010; Qiao et al., 2013; Xie et al., 2013).

India is also experiencing economic development, rapid growth of urban centres and unprecedented infrastructure development with industrial advancement, mostly after liberalization in the 1990s (Sharma & Mathur, 2020). Thus, Indian cities are also experiencing the growth of LST, which is becoming a contributory to urban heat island specifically surface urban heat island effects (SUHI) and a deteriorating urban thermal environment. The urban areas witnessed a dense concentration of built-up areas. The built-up areas consist of the materials such as asphalt, concrete, and brick, etc., which are capable of absorbing and storing solar radiation during the daytime and releasing it gradually at night (Maithani et al., 2020). Thus, LST rises in cities as a result of expansion of the concrete structures or the built environment. The LST is chiefly based upon land surface composition and solar radiation (Guha et al., 2018; Peng et al., 2016). The surface with dense vegetation cover develops lower LST, whereas urban concrete areas develop higher LST (Li et al., 2017). The LST is also related to the air temperature and humidity pattern of an area. There is a higher positive correlation

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ORIGINAL ARTICLE



## Understanding the influence of traffic volume on RST (road surface temperature) in Dibrugarh city of India

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### Abstract

The basic objective of the study is to analyze the potential role of traffic and transportation volume on RST (road surface temperature) in the streets of Dibrugarh city. Additionally, the study evaluates the role of meteorological parameters on RST of the city. The experiment is accomplished by field measurement using HTC Non-contact IR thermometer over 11 selected streets of Dibrugarh city of Assam for a period of 4 months (August to November 2019). Diurnally, maximum RST is recorded in the mid-afternoon period (1.30–2.00 pm) in the month August and September. But interestingly, peak RST has been noticed in the late morning phase (11.30–12.00 pm) in the subsequent months of October and November. Seasonally, Monsoon acquires maximum positive growth of RST till mid-afternoon and rapid negative growth in the later periods. But post-monsoon reveals negative growth of RST since morning period. The study also found a varying degree of coefficient of correlation between traffic volume and mean RST. The degree of correlation is found as moderately positive in the morning and afternoon episodes during August. While September encountered moderately positive correlation only during afternoon and weaker towards the later part. Evidently, October maintains moderately strong correlation in the morning and evening sections, whereas stronger positive towards the later periods. And finally, November surprisingly displayed weak positive correlation in the morning periods to negative correlation in the successive episodes. Meteorologically, air temperature and relative humidity evidenced strong correlation with RST. Air temperature and RST accounted for a strong positive correlation with  $r$  value of 0.80 and 0.77 in monsoon and post-monsoon season, respectively. While relative humidity dominates strong negative correlation with RST with  $r$  value of  $-0.80$  and  $-0.55$ . Therefore, maximum traffic volume with higher air temperature and lower relative humidity is chiefly accountable for development of RST.

**Keywords** RST · Traffic volume · Air temperature · Relative humidity · Correlation

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### Introduction

The study of road surface temperature (RST) in urban areas has become an integral part to deal with the effects and magnitude of urban heat island, especially for surface heat intensity. Furthermore, RST is useful procedure to predict and detect of the spatial pattern of nocturnal RST over an area (Thornes 1991) and developing thermal mapping of the urban areas. Such thermal mapping using RST data were initially used for detection of cold section of the road surface for deicing policies (Chapman and Thornes 2005). Nowadays, thermal mapping is also used as valuable tool for road weather forecasting and in maintenance of winter road (Todeschini et al. 2016). In addition to these, the thermal mapping is also used to spot the distinctiveness of RST distribution on individual routes. The results of such mapping also help to understand the segment differences



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## Exponential Smoothing State Space Innovation Model for Forecasting Road Accident Deaths in India

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### Abstract

Now-a-days, road traffic accident increases day by day and becomes burning problem in India. With the use of statistical methods and models it is possible to predict the future occurrence of road accident or deaths with the available data. The present study talk about the development of a exponential smoothing state space innovation model for the annual deaths due to road accident in India considering the period from 1967 to 2015 and to forecast the number of annual deaths expected to occur in forthcoming days. The researchers' collected data from National Crime Record Bureau, Ministry of Home Affairs, India. After examining all the probable models, it is observed that exponential smoothing state space model (A, A, N) is suitable for the given data set. Further, study also shows that forecasted number of deaths for the upcoming 10 years from the proposed model also reveals an upward trend.

**Keywords:** Akaike information criteria, Kolmogorov-Smirnov test, mean absolute percentage error, mean absolute scaled error.

### 1. Introduction

Technology has significant impact on transportation system. Ancient time's people are moving from one place to another on foot or by sea which is time consuming. But, due to enormous development of technology, people can easily move from one place to another by bus, train or airplane. Transportation through road is easily accessible to the common people. Further, Afere et al. (2015) also suggested that the development of all forms of trade and industry and community activities is incorporated with road transport. Due to the expansion of economic and financial condition of the people number of motor vehicles also increases which leads to overcrowding on road. Moreover, Sivakumar and Krishnaraj (2015) also state that overcrowding on road leads to traffic accident. Finally, accident creates in injury, deaths, damage to property of the victims. Sometimes, injuries causes from the accident make many people physical or mental disability. Finally, the lost due to accident adversely affect the family and the nation.