

Book of Abstract

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Vermicomposting, a step to use worm power for a greener tomorrow

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Abstract: Vermicomposting is an ancient practice, now has gained renewed recognition and potential for addressing environmental concern and sustainable waste management and agriculture as well. And it is the earthworm that play a crucial role in the production of vermicompost, the end product of this technology, where worms create a heterogenous mixture of decomposed organic wastes, bedding materials andvermicast. Vermicompost is a very nutrient rich organic fertilizer that may lead our country to organic farming. So understanding the significance of vermiculture and vermicomposting we can make an informed choice for a healthy future.

Keywords: Vermiculture, vermicomposting, sustainable waste management, organic farming.

Can whistle sound be predict respiratory capacity: Fighting against COVID-19 infection

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Abstract: Respiratory capacity may be assessed by Spirometry. It includes vital capacity, Forced vital capacity etc. These measurements are very important to assess respiratory health. It is also established that reduction of vital capacity is well correlated with respiratory diseases like obstructive and restrictive lung diseases. Evidence suggests lungs as the organ most affected by coronavirus disease 2019 (COVID-19). The literature on coronavirus infections reports that patients may experience persistent impairment in respiratory function after being discharged. Therefore routine Spirometry is essential to know respiratory health. However, sophisticated spirometer is costly by which spirometry can be performed and it needs technical support also. Few studies hypothesized that a short, sharp and maximal expiration through a narrow aperture, a “whistle”, might provide a complementary test of expiratory muscle strength. Keeping all the above facts we have prepared this student's science project to find out whether ‘whistle sound time’ can be used as an alternative non-invasive method to assess respiratory capacity.

Keywords: Spirometry, vital capacity, forced vital capacity, whistle

***Dioscorea* spp. (A wild yam): A study on its seasonal food security, pharmacognosy, phytochemistry and traditional medicines used by the indigenous people of Tripura**

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Abstract: The genus *Dioscorea*, commonly known as yam, belonging to the family Dioscoreaceae comprises 600 species is a well-known taxon for having medicinal properties. It is distributed throughout the tropical regions of the world including the Sub-Himalayan belt of India. This wild tuber crop is one of the major food sources among different tribal communities of Tripura. Out of nine species so far reported from Tripura, *D. alata* is cultivated by the local people while tubers of other species are collected from wild state. This study was undertaken to document ethnomedicinal knowledge of *Dioscorea* species and to highlight the dependency of the interacting communities to this tuber crop as alternative sources of food. A questionnaire was prepared and 120 people including local healers of various ages were randomly selected for gathering information. This type of survey was repeated at least three times for collection of data from the local communities of a particular area. Data were assembled and analysis was done after having group discussion with people of interacting communities without any bias. Finally the assemble data of each plant were cross checked for further verification. The people of the tribal communities used these plants for well-being of their life and general ailments as initial support. The traditional healers and local herbalists of the region usually utilize every part of the plant except flower and fruit. The result also revealed that the most frequent used parts for traditional medicine are tuber (54%); followed by leaf (21%), leaf with bulbils (14%) and solely bulbils (9%). The present study represents valuable information about the traditional knowledge of 13 ethnic communities of Tripura on nine *Dioscorea* sp. This rich traditional knowledge may also be utilized for important phytochemical investigation and efforts should be taken to conserve this wild germplasm.

Keywords: *Dioscorea*, seasonal food, traditional knowledge, phytochemical.

***Tinospora cordifolia*, a potential medicinal plant of Tripura: an overview of its therapeutic activities**

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Abstract: *Tinospora cordifolia* is a large, perennial, climbing shrub of weak and fleshy stem found throughout Tripura. It is a widely used plant in Folk and Ayurvedic systems of medicine. Various properties of the plant are described in ancient texts. Potential medicinal properties include anti-diabetic, antipyretic, anti-inflammatory. The bark is papery, creamy white to gray in appearance with large rosette like lenticels. Flowers Unisexual, receptive, and greenish yellow in hue, flowers only bloom when a plant has no leaves. Female flowers are seen in single inflorescences, while male flowers are grouped together. There are 6 sepals in 2 sets of 3 each. Fruit have an orange-red colour, are fleshy, ovoid, smooth, aggregates of one to three, and are drupelets on robust stalks with sub terminal scars. The arial root has primary structures with tetra to penta arches. Propagation by seeds and vegetative cuttings can be used. *T. cordifolia* has potential anti-diabetic activities. The stem of this plant is commonly used to treat diabetes by controlling blood glucose levels. It has been stated that it acts as an anti-diabetic medication by boosting insulin secretion by suppressing gluconeogenesis and glycogenolysis. The crude fibre content is relatively high, with a large amount of protein and a low fat content. It contains minerals such as calcium, iron, phosphorus, potassium, manganese, zinc, and copper. Recently the discovery of active components from the plant and their biological function in disease control has led to active interest in the plant across the globe.

Keywords: *Tinospora cordifolia*, medicinal plant of Tripura, insulin secretion

Millets-a super food or a diet fad

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Abstract: Millets are one of the oldest food grains known to mankind and possibly the first cereal grain used for domestic purposes. Millets were rendered as ‘orphan crops’ – less consumed and almost forgotten. Some common varieties of millets are Pearl, Foxtail, Kodo, Finger, Proso, Browntop, Teff and Job,s Tears. Millet earns its super food status due to its impressive nutritional profile. They're fiber-rich, support digestion, and help manage weight and blood sugar levels. Millets are rich in fiber, vitamins, minerals, and antioxidants. Essential amino acids make millets a valuable protein source. High fiber content aids in satiety and weight control. Slow digestion helps regulate blood sugar levels Promotes healthy digestion and prevents constipation. Millets require less water compared to major cereal crops, promotes biodiversity and crop rotation. Millets have gained attention in recent years due to its health-conscious diets. Millets are a nutritional powerhouse with numerous health benefits. Their sustainability makes them an important part of the future food landscape. Whether super food or diet fad, millets have a role to play in promoting a healthier future.

Keywords: Integrated smart system, automated SOS, IR modules, RFID technology

***In silico* identification of the inhibitory potential of edible fruits against diabetics using molecular docking**

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Abstract: The International Diabetic Federation projects that there will be 578 million individuals worldwide with diabetes by 2030 and 700 million by 2045. α -Glucosidase is one of the promising drug target for treatment of diabetic. Diabetes can be controlled using α -glucosidase inhibitors, which inhibit the breakdown mechanism of complex carbohydrates into simple sugars. To identify the potential α -glucosidase (AG) inhibitors 60, 166 and 22 compounds of *Morinda citrifolia*, *Tamarindus indica*, and *Dillenia indica*, respectively were, subjected to structure based virtual screening against α -glucosidase followed by docking based MM-GBSA study. The binding affinity of three hits from T. indica TI_01, TI_02, and TI_03 were less than two known AG inhibitors Miglitol and Voglibose. The binding affinity of two hits from D. indica, DI_01 and DI_02 were \leq two known inhibitors. The binding affinity of TI_01, TI_02, TI_03, DI_01, and DI_02 were -12.433, -11.131, -10.179, -11.558 and -9.982 kcal/mol, respectively. The binding affinities of one compound of M. citrifolia were greater than two known inhibitors. Among the three fruits compounds T. indica exhibited more binding affinity towards AG than other fruits. The MM-GBSA ΔG_{bind} of TI_01, TI_02, TI_03 were -47.816, -38.576 and -26.719 kcal/mol, respectively. The MM-GBSA ΔG_{bind} of compounds of T. indica were also very good. All the three fruits were edible and therefore T. indica may be used after meal to reduce glucose supply from small intestine to blood. The estimated oral absorption rates for most of the compounds in humans were low, like known inhibitors, which supports of using these substances as anti-diabetics. Before use T. indica as anti-diabetic agent the in vitro, in vivo and concentration of the promising compounds TI_01, TI_02, TI_03 need to be measured.

Keywords: *M. citrifolia*, *D. indica*, *T. indica*, Virtual Screening, Anti-diabetic, α -Glucosidase inhibitor.

Auto stop in Saline

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Abstract: We see there are many problems occur due to the reverse flow of blood of the empty bottle of saline. In many villages and rural areas due to lack of health workers when a peasant goes through a saline and when the saline got empty and due to absence of anyone. The blood in the peasant's body gets sucked back to the bottle due to air pressure. So, to solve this problem we developed our model. Our model work on the principle of gravity and weight machine. Our model works like, the saline stand will consist of two saline bottle and of "T" Shape where the horizontal part will be of moving part which connected to the vertical part. And when one bottle gets empty and due to gravity and weight of the full bottle the bottle will go down and the pipe of the empty bottle will be squished and the air flow will be stop and eventually prevent the flow of blood to occur.

Our future plan toward the model is that we want to modify it so that it be used for all density of fluid i.e. blood and etc.

Keywords: Saline, weight mechanism, reverses flow of fluid, gravitational force, air pressure.

Mystery of casino

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Abstract: "Cardboard Casino Game" is an innovative tabletop gaming experience designed to simulate the thrill and strategy of a casino within a cardboard-based framework. This game offers a diverse array of classic casino activities, such as blackjack, roulette, poker, and slot machines, creatively reimaged in a compact, tactile format. Players engage in strategic decision-making, employing cards, dice, and tokens to navigate

various game scenarios, all ingeniously constructed from recyclable materials. The game combines chance and skill, encouraging social interaction and fostering a competitive yet entertaining atmosphere. With its portable and eco-friendly design, Cardboard Casino Game provides an accessible and engaging entertainment option for diverse audiences, promoting

both sustainability and recreational enjoyment. Whether played casually or competitively, this game promises an immersive and enjoyable experience, transcending the boundaries between traditional gaming and environmental consciousness.

In brief ; The casino environment serves as a compelling backdrop for exploring the principles of probability, offering a captivating platform to delve into the intriguing realm of chance. In this model, we embark on a journey through the dynamics of probability theory, unraveling its significance in the context of casino games.

At its core, probability is the mathematical study of uncertainty, and the casino floor becomes a living laboratory where these uncertainties manifest in games of chance. From the spin of a roulette wheel to the shuffle of cards at the blackjack table, each moment encapsulates a probability distribution that governs potential outcomes.

Through vivid illustrations and real-world examples, we demystify the intricacies of probability, demonstrating how it underpins the very fabric of casino games.

The crux of the model lies in dissecting key concepts such as probability distributions, expected values, and the law of large numbers. Participants will gain a nuanced understanding of how these principles influence decision-making in games like poker, craps, and slot machines. The juxtaposition of theoretical probability and practical application within the casino setting provides a unique perspective on risk and reward. Furthermore, the model explores the role of probability in strategic decision-making for both players and the house. Analyzing scenarios like optimal betting strategies and the house edge, participants will grasp the subtle interplay between chance and strategy in the pursuit of favorable outcomes.

As the casino board becomes a canvas for probability exploration, attendees will not only grasp the mathematical foundations but also appreciate the broader implications in fields ranging from finance to artificial intelligence. The model culminates in an engaging dialogue on the ethical considerations of probability within the casino industry, touching on responsible gaming practices and the societal impact of chance-based entertainment.

In essence, the casino board model on probability transcends the confines of a mathematical discourse, offering a captivating narrative that unveils the magic and mystery behind the games of chance that define the casino experience.

Keywords: Card board casino games, casino activities, strategy, probability & skill, risk & reward.

Application of trigonometry in real life by using clinometer

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Abstract: In this presentation, we explore the practical application of clinometers as an efficient tool for determining the heights of objects in our surroundings. By employing fundamental trigonometric principles, particularly the tangent function, in conjunction with the measurements obtained through a clinometer, we ascertain the heights of distinct structures such as buildings, trees, and poles.

The foundational concept begins with the triangulation method, utilizing the tangent function of angles measured by the clinometer. By establishing a relationship between the angle of elevation, base length, and the tangent function (\tan), we can derive the height of an object. The presentation elucidates the process of utilizing a clinometer to measure the angle of elevation. As demonstrated in the case study focusing on a building, an angle of elevation of 45 degrees is observed, facilitating the initial step towards height determination. The methodology involves the simple yet potent trigonometric relationship:

$$\text{Height} = \text{Distance} \times \tan(\text{Angle})$$

This abstract math model allows us to estimate the height of the building using trigonometry based on the angle of elevation and the distance from the building. Leveraging this relationship alongside the measured base (24 cm) in the case of the building a height of 24 cm is derived. This calculation elucidates the direct correlation between the measured angle and the object's height.

This presentation details the step-by-step process for calculating the heights of different objects. It can be applied in various fields like; Site Assessment for construction, Land management, Telecommunication Tower Maintenance & in forestry it is widely used. The application of clinometers for height estimation offers a cost-effective and accessible approach in various fields, including architecture, forestry, and survey.

In Short, this presentation aims to provide a comprehensive understanding application of trigonometry by using clinometers as a reliable tool for height determination, emphasizing its significance in diverse real-world scenarios.

Keywords: Clinometers, tangent function, trigonometry principle, angle of elevation, telecommunication.

Health related quality of life (HRQL), general health and nutritional status: a study among adult population of Udaipur, Tripura

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Abstract: Health-related quality of life (HRQL) encompasses physical, psychological, social and functional areas of life. Nutritional status is the result between the nutritional intake received and the demands, The aim of the study was to evaluate these among the adult population of Udaipur, Tripura.

The study was performed cross sectionally. Among sixty participants, 30 male and 30 female (30-50 years of age) were selected. For general health and nutritional status, anthropometric parameters, blood pressure (BP), respiratory rate (RR) and heart rate (HR) were evaluated. HQRL was evaluated by using the SF-36 questionnaire.

Results showed that there were significant differences in height ($P<0.05$), weight ($P<0.05$), waist circumference ($p<0.05$) between male and female adults. High prevalence of chronic energy deficiency(CED)was found in female group, compared to male group. The subjects with CED had poor HRQL in male and female subjects. Subjects with and without CED showed significant differences in the mean scores of different subscales of HQRL like physical functioning (PF) and general health (GH). Female subjects showed significantly lower values in role emotional (RE) subscale in comparison to male subjects. PF correlated significantly with both systolic and diastolic blood pressure and GH significantly correlated with BMI in males.

Over all presence of CED have impact on HRQL in adults irrespective of sex. The study also revealed that nutritional intervention was required for the population of the studied area. So there is a need for the local health authorities to implement various assessment programs for managing the burden of under nutrition and poor health status of the studied population.

Keywords: HRQL; PF; GH; BMI.

Profitable paths: business mathematical insights into the travelling salesman

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Abstract:-

In business mathematics, the Travelling Salesman Problem (TSP) is pivotal. It addresses the challenge of finding the most efficient route for a salesperson to visit multiple locations, optimizing time and resources. TSP's solutions play a vital role in logistics, cost reduction, and strategic decision-making for businesses with field operations.

The Travelling Salesman Problem (TSP) unfolds in two crucial stages. Initially, it identifies the optimal sequence for visiting multiple locations. Subsequently, it delves into minimizing travel costs, offering businesses a strategic edge in route planning and resource allocation, impacting logistics and operational efficiency significantly.

The Travelling Salesman Problem (TSP), a cornerstone of business mathematics, addresses the optimization of routes for sales representatives navigating a set of destinations. This combinatorial optimization challenge seeks to minimize travel costs or maximize profits by determining the most efficient path while visiting each destination exactly once before returning to the starting point. In the dynamic landscape of business logistics, TSP proves instrumental in enhancing operational efficiency and resource allocation.

This abstract underscores the pivotal role of TSP in route planning and strategic decision-making within various business scenarios. By formulating TSP mathematically, businesses can create optimal routes, minimizing distances travelled and resource utilization. TSP's applications extend beyond geographical logistics, influencing fields such as supply chain management and field service scheduling.

In summary, the Travelling Salesman Problem stands as a powerful tool in the arsenal of business mathematics, contributing to streamlined operations, prudent resource management, and ultimately, cost-effectiveness.

In conclusion, the Travelling Salesman Problem in business mathematics optimizes routes, enhancing operational efficiency and resource allocation.

Key Words: Operational Efficiency; Resource Allocation; Route Planning; Strategic Decision-making; Supply Chain Management; Field Service Scheduling.

Integrated smart system for road safety enhancement

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Abstract: Road accident is an alarming global issue, leading to the need for advanced technological interventions to reduce accidents and enhance road safety. This project proposes an integrated smart system designed to prevent road accidents through multi-faceted approaches. The system contains five key functionalities: helmet detection, license verification, adaptive lighting control for high and low beams, alcohol detection, and an automated SOS sending system during accidents.

The first component of this system focuses on helmet detection, using IR modules to identify and ensure that motorcycle riders are wearing helmets. Thus, the system promotes adherence to safety protocols and can reduce head injury risks during accidents. Without wearing helmet ignition will be denied.

The second facet involves license verification through RFID (Radio-Frequency Identification) technology. By integrating RFID tags into driving licenses, the system facilitates instantaneous verification of a driver's credentials, ensuring that only authorized individuals operate vehicles.

Additionally, the system integrates adaptive lighting control that automatically adjusts between high and low beams during night-time driving, ensuring optimal visibility for the driver without causing discomfort to oncoming vehicles.

Moreover, the system incorporates alcohol detection capabilities using sensors that analyze the driver's breath. If the driver is drunk, ignition will be denied.

Finally, the system includes a smart SOS service based on flex and force sensors which can detect accident and send real-time alerts to the rider's family. It reduces the potential risk of death caused by late reporting of accident during late nights.

In conclusion, the proposed integrated smart system involves various technological components to actively address road safety concerns, aiming towards a significant reduction in accidents and enhance overall safety for all road users.

Keywords: Integrated smart system, Automated SOS, IR modules, RFID technology