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Sr. No.	Name of the faculty member	Title of the paper	Name of the Journal	Year
1.	Dr. Akash Deep Sharma	A Constitutive Modeling and experimental Effect of Shock waves on the Microstructural sub-strengthening of Granular Copper	Journal of Metallic Materials Research	2021
2.	Dr. Roop Lal	Nature of phytotoxic interference of alien weed 'Calyptocarpus vialis' against some crop plants	Environmental Monitoring and Assessment	2021
3.	Dr. Akash Deep Sharma	Influence of High Detonation Pressure on the Structural, Microstructural and mechanical behavior of In718 superalloy: numeric simulations vis-a-vis experimental shock wave processing.	Bulletin of Materials Science	2022
4.	Dr. Manoj Kumar	Protective role of AKBA against benzo(a)pyrene-induced lung carcinogenesis by modulating biotransformation enzymes and oxidative stress	Journal of biochemical and molecular toxicology	2022
5.	Dr. Roop Lal	Projected Impacts of Climate Change on the Range Expansion of the Invasive Straggler Daisy (Calyptocarpus vialis) in the Northwestern Indian Himalayan Region	Plants	2023
6.	Dr. Pitamber Dutt	DNA Profiling of the Threatened Himalayan Herb Polygonatum Verticillatum L. Using Cross-Transferred Betula SSR Markers	Current Agriculture Research Journal	2024
7.	Mrs. Beby Kumari	Growth of Main Sectors in Himachal Pradesh	International Journal of Business Economics and Management Research	2024

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8.	Dr. Manoj Kumar	Exploring Integrative Approaches: EGCG's Potential in Combating Prostate Cancer	World Cancer Research Journal	2024
9.	Dr. Manoj Kumar	Green Tea's EGCG: Brewing Hope in the Battle against Breast Cancer	The Natural Products Journal	2024
10.	Dr. Roop Lal	Green Tea's EGCG: Brewing Hope in the Battle against Breast Cancer	The Natural Products Journal	2024
11.	Mr. Ashish Kumar	Changing Processes in Agro-Horticulture Pattern During The British Period in Chamba Princely State	International Journal of Creative Research Thoughts	2025
12.	Mr. Ashish Kumar	An Observation on the Growth of Floriculture Tradition in the Development of Himachal Pradesh under the British Rule	Quest Journal of Research in Humanities and Social Science	2025
13.	Mr. Vipan Kumar	Agni Puraan me Prasaad-Vaastu	Universal Research Journal	2025

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ARTICLE

A Constitutive Modeling and Experimental Effect of Shock Wave on the Microstructural Sub-strengthening of Granular Copper

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ABSTRACT

Micro-sized copper powder (99.95%; O≤0.3) has been shock-processed with explosives of high detonation velocities of the order of 7.5 km/s to observe the structural and microstructural sub-strengthening. Axisymmetric shock-consolidation technique has been used to obtain conglomerates of granular Cu. The technique involves the cylindrical compaction system wherein the explosive-charge is in direct proximity with the powder whereas the other uses indirect shock pressure with die-plunger geometry. Numeric simulations have been performed on with Eulerian code dynamics. The simulated results show a good agreement with the experimental observation of detonation parameters like detonation velocity, pressure, particle velocity and shock pressure in the reactive media. A pin contactor method has been utilized to calculate the detonation pressure experimentally. Wide angled x-ray diffraction studies reveal that the crystalline structure (FCC) of the shocked specimen matches with the un-shocked specimen. Field emissive scanning electron microscopic examination of the compacted specimens show a good sub-structural strengthening and complement the theoretical considerations. Laser diffraction based particle size analyzer also points towards the reduced particle size of the shock-processed specimen under high detonation velocities. Micro-hardness tests conducted under variable loads of 0.1 kg, 0.05 kg and 0.025 kg force with diamond indenter optical micrographs indicate a high order of micro-hardness of the order of 159 H_v. Nitrogen pycnometry used for the density measurement of the compacts shows that a compacted density of the order of 99.3% theoretical mean density has been achieved.

1. Introduction

In the prevailing atmosphere of worldwide militarization and an age of nuclear engineering, the use of light sustainable metals is increasing due to their high ductility, malleability and high temperature or corrosion resistant properties. An excellent thermal and electrical conductivity with intrinsic strength of formability, ductility and corrosion/fatigue resistance make non-magnetic copper components a premier choice in the aerospace industries [1-5]. The solidification of commercially available or chemically/physically synthesized Cu powder involves hydraulic or isostatic processing, metal injection molding or sintering. Distinctive challenges arising on the solidification/ compaction of powders are due to deterioration of fine grained structure as well as formation

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Nature of phytotoxic interference of alien weed '*Calyptocarpus vialis*' against some crop plants

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Abstract *Calyptocarpus vialis* (syn. *Synedrella vialis*; Asteraceae), a native of the tropical Americas, has acquired an invasive status in the eastern Asia and Africa and, of late, in India. It is an annual herbaceous weed that forms a dominant ground cover due to its prostrate expansion and interferes with the growth of other plant species. However, the reasons for this interference are largely unknown. Therefore, we examined the allelopathic interference of *C. vialis* via leachation and residue degradation on the emergence, growth, and development of three crop species (*Brassica nigra*, *Triticum aestivum*, and *Avena sativa*). In a laboratory bioassay, the leachates (0.5–4%) of *C. vialis* exhibited a dose-dependent inhibitory effect on various growth parameters of the test plants. Similarly, under screenhouse, *C. vialis*-amended soil (1–4%) affected the growth of test species in a dose-dependent manner. Further, the phytotoxicity of the residues of *C. vialis* was examined using rhizospheric soil (RS) and residue-amended soil (RAS). It was observed that RAS exerted the maximum allelopathic effect on the test species accompanied by significant changes in pH, electrical conductivity, and total water-soluble phenolic content, as compared with the control soil (CS) and RS. Liquid chromatography and mass spectroscopy analyses confirmed the presence of eleven allelochemicals as the major phytotoxins. The study demonstrated that *C. vialis* exerts strong phytotoxic effects on other plants through the release of potent allelochemicals, both via leachation and residue degradation.

Keywords Allelochemicals · Allelopathy · Leachation · Residue degradation · Straggler Daisy · *Synedrella vialis*

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Introduction

Allelopathy is a phenomenon in which the release of allelochemicals (plant secondary metabolites) by one specific plant suppresses (rarely stimulates) the growth of associated plants (Rice, 1984). It is an important tool which helps alien weeds in their establishment and, in turn, invasion success in non-native habitats (Becerra et al., 2018; Ooka & Owens, 2018; Uddin & Robinson, 2017; Zheng et al., 2015). Weeds exhibit allelopathy by releasing water-soluble phenolic compounds (Batish et al., 2007a; Cheng & Cheng, 2015) and sesquiterpene lactones (Padilla-Gonzalez et al., 2016) from different plant parts (aboveground,

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Influence of high detonation pressure on the structural, microstructural and mechanical behaviour of IN718 superalloy: numeric simulation vis-à-vis experimental explosive shock processing

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Abstract. Micro-sized IN718 superalloy powder with an average particle size of 70 μm has been explosively shock-processed with high pressure of the order of 41.3 GPa. A hydrocode, AUTODYNE-2D, with Eulerian mesh is used to simulate and to compute the detonation pressure, particle velocity and shock pressure on the superalloy in the reactive zone. The grazing shock pressure at different regions in the compaction system has been calculated and compared with the experimental work. Axisymmetric cylindrical compaction geometry has been used for the shock-loading of IN718 superalloy. The shock pressure at different points was calculated experimentally by pin-oscillography with the help of electrical as well as fibre optical probes. Wide-angle X-ray diffraction study indicates the intact crystalline FCC structure within the shock-processed specimen having dominating γ[Ni-Cr-Fe] and strengthening γ'[Ni_3(Ti,Al)] phases. Laser diffraction particle size measurement points towards the reduced particle size of the shock-loaded specimen. The Line-broadening Williamson-Hall method shows a very small amount of locked-in microstrain of the order of 0.23%. Energy-dispersive analysis using X-ray examination shows no evidence of any chemical segregation within the compacts. Field-emission scanning electron microscopy shows satisfactory sub-structural strengthening and desired morphology at different regions in the fractographs of the compacted specimen without melting of the core of the specimen. Micro-indentation testing at variable loads of 0.98, 1.96 and 4.9 N shows a good hardness of the order of 642 H_v. The monolith cut-along the consolidation axes show tensile and compressive strengths of the order of 1.126 and 1.04 kN mm^{-2}, respectively. Uniform crack/void-free compacts have been obtained with a density close to 99.2% of the theoretical value with negligible porosity.

Keywords. Crystal structure; microstructure; microstrain; shock waves; simulation; IN718 superalloy.

1. Introduction

Nickel-based IN718 (Inconel 718) superalloys are a premier choice as far as the aerospace industry and strategic defence applications are concerned. Due to the high toughness, load-bearing capability and corrosion/oxidation-resistant properties at high temperatures, they show promising applications in gas turbine engines/blades, submarines, nuclear reactors, jet engines, rocket motors and chemical process manufacturing [1–5]. In a precipitation/particle hardening state, this alloy contains multiple phases having γ[Ni-Cr-Fe] as a continuous matrix with nonmagnetic FCC, γ' [Ni_3(Ti, Al)] as an intermetallic-ordered FCC phase (Ni at face-centres and Al or Ti at the cube-corners), γ'' [Ni_3Nb] as a BCT (Nb at the centre and corners of the tetragonal) and the metal carbides such as MC, $M_{23}C_6$ and M_6C type. The γ-matrix permits significant addition of alloying elements, γ' matrix provides high-temperature strength and creep resistance via ordered strengthening, γ'' phase matrix provides coherent strengthening at low/intermediate temperature via high coherency strain and carbides formed at the grain boundaries and used to stabilize the material against plastic deformation at high temperatures [6,7].

A typical challenge while working with such superalloy powders is to obtain a single conglomerate of desired dimensions from its original synthesized powder state. The general processes involved are hot/cold isostatic pressing and hydraulic pressing. Consolidation of spherical and hard superalloy powders by these techniques cause problems due to lengthy processing time and prolonged temperature exposure that may deteriorate the fine-grains or result in the formation of undesired phases or coarse intermetallic

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RESEARCH ARTICLE

Protective role of AKBA against benzo(a)pyrene-induced lung carcinogenesis by modulating biotransformation enzymes and oxidative stress

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Abstract

The present study was designed to explore the chemopreventive potential of 3-acetyl-11-keto-β-boswellic acid (AKBA) during the initiation and promotion stage of lung carcinogenesis induced by benzo(a)pyrene (BaP) in female Sprague Dawley rats. BaP was administered at a dose level of 50 mg/kg b.wt. twice a week orally in olive oil for 4 weeks. AKBA administration was started 4 weeks before BaP treatment and continued for another 8 weeks at a dose level of 50 mg/kg b.wt. orally in olive oil three times a week. BaP treatment showed significantly increased in the activities of Phase I biotransformation enzymes (Cytochrome P_{450}, b_5, and aryl hydrocarbon hydrolase) and inhibited the activity of Phase II enzyme (glutathione-S-transferase). Also, a significant elevation in oxidative stress biomarkers lipid peroxidation, reactive oxygen species, and protein carbonyl content concentration. Further, an appreciable decrease was observed in the activities of endogenous antioxidant enzymes superoxide dismutase, CAT, GPx, GR, and a decline in nonenzymatic GSH levels. As a result of BaP induced oxidative stress, alteration in erythrocytes morphology was observed. Fourier transform infrared spectroscopy spectrum of lung tissue showed structural changes due to BaP exposure. Moreover, levels of tumor biomarkers such as total sialic acid, carcinoembryonic antigen, and alkaline phosphatase were significantly elevated following BaP treatment which was substantiated by alterations noticed in the histoarchitecture of lung tissue. Interestingly, AKBA administration to BaP treated rats appreciably alleviated the changes inflicted by BaP on various biochemical indices and histoarchitecture of lungs. Therefore, the study clearly revealed that AKBA by containing oxidative stress shall prove to be quite effective in providing chemoprevention against BaP induced lung carcinogenesis.

KEYWORDS
carcinoembryonic antigen, chemoprevention, cytochromes P_{450}, erythrocytes morphology, FTIR

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plants

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Article

Projected Impacts of Climate Change on the Range Expansion of the Invasive Straggler Daisy (*Calyptocarpus vialis*) in the Northwestern Indian Himalayan Region

Roop Lal [1,†], Saurav Chauhan [2], Amarpreet Kaur [1], Vikrant Jaryan [3], Ravinder K. Kohli [4], Rishikesh Singh [1,5], Harminder P. Singh [6], Shalinder Kaur [1,*] and Daizy R. Batish [1]

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Abstract: Human-induced climate change modifies plant species distribution, reorganizing ecologically suitable habitats for invasive species. In this study, we identified the environmental factors that are important for the spread of *Calyptocarpus vialis*, an emerging invasive weed in the northwestern Indian Himalayan Region (IHR), along with possible habitats of the weed under current climatic scenarios and potential range expansion under several representative concentration pathways (RCPs) using MaxEnt niche modeling. The prediction had a high AUC (area under the curve) value of 0.894 ± 0.010 and a remarkable correlation between the test and expected omission rates. BIO15 (precipitation seasonality; 38.8%) and BIO1 (annual mean temperature; 35.7%) had the greatest impact on the probable distribution of *C. vialis*, followed by elevation (11.7%) and landcover (6.3%). The findings show that, unlike the current situation, "high" and "very high" suitability areas would rise while less-suited habitats would disappear. All RCPs (2.6, 4.5, 6.0, and 8.5) indicate the expansion of *C. vialis* in "high" suitability areas, but RCP 4.5 predicts contraction, and RCPs 2.6, 6.0, and 8.5 predict expansion in "very high" probability areas. The current distribution of *C. vialis* is 21.59% of the total area of the state, with "medium" to "high" invasion suitability, but under the RCP 8.5 scenario, it might grow by 10% by 2070. The study also reveals that *C. vialis* may expand its niche at both lower and higher elevations. This study clarifies how bioclimatic and topographic factors affect the dispersion of invasive species in the biodiverse IHR. Policymakers and land-use managers can utilize the data to monitor *C. vialis* hotspots and develop scientifically sound management methods.

Keywords: bioclimatic factors; climate change; MaxEnt; northwestern Indian Himalayan region; receiver operating characteristic (ROC); topographic factors

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1. Introduction

Human-driven modifications of climate strongly transform the potential matrix of plant species distribution by reshuffling ecologically suitable habitats [1]. Changes in climate have led to increased temperatures, erratic precipitation, enhanced atmospheric carbon dioxide, unpredictable seasonal shifts, extreme weather events, prolonged drought periods, frequent forest fires, acidification of water bodies, desertification of drylands, the formation of heat islands, and habitat loss and fragmentation [2,3]. In addition to alterations in vegetation patterns and community structure and function, climate change has enhanced

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DNA Profiling of the Threatened Himalayan Herb *Polygonatum Verticillatum* L. using Cross-Transferred *Betula* SSR Markers

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Abstract

Polygonatum verticillatum is an important Himalayan herb that is used in different medicine systems for improving health and curing many diseases. Herein, simple sequence repeat (SSR) marker characterization of this plant species was performed using cross-transferred SSR markers of a distantly related species *Betula utilis*. Among the 25 SSR markers tested, 13 generated clearly distinguishable alleles. Of these, 12 SSR primers were polymorphic and 1 was monomorphic. All the 12 markers collectively amplified 42 alleles. The average value of 3.5 alleles was observed. The size of alleles ranged from 100 - 600 bp. The mean polymorphism information content (PIC) was 0.459, and mean marker index was 1.61. The dendrogram clustered all the studied accessions into three groups according to geographical locations. The results showed high genetic diversity in the populations of *P. verticillatum* in Indian Himalayan region. SSR marker exhibited good amplification in distantly related species. The SSR markers used in the present work can help diversity and breeding research of *P. verticillatum* in coming days. The results of present work will be helpful for characterization, conservation, management and improvement of the germplasm of this plant in the future.

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Cross-Transferability;
Genetic Diversity;
Polygonatum verticillatum;
Simple Sequence Repeat (SSR);
Betula Utilis.

Introduction

Polygonatum verticillatum L. is a highly valued medicinal herb of Indian Himalayan region (IHR) and occurs from 2000 -3000 m asl. It is a member of family Asparagaceae. It is known as "Meda" in Sanskrit and "Salam Mishri" in Hindi. This herb yield important metabolites and is one of the constituents of many ayurvedic formulations.[1-3] Morphologically, plants are slender and generally, unbranched with leaves arranged in verticillaster manner. Leaves are lanceolate, and stem bear flowers near the base of leaves. Flower colour is generally pale yellow and greenish. The fruits are round berries that are initially green in colour and become red when ripe. It is a plant of high importance. However, unscientific exploitation by local traders and anthropogenic

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Growth of Main Sectors in Himachal Pradesh

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ABSTRACT

This paper attempts to explore the some of the important long-term changes that have occurred in the primary, secondary and tertiary sectors of Himachal Pradesh economy.For this purpose, the information on state gross domestic product for the primary, secondary and tertiary sectors (at constant prices) at aggregated levels, available for the period from 1980-81 to 2015-16 was compiled. For measuring the growth of primary, secondary and tertiary sectors andto justify the equation of best fit, eleven different types of growth rates simple linear (SILR); parabolic (PRBO); cubic (CUBI); log-linear (LOLN); log-parabolic (LOPB); log-cubic (LOCB); geometric (GEOM); hyperbolic (HYPE); modified exponential (MOEX); gompertz (GOMZ); logistic (LGST) were tested at aggregated/disaggregated level. The best functional form was decided with the help of Akaike's information criterion (AIC) values. Three main sectors of SGDP that is primary, secondary and tertiary sectors were taken as the indicators of study. The performance of the primary, secondary and tertiary sectors was assessed in terms of relative growth rates ofthese sectors. The study is entirely based on secondary data collected from the various reports of statistical abstracts and economic surveys of Himachal Pradesh. Accordingly, findings from the investigation are expected to deliver useful policy input for attaining balanced growth for the primary, secondary and tertiary sectors at the regional level.

Keywords: Secondary, Growth,Sector and Himachal Pradesh

JEL Classification Codes: C82, E01, O13, R11

1. Introduction

Himachal Pradesh is a hilly state, with 55673 square kilometre, which occupies the 1.69 percent of India's area. Theeconomy of Himachal Pradesh has shown a shift from agriculture sector to industries and services, as the percentage contribution of agriculture and allied sectors in total state domestic product has declined from 57.9 percent in 1950-51 to 8.8 percent in 2017-18. The share of services sectors has increased from 5.9 percent in 1950-51 to 43.3 percent in 2017-18 (GoHP). The agriculture, horticulture, and other allied activities are the mainstay of livelihood for peoples of the state in rural areas. Whilein the urban area majority of the people earn their livelihood mainly from the services sector (NSSO, 2011-12).An increase in the share of services is usually viewed as a rise in the standards of living and a sign of development. Himachal Pradesh is performing well when compared to

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EXPLORING INTEGRATIVE APPROACHES: EGCG'S POTENTIAL IN COMBATING PROSTATE CANCER

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• • •

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ABSTRACT – Prostate cancer is the most common cancer in males and one of many types of malignancies that are said to be prevented by drinking green tea and Epigallocatechin-3-gallate (EGCG) intervention. However, epidemiological studies have produced conflicting results regarding the anti-cancer effects of EGCG. In recent years, numerous researchers have demonstrated the effectiveness and safety of green tea polyphenols, including EGCG alone and in combination therapies, through *in vivo* and *in vitro* studies. Nevertheless, the molecular mechanisms underlying the anticancer potential of EGCG remain poorly understood. To evaluate the prevention and treatment of prostate cancer, it is critical to have a better understanding of the precise mode of action of EGCG against the growth and progression of prostate cancer. With a focus on the molecular mechanisms of action of EGCG, such as influencing tumour growth, apoptosis, androgen receptor signaling, cell cycle, and various malignant behaviors, we present information regarding the anti-cancer effects of EGCG in the prevention and treatment of prostate cancer in this review.

KEYWORDS: EGCG, Prostate Cancer, Signaling Pathways, Clinical trials.

INTRODUCTION

With 12,76,106 new cases and 3,58,989 deaths (3.8% of all deaths from cancer in men), Prostate cancer (PCa) is the second most common malignancy in men worldwide (after lung cancer)[1]. According to Rawla et al[2], PCa incidence and mortality are both correlated with ageing globally, with an average age of 66 at diagnosis. Due to population growth and ageing, it is predicted that there will be almost 2.3 million cases of PCa globally and 7,40,000 deaths by 2040[3]. The well-known risk factors for PCa are age, race, and a family history of the disease[4]. There are numerous reports that claim low plasma-selenium and -tocopherol concentrations and high calcium intake in the diet increase the risk of PCa[5]. Androgens are necessary for the growth and development of the prostate gland, and it has long been believed that high levels of them are a major factor in the development of PCa[6,7]. According to recent studies, the majority of prostate tumours respond to androgen deprivation therapy until the point at which they develop an androgen-independent growth mechanism[8,9].

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REVIEW ARTICLE

Green Tea's EGCG: Brewing Hope in the Battle against Breast Cancer

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Abstract: Breast cancer, a pervasive global malignancy, is anticipated to undergo a significant increase by 2040. Despite the conventional armamentarium of treatments including chemotherapy, radiation therapy, and surgery, the intricate landscape of breast cancer, characterized by its multifaceted surface receptors and signalling pathways, presents formidable challenges to treatment efficacy. Epigallocatechin-3-gallate (EGCG), extracted from *Camellia sinensis*, has emerged as a subject of interest due to its robust antioxidative properties stemming from its chemical structure. EGCG exerts its effects on pivotal stages of tumour growth and proliferation by modulating key signalling pathways such as MAPK, PI3K, NFkB, and ERK1/2 influencing apoptosis and cell cycle regulation. Clinical trials have provided insights into EGCG's potential impact on breast cancer such as mammographic density and pharmacokinetics, indicating its potential as a potent therapeutic agent. Moreover, when administered with conventional chemotherapy, EGCG demonstrates synergistic effects, enhancing therapeutic outcomes. Nevertheless, further research is warranted to validate the safety and efficacy of EGCG in breast cancer prevention and treatment.

Keywords: Adjunctive therapy, cancer cell line, signalling pathways, antioxidants, catechins, synergistic.

1. INTRODUCTION

Tea (*Camellia sinensis*) is the most consumed beverage with a rich cultural history and significance [1]. Numerous studies have reported the chemopreventive effect of green tea on cancer [2-4]. The chemopreventive effectiveness of green tea is attributed to its intricate chemical composition, predominantly characterized by polyphenols. Among these, the pivotal catechins epigallocatechin gallate (EGCG), epigallocatechin (EGC), epicatechin gallate (ECG), and epicatechin (EC) take centre stage. The proportion of EGCG, EGC, ECG, and EC in total catechin ranges from 50-60%, 11-15%, 9-12%, and 6-10 % respectively [2, 5]. The potent catechin found in green tea, particularly EGCG, has gained significant attention for its potential role in disease prevention, such as reducing the risk of heart disease, combating inflammation and oxidation, and managing diabetes and cancer [6-10]. EGCG is emerging as a promising agent due to its potential antioxidant activities in the fight against cancer, offering a natural complementary approach to conventional therapies.

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Cancer, a life-threatening disease is initiated by various carcinogens, tumour promoters, and inflammatory agents that modulate the molecular signalling pathways by altering the structure and function of various growth factors, proapoptotic, antiapoptotic, and cell cycle proteins [11, 12]. Breast cancer, in particular, is the most prevalent malignant disease in women worldwide, accounting for a substantial number of cancer-related deaths [13]. Despite advances in cancer therapies (chemo, radiation & hormonal) and surgical interventions, the high metastasis rate and resistance to standard treatments through conventional therapies remain significant barriers to effective breast cancer management [14]. Numerous clinically proven adjuvant drugs like doxorubicin, cyclophosphamide (chemotherapy); Trastuzumab, pertuzumab, CDK4/6inhibitors (targeted therapy), Tamoxifen, anastrozole (hormone therapy) are present in the market that limit the recurrence of specific breast cancer but often associated with high rate of adverse event thus high mortality. However, EGCG is a natural compound present in green tea, showing potential anti-cancer properties alone and in combination with chemotherapeutic drugs, particularly in preclinical trials but lacks clinical validation and regulatory approval compared to traditional adjuvants. It may enhance the treatment efficacy but requires extensive clinical research to link it with breast cancer management [15, 16].

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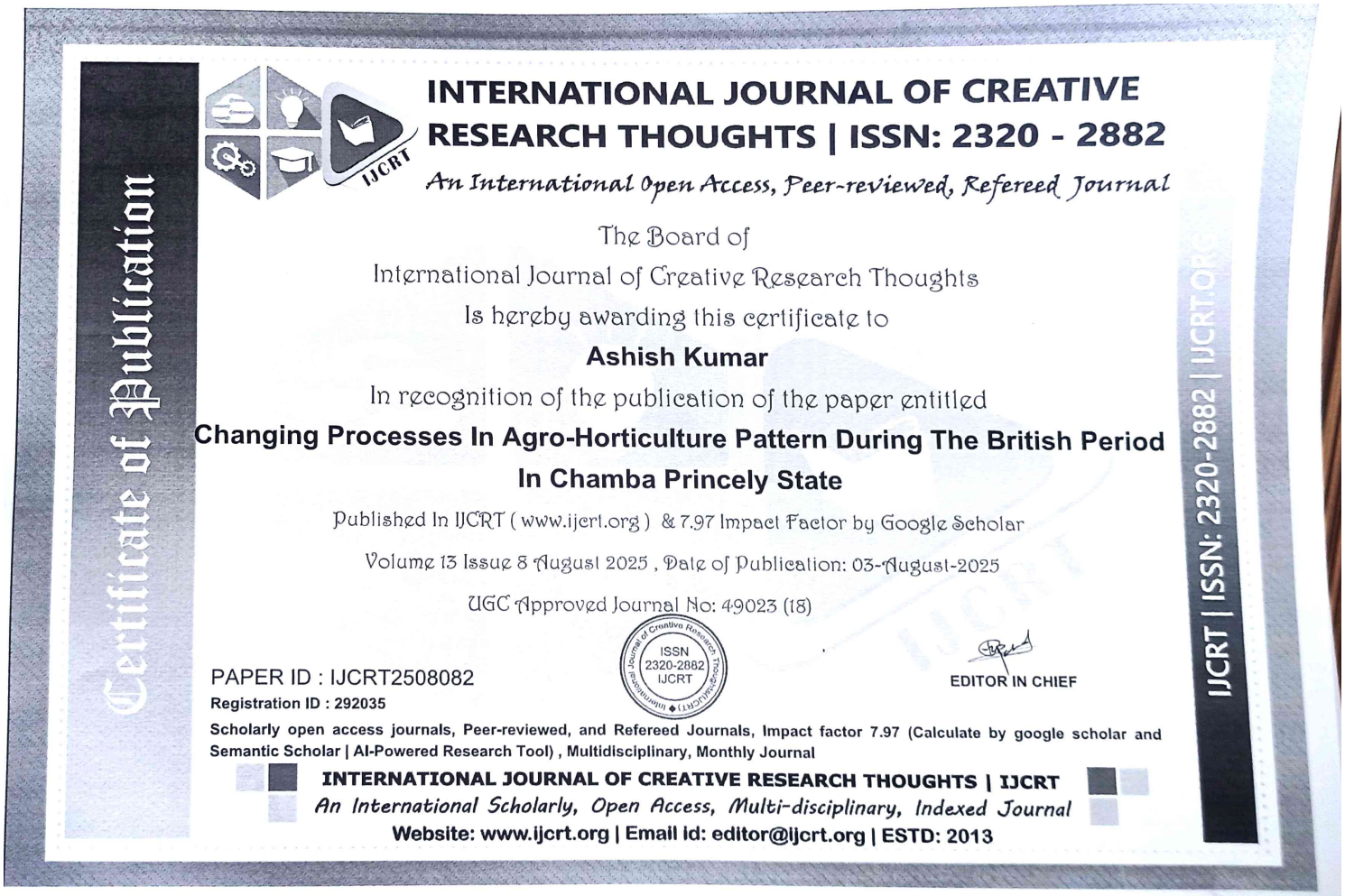

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