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3.3.1: Number of research papers published per teacher in the Journals notified on UGC care list during the last five years [Q_n]

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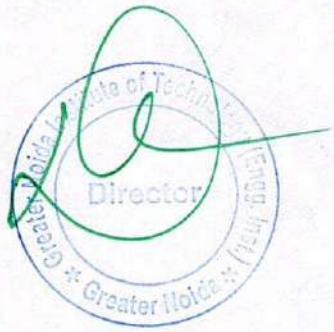

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3.3.1 Number of research papers published per teacher in the Journals notified on UGC website during the last five years

S. NO.	Title of paper	Name of the author/s	Department of the teacher	Name of Journal	Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal /Digital Object Identifier (doi) number		
1	Lead time for cities of Northern India by using multi parameter EEW algorithm	Rakhi Bhardwaj	ECE	International journal of Geophysics	2018	9086205		https://doi.org/10.1155/2018/9086205	Yes
2	Experimental Investigation and Optimization of Process Parameters for Shear Strength of Compound Cast Bimetallic Joints	Sudhir Kumar	ME	Transactions of the Indian Institute of Metals	2018	09722815, 09751645		https://doi.org/10.1007/s12666-018-1349-1	Yes
3	Experimental Investigation and Optimization of Process Parameters for Impact Strength of Compound Cast Bimetallic Joints	Sudhir Kumar	ME	International Journal of Metal casting	2018			DOI 10.1007/s40962-017-0190-3	Yes
4	MICROSTRUCTURE EVALUATION, THERMAL AND MECHANICAL CHARACTERIZATION OF HYBRID METAL MATRIX COMPOSITE	Sudhir Kumar	ME	Journal of Science and Engineering of Composite Materials	2018			https://doi.org/10.1515/secm-2017-0210	Yes
5	Characterization and microhardness evaluation of A356/Mg joint produced by vacuum assisted sand mold compound casting process	Sudhir Kumar	ME	International Journal of Metal Casting	2018			https://doi.org/10.1007/s40962-018-0264-x	Yes
6	Experimental Investigation and Evaluation of Joint Strength of A356/Mg Bimetallic Fabricated Using Compound Casting Process	Sudhir Kumar	ME	International Journal of Metal casting	2018			https://doi.org/10.1007/s40962-018-0288-2	Yes
7	New Dynamic Metrics Suite To Measure Complexity Of Component Based Software	Anjali Chaudhary	CSE	International Conference on Emerging Trends in Science, Engineering & Technology with VSRD International Journal of Technical and Non-technical Research	2018	0976-7967			Yes
8	An efficient algorithm for CBIR using clustering techniques for large dataset	Monika Jain	CSE	ICCCA conference2018,published in IEEE Xplore 2019	2018				Yes
9	Analysis and Impact of Social Media and it's Privacy on Big Data	Shilpi Bansal	CSE	2018 International Conference on Advances in Computing and Communication Engineering (ICACCE), Paris, 2018	2018				Yes
10	Blockchain -the Technology of Crypto Currencies	Shilpi Bansal	CSE	2018 International Conference on Advances in Computing and Communication Engineering (ICACCE), Paris, 2018	2018				Yes
11	Study and comparison of performance of Shell and Tube Heat Exchanger with Two Numerical Methods	Navin Kumar	ME	International journal for research in applied science and engineering technology (IJRASET)	2018	2321-9653			Yes
12	A MIG welding testing on tensile and hardness using Taguchi method	Navin Kumar	ME	International journal of Advanced Research in Electronics and Communication Engineering (IJARECE)	2018	2278-909X			Yes
13	Performance enhancement for scale-up of Gas hydrate forming reactors using stirred tank reactors	Navin Kumar	ME	International journal of Advanced Research in Electronics and Communication Engineering (IJARECE)	2018	2278-909X			Yes
14	A review on phytoconstituents and medicinal properties of Emblica officinalis	Dipti Bharti	AS	Annals of Horticulture Journal	2018	0976-4623		DOI : 10.5958/0976-4623.2018.00002.6	Yes

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International Journal of Geophysics
Volume 2018, Article ID 9086205, 8 pages
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Research Article

Lead Time for Cities of Northern India by Using Multiparameter EEW Algorithm

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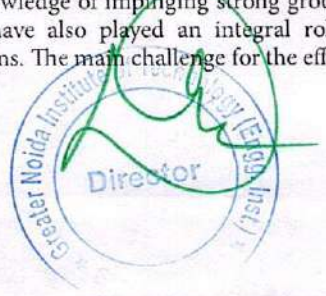
Guest Editor: ZhiQiang Chen

Earthquake early warning (EEW) is considered one of the important real-time earthquake damage mitigation measures. The presence of seismogenic sources generating high seismicity in Himalayas and the cities of concern lying at appropriate distances makes Northern India a perfect case to be monitored using EEW systems. In the present study, an attempt has been made to estimate the lead times for Northern Indian cities for issuing early warning by using the EEW system deployed by IIT Roorkee in Central Himalayas. The instrumentation deployed at 100 locations between Uttarkashi and Chamoli has been used to estimate the lead time at six cities. The estimated lead time includes the time to reach S-wave after subtraction of the sum of P-wave arrival time at the station, time taken by EEW algorithm, transmission and processing delay. The study reveals that for Dehradun, Hardwar, Roorkee, Muzaffarnagar, Meerut, and Delhi the minimum calculated lead time is 5, 11, 20, 35, and 68 sec while the maximum lead time is 37, 36, 47, 59, and 90 sec, respectively. Such larger estimated lead times to these densely populated cities show that EEW can successfully work as one of the important real-time earthquake disaster reduction measures in Northern India.

1. Introduction

The rapid growth of the world's population over the past few decades has led to a concentration of people, buildings, and infrastructure in urban areas. These vulnerable areas when falling in vicinity of seismically active sources become the center of disasters in terms of economic losses and death tolls. Such a case exists in Northern India where a lot of development has taken place in the vicinity of Himalayas which is one of the world's seismically very active zone. Himalaya has been repeatedly hit by damaging earthquakes including some of the great earthquakes, namely, 1897 Shilong (M 8.7), 1905 Kangra (M 8.6), 1934 Bihar (M 8.4), and 1950 Assam (M 8.7), along with other moderate earthquakes which occurred recently, for example, 1991 Uttarkashi (M 6.8), 1999 Chamoli (M 6.4), 2005 Muzaffarabad (M 7.6), and 2011 Sikkim earthquake (M 6.9) in which huge loss of life and property took place [1–3]. The recent 2015 Nepal earthquake may be considered as a whistle blower for revisiting our preparedness towards heavy losses which the local populace has to face in future due to such natural calamity. The problem becomes manifold when the pace of urbanization rapidly increases into the Himalayan region and its periphery and, in turn, increase in the vulnerability is considered. It is therefore essential to take measures to reduce earthquake losses through scientific research. In addition, to create an earthquake resilience society by providing earthquake resistant built environment, it will be of paramount importance to consider the information about such event if it can be given *a priori*. Since earthquake prediction seems to be a little distant future, the earthquake early warning (EEW) systems are making swift in-roads in becoming a practical tool to reduce the losses by giving warning before the arrival of a damaging ground motion at a site [4, 5]. One of the prerequisites for disaster mitigation and management is the *a priori* knowledge of impinging strong ground motion. EEW systems have also played an integral role in engineering applications. The main challenge for the effective use of EEW



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TECHNICAL PAPER

Experimental Investigation and optimization of Process Parameters for Shear Strength of Compound Cast Bimetallic Joints

Rajender Kumar Tayal[1] · Sudhir Kumar[2] · Vikram Singh[1]

Received: 18 September 2017 / Accepted: 4 June 2018 / Published online: 19 June 2018

Abstract Joining of A356 alloy and magnesium was carried out by vacuum assisted sand mold compound casting process. Microstructure at the joint interface was studied by using optical microscope, scanning electron microscope, energy dispersive X-ray spectroscopy and X-ray diffractometer. Characterization indicated that a relatively uniform joint interface was obtained. The joint interface was composed of three distinct layers containing Mg_2Al_3 on aluminum side, $Mg_{17}Al_{12} + \delta$ eutectic structure on magnesium side and $Mg_{17}Al_{12}$ as middle layer. As a result of interaction between silicon, present in A356 with magnesium, Mg_2Si compound was formed. Push out test was conducted on electronics universal testing machine to measure the shear strength across the joint interface. The important process parameters (grit size of sand paper, insert temperature, pouring temperature and vacuum pressure) were optimized to maximize the shear strength. Optimization was carried out by using response surface methodology, desirability analysis and genetic algorithm (GA) techniques. It was observed that the shear strength increased by 14.21, 8.60 and 4.80% with genetic algorithm, desirability analysis and regression model respectively. GA reported the optimal value of shear strength.

Keywords Compound casting · Micro-structure · Characterization · Shear strength · Optimization · Genetic algorithm · Response surface methodology · Desirability analysis

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1 Introduction

Aluminum and magnesium, the lightest engineering metals, are preferred in aerospace, automobile, computers and electronics industry, navigation and military affairs owing to their unique properties. These metals possess low weight to strength ratio, excellent castability and corrosion resistance [1, 2]. Weight of magnesium is nearly one third of aluminum while having similar melting points. Aluminum alloys as an alternative to steel and cast iron exhibit the improved energy efficiency and performance of vehicles. Aluminum is able to maintain strength at elevated temperature and possesses high ductility. On the other hand, the use of magnesium alloys has increased significantly in automobile sector in order to reduce the weight of vehicle and hence CO_2 emissions. Magnesium exhibits low ductility and creep resistance [3, 4]. The joint of aluminum and magnesium leads to the advantage of combined properties of both the materials. The combined configuration proves to be quite effective to meet the requirement for lightweight and high performance parts. Therefore, the Al–Mg compound structures seem to be a promising solution for present industrial applications.

Aluminum and magnesium can be joined together by different fusion and diffusion processes such as tungsten inert gas welding, spot welding [5], laser welding [6, 7], vacuum diffusion bonding [8, 9] and friction-stir welding [10–12]. In these processes, hard and brittle intermetallic compounds are produced at the Al/Mg interface, which are undesirable as far as the mechanical properties are concerned. Compound casting process is preferred as it results

EXPERIMENTAL INVESTIGATION AND OPTIMIZATION OF PROCESS PARAMETERS FOR IMPACT STRENGTH OF COMPOUND CAST BIMETALLIC JOINTS

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Sudhir Kumar
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DOI 10.1007/s40962-017-0190-3

Abstract

Aluminum alloy A356 and pure magnesium bimetallic castings were produced by vacuum-assisted sand mold compound casting process. The effect of process parameters, i.e., pouring temperature, vacuum pressure, insert temperature and grit size of sandpaper, on impact strength of joint interface was investigated. The experiments were executed by using central composite design approach. Experimental data were utilized to formulate a second-order regression model. Scanning electron microscopy of joint interface revealed that a uniform joint interface consisting of three different layers is obtained due to the diffusion between A356 insert and Mg melt. X-ray diffraction and energy-dispersive X-ray spectroscopy patterns confirmed the formation of intermetallic compounds Mg_2Al_3, $Mg_{17}Al_{12}$ and Mg_2Si at A356/Mg interface. The parameters were optimized by using desirability analysis (DA), response surface methodology and genetic algorithm (GA) techniques in order to maximize the impact strength. The maximum value of impact strength is obtained as 10.5, 10.68, 11.71 and 12.29 in experimental, regression, DA and GA, respectively. The best value of impact strength (12.29 MPa) is obtained by GA optimization at 661.13 °C pouring temperature, 200.02 mm of Hg vacuum pressure, 328 °C insert temperature and 1187.15 as grit size of sandpaper.

Keywords: *VASMCC process, microstructure, impact strength, optimization, GA, RSM, desirability analysis*

Introduction

Die casting is an effective casting method for the bulk production of light metal components. The parts with complicated shape and high degree of precision can be fabricated with this method that finds a large number of applications in automotive and aerospace industries.[1,2] However, the requirement of lightweight construction cannot be fulfilled with one material alone. A feasible solution arises with the use of multi-materials.[3] Multi-material joining techniques play a vital role in manufacturing of such lightweight structures. Compound casting process allows the joining of dissimilar (or similar) materials through direct casting in which one material is kept in solid state, while the other is kept in liquid. The solid insert is placed in mold cavity, and the liquid material is allowed to pour around it. Diffusion reaction zone initiated at the interface of sold insert and melt leads to the formation of joint.[4,5] A number of attempts have been made by the researchers to employ this process to join dissimilar or similar metals such as Al/Al,[6] Al/Mg,[7,8] steel/Cu,[9] Al/Cu[10,11] and steel/Al.[12] It has been reported that Al/Mg joint renders the desirable mechanical and metallurgical properties. This leads to the significant increase in the applications of these metals in automotive industry. Solid state joining and fusion welding processes have also been employed to join aluminum and magnesium.[13–16] The problem associated with these processes is the presence of oxide film on the surface of Al/Mg. It results in the formation of weak joints and undesirable highly brittle Al–Mg intermetallic compounds.

Hajjari et al.[17] studied the interface formation of Al/Mg joint prepared by compound casting process. The authors

Shyam Lal*, Sudhir Kumar and Zahid A. Khan

Microstructure evaluation, thermal and mechanical characterization of hybrid metal matrix composite

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Abstract: In this paper, an inert gas assisted electromagnetic stir casting process is adapted for manufacturing a cast hybrid metal matrix composite (MMC) using Al_2O_3 and SiC particulates as a hard phase reinforcement in Al 7075 alloy metal matrix. Four different samples containing 5, 10, 15 and 20 wt% of Al_2O_3 and SiC with Al 7075 alloy composites were fabricated. The characterizations for all the samples were carried out through optical microstructure, scanning electron microscopy (SEM) fractograph, X-ray diffraction (XRD) analysis, differential thermal analysis (DTA) analysis and mechanical properties. The results revealed that the particles are uniformly distributed in the matrix. No peaks of Al_4C_3 were found. There is negligible loss of material in the composite. The tensile strength and microhardness of the hybrid composite are higher by 65.7% and 13.5%, respectively, when compared to its cast metal matrix Al 7075 alloy.

Keywords: Al7075; DTA; electromagnetic stir casting; hybrid composite; XRD.

1 Introduction

Composite materials are engineered materials having a combination of two or more chemically distinct and insoluble phases. The ceramic reinforcement has high strength and high modulus whereas the metal matrix is ductile. The resulting composite material has mechanical properties intermediate to the matrix alloy and the ceramic reinforcement. In metal matrix composites (MMCs), the primary function of the reinforcement is to support most of the applied load, while that of the matrix is to bind the reinforcement together [1]. Aluminum is widely used as a metal matrix because of its light weight, good mechanical properties and formability, economy and high resistance to environmental degradation. Also aluminum has the capability to incorporate a wide variety of reinforcing agents such as Al_2O_3, SiC, graphite fibers, whiskers and other particles. Hybrid MMC is obtained by incorporating two or more different kinds of reinforcements in a single matrix. Hybrids have a better all-round combination of mechanical properties than composites containing only a single reinforcement. Composite materials find wide applications in aircraft, space vehicles, offshore structures, piping, electronics, automobiles, boats and sporting goods [2, 3]. Cambronero et al. [4] produced MMC through the powder metallurgy route using 7015 Al-alloy powder with 5 wt% Si_3N_4, TiB_2 and B_4C ceramic powder (8–10 μm size). Ceramic powders are uniformly distributed in AA7015 matrix and no porosity was found. The authors further observed that ceramic addition decreases electrical conductivity, lowers tensile strength, decreases plastic deformation, but has a better wear behavior when compared with heat treated T_6 AA7015 Al-alloy [4]. Kumar and Balasubramanian [5] fabricated AA7075/SiC_p composite by the powder metallurgy route and developed a mathematical model to evaluate the wear rate. The authors concluded that particle size has an inversely proportional relationship with wear rate, while the volume fraction of reinforcement and sliding speed are directly proportional with the wear rate. Kalkanli and Yılmaz [6] prepared Al7075 composite with 10 wt%, 15 wt%, 20 wt% and 30 wt% SiC through vertical pressure die/squeeze casting.

Characterizations of samples were carried out through scanning electron microscopy (SEM) analysis, X-ray diffraction (XRD) analysis and mechanical properties. The results revealed that no Al_4C_3 was present in the sample and hardness increased with an increased in SiC content [6]. Karthikeyan et al. [7] made a calorimetric study of 7075 Al/SiC_p composite fabricated by the stir casting technique having 10%, 15% and 20% volume fractions of SiC_p of 20 μm average size. The cast billets were hot extruded in a ratio of 20:1. After keeping the cast billets in a soaking temperature of 420°C for 30 min duration, the authors observed that heat capacity of all the composites is less than the

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CHARACTERIZATION AND MICROHARDNESS EVALUATION OF A356/Mg JOINT PRODUCED BY VACUUM-ASSISTED SAND MOLD COMPOUND CASTING PROCESS

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https://doi.org/10.1007/s40962-018-0264-x

Abstract

Joining of A356 alloy and magnesium was carried out by vacuum-assisted sand mold compound casting process. Experiments were performed as per central composite design method. The second-order regression model validated the accuracy and reliability of experimental results. The interfacial microstructure was assessed by using scanning electron microscope and energy-dispersive X-ray spectroscopy. Phase constitutions were identified by X-ray diffractometer. It was observed that a uniform joint interface of A356/Mg formed with three distinct layers composed of Mg_2Al_3, $Mg_{17}Al_{12}$ and $Mg_{17}Al_{12} + \delta$ eutectic structure. Mg_2Al_3 revealed highest microhardness followed by $Mg_{17}Al_{12}$ and $Mg_{17}Al_{12} + \delta$ eutectic structure. Brittle and partial ductile fracture morphology was observed on A356 and Mg side, respectively, whereas the middle layer indicated mixed brittle and partial ductile fracture morphology. The process parameters (pouring temperature, vacuum pressure, insert temperature and surface roughness of insert) of compound casting were optimized with respect to the microhardness of joint interface. Optimization was carried out by using response surface methodology (RSM), desirability analysis (DA) and genetic algorithm (GA). A variation of 0.30, 0.84 and 1.35% in microhardness was obtained by RSM, DA and GA, respectively.

Keywords: *compound casting process, microhardness, interfacial microstructure, characterization, optimization*

Introduction

Aerospace and automobile industry increase the demand of parts with minimum weight while achieving similar or even superior parts properties. At the same time, the parts must be produced at lower cost. Sometimes, single material is not able to complete the demand of market; then, compound configuration is required because it provides desired properties.[1–3] The compound casting process covers a wide range of requirements within one component by combining different materials. In this process, one material in liquid state and the other in solid form diffused properly. Consequently, a consistent metallic transition formed between these two materials.[4–6] The process is employed to join semifinished components having the complicated shape merely by pouring a liquid metal around a solid shaped insert.[7]

In transport industry, lightweight fabrication helps to reduce weight and thus saves fuel. Magnesium and aluminum are light metals. These metals are employed to an ever-increasing extent in lightweight fabrication. A number of processes such as diffusion bonding,[8,9] friction stir welding,[10–12] laser welding[13,14] and metal arc welding[15,16] are also feasible to achieve the joining of dissimilar metals like aluminum and magnesium. The joining of Al/Mg by these processes leads to the formation of intermetallic compounds at the interface, which are highly brittle. The preference of using the compound casting process over other dissimilar joining processes renders the formation of a uniform interface zone. At this zone, the liquid metal diffuses into the solid metal by the formation of reaction phases and solid solutions.

EXPERIMENTAL INVESTIGATION AND EVALUATION OF JOINT STRENGTH OF A356/Mg BIMETALLIC FABRICATED USING COMPOUND CASTING PROCESS

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https://doi.org/10.1007/s40962-018-0288-2

Abstract

In the present work, two lighter materials (pure magnesium and aluminum alloy A356) were joined together by vacuum-assisted sand mold compound casting process. The dominating process parameters such as pouring temperature, insert temperature, surface roughness of insert and vacuum pressure were chosen to execute the casting process. Microstructure of joint interface was analyzed by SEM, EDS and XRD techniques. Mechanical properties, namely, microhardness, impact and shear strength of joint, were measured experimentally. The accuracy of experimental data was checked by using response surface methodology. The joint strength of A356/Mg interface was evaluated by applying graph theoretic approach (GTA). A numerical value, joint strength index, was proposed to show the effect of factors and subfactors. Index values of subsystems revealed that shear strength has maximum influence on joint strength followed by microhardness and impact strength. GTA proves an effective tool in estimating the optimum process parameters for compound casting process.

Keywords: *compound casting process, joint interface, microstructure, mechanical properties, graph theoretic approach*

Introduction

Magnesium and aluminum are the lightest engineering metals. Magnesium is 35% lighter than aluminum.[1] Owing to the desirable properties such as light weight, good castability, high strength and corrosion resistance, aluminum alloys are extensively used in automobile, aerospace and defense sectors.[2] Magnesium possesses excellent castability and better noise and vibration dampening properties than aluminum.[3]

Sometimes, the requirement of a lightweight part is notable to meet with a single material alone. This problem can be sorted out by employing the part fabricated with multi-materials. A joint of magnesium and aluminum offers the benefit of distinctive properties of both the materials into a single part. These metals can be joined together by a variety of processes such as spot welding,[4] tungsten inert gas welding,[5] gas metal arc welding,[6] friction stir welding,[7–9] laser welding[10,11] and vacuum diffusion bonding.[12,13] The formation of brittle intermetallic compounds at Al/Mg interface is accompanied in these processes due to which the interface turns out to be weaker.

The compound casting process provides a better solution to this problem. It is a unique metal casting process preferably employed to join dissimilar materials. It involves pouring of liquid metal over a solid metallic insert.[14] A diffusion process is initiated at the solid–liquid interface which results in the development of a uniform transition zone sandwiched between two materials. The transition zone consists of intermetallic compounds, which possesses the

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A REVIEW ON PHYTOCONSTITUENTS AND MEDICINAL PROPERTIES OF EMBLICA OFFICINALIS

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ABSTRACT

Emblica officinalis has great importance in herbal, Ayurvedic, Chinese and traditional medicinal systems in various countries. *Emblica officinalis* has been believed to increase defense against various diseases. In this article, phytoconstituents separated from *Emblica officinalis* and application of *Emblica officinalis* in various diseases like, cancer, diabetes, heart disease, diarrhea, ulcer, pyria, snake bite, analgesic, antioxidant, antitussive, antimicrobial, hypoprotective, and cytoprotective etc., have been reviewed. *E. officinalis* is also used as ingredient of various preparations used to enhance memory, treat ophthalmic disorders and lowering cholesterol level.

Key words : *Emblica officinalis*, antioxidant activity, anticancer, antivenom activity.

Medicinal plant have played key role in world health. Herbal drugs have been used since ancient time as medicines for the treatment of rang of diseases. Herbal medicinal preparations are still popular in developing countries inspite of great advanced observed in modern medicines in recent decades. Plants are very efficient sources of renewable organic materials such as unusual and nutritionally rich proteins, lipids and enormous spectrum of chemical constituents. Many of them have known value as drugs, biomaterials, flavorings, fragrances, coloring agents and potent agrochemicals (1).

Medicinal plants are known to be much safer. These are used for the treatment of various bacterial fungal and viral diseases in crops as well as in Ayurvedic and other medicinal systems (2) (3). In the world 5-10% of all plants are systematically investigated for their medicinal property. Two thousand medicinal plants are recognized. *Emblica officinalis* is a deciduous tree of euphorbiaceae family. Plant has been also known as Dhatriphaa, Amla Amaliki, Amalakan, Sriphalam, Vayastha in Sanskrit, Amla in Hindi and German, Emblica myroblan in English, Mirabolano emblica in Italian, Amba in Nepalese, An mole in Chinese, Papak Melaka in Malaysian, Mirabolano emblica in Portugues and Tibetan (4).

Emblica officinalis contains innumerable constituents in varying amounts falling in broad of alkaloids, benzenoids derivatives, diterpenes and furanolactones, flavonoids and sterols (2). Amla or Indian gooseberry has been playing a significant role from ancient times in traditional medicine, Ayurveda and in tribal medicine. These phytochemicals extracted from other plants has been investigated for different bioscreening showing significant results but have not been researched from *Emblica officinalis* solvent extraction yet (5).

The chemical constituents of this plant have been used in formulation of many herbal and patent drugs (6). Many of medicinal properties like analgesic, antipyretic, anticancer, antioxidant, antivenom, antitussive, antimicrobial, antibacterial, antifungal, antitumour, antiulcerogenic, hypoprotective, cytoprotective, antidiarrheal etc. reported in this plant. It is usefull in memory enhancing, ophthalmic disorders and lowering cholesterol level. It is often used in the form of Triphla which is an herbal formulation containing fruit of *Emblica officinalis*,

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