Chapter - II

1. Review of Literature

2.1. Introduction for plant requirement on Earth

Plant is a primary resource for food, cloth, medicine, house, maintaining oxygen and humidity in the atmosphere, minimizing the pollutant and solar radiations effects and all other human requirement. Hence plant kingdom has been used since ancient time. Plants could be hybrid and cross hybrid but, no one replaces the plants contribution on the earth requirement to be alive. The other usage of plant is food; as per Bennett B.C et al (2002) Plants are irreplaceable food sources for human beings since life generated on the earth. The cultivation started from 9000 to 10000 years ago. As per the world requirements 85% of calories were offered from 20 species of plants for entire human usages and 60 % of calories where obtained only from three species (wheat, rice and mize). Another importance usage after food is cloth. Since many years human being were wear the plant material and plant products are used as a cloth. It was stated the barks of the plant and then the thin thread from the plant bark after treatment and then a thin fiber for looming and still the good comfort clothe is made up of cotton only. Cotton is one of the outstanding incredible fibers in the world. The cotton even after 8,000 years none of the synthetic fiber close to the human skin as comfort as required. There are more than thousand faces of fibers are in usage which are comparatively changeable by the modern science expect cotton. The world requirement of cotton is produced 15-20% in India as per Cherrett et al (2013). Hence the plant is the only source since from the beginning of the human for clothing and all other. The third important usage of plant is medicine, as per Christopher E et al (2014) Plants are used large quantity to get the herbal medicine and innumerable types of plant products has been used for various types of treatments worldwide. The phyto and herbal medicine were traditionally accepted and universally practiced now a day after toxicological profile of the plants and herbs.

Photochemistry deals with plant chemistry; the origin of the word phyto means plant in Greek language. There are many biologically active compounds found in plants; which provide food, nutrition and more health benefits for humans being since from the origin of mankind. The plant accredited for many type of nutrition in general there are two divisions of nutrition’s called macronutrients and micronutrients as per
Hasler CM et al (1999). Not only the plant kingdom provides nutrition’s, food and medicine; further the kingdom the leaf of all plants protect environmental hazards such as pollution, maintaining the humidity in the atmosphere. As per Mathai K et al (2000), phytochemicals are preventing living system from UV exposure and dust (natural and artificial). Such plants are available more than 4,000 numbers and had been recorded and classified with respect to functions of the chemical characteristics as per Meagher E et al (1999).

As per Baker D D et al (2007), the plant system has the significant value to study and determine the new molecule requirement and its biological applications. Now a days many drug molecules / medicines were not responded to the particular treatments due to the resistance among the system; these kinds of resistance developing path ways can be predicted by studying the plant molecules and is continuous changes in the environment. Each plant has a unique property and a world requirement were also increased a lot, hence plant and plant products related work can survive the small companies and this processes have to make increasing the frequency of the natural product usages among the peoples. New analytical technologies could provide ripped solutions for identification, new extractions could provide a fast extraction or separation of the plant active molecules and the large capacity of the plant would provide the low cost of the plant products and hence all the plant products were useful to human in all the ways.

The earth is being live because of the plant and is scarification to all other living organism and systems. The plant parts being used as food, cloth and medicine since ancient time by human beings. When a biological compound was active and has been reported by WHO were call medicinal plant as per Ayoka A. O et al (2008) and stated that when plant has been proven for its clinical values and understand the biological evaluation with respect to the active compound of the plant then only the plant will be added in the medicinal plant list. All this activities were monitored by WHO system

Many research articles were stated the importance of the plants usages and its chemical content, as per Tasneef Ahmad et al (2013), there were 4 billion people (80%) of the world’s population were being uses the herbal medicine either as a health care (medicine), in the form of external applications, by confirmations from
World health organization (WHO) estimations. Medicinal plants contribution to the health management of individuals and communities were important; and the chemical composition of the plant and its extract that induce a definite physiological sensation or action in the human body system.

Any plant could be used as medicine due to its active substances and the clinical application rating. As per Rates S.M.K. et al (2001) plants were used for medicine after the understanding the complete molecule knowledge of the active substances. Selecting the plant, Physical preparation of the plant material or parts and extraction for isolation of the active compounds, purification of the active compounds from its main fraction (depend up the solubility of the active compound the fractions has to be selected), Chemical characterization for understanding the structure of the compound using the complementary analytical technique like proton NMR for its proton distribution, $^{13}$C NMR for the carbon chain connectivity in the structure of the compound, FT-IR for the confirmation of the function group of the active compound, Mass spectra for the confirming the molecular mass of the active compound, UV-Vis analysis for the lambda max of the active compound. The confirmed the structure of the active compound by synthesis from the known raw material source and comparing the analytical results of the separated and synthesized molecule and confirmed the structure of the compound. The active compound has to be checked for its toxicity and the bioassay of the active compound has to be estimated and then only the plant active compound is said as medicinal plant. Hence conforming the medicinal plant has a set of processes and them the economic value of the plant / active substance will be evaluated.

2.2. History of plant usages

There are many research in the pytochemistry with respect to medicinal usages to human beings, after many centuries of empirical utility of herbal, the first isolation held for alkaloids. There are many alkaloids, but such as morphine, quinine are widely used since from ancient days, that is, in the early 19th century, this marked a new era in the use of medicinal plants and this is the beginning of medicinal plants research. This usage has been continued even after the development of synthetic pharmaceutical after 1945. During this period all plant metabolites were mainly from a phytochemical to identify the real molecule requirement of the living system. Over
the past decade, human interest to follow the new molecule probably animal origin as per Hamburger M et al (1991). In the plant kingdom there are few known and many thousand unknown phytochemicals were secreted in the leaves of plant kingdom world. Many plants are protect themselves by the natural way of its chemical properties and many other phytochemicals also protecting human against diseases as per Narasinga Rao et al (2003).

Many natural products had been used effectively by Human being since ancient days. Among these Embelin molecules consider as gold product of India Gnanamani et al (2014) because of its usage since very long time and many research publications has been increasing on embelin for the last 99 years. There are more than seventeen., Gnanamani et al (2014) medical usages had been identified on embelin molecule so for Viz Antioxidant activity, Anthelmintic activity, Anti-inflammatory activity, Antimicrobial activity, Enzyme inhibitory activity, Anti spermatozoa activity, Anti hyperlipidemia activity, Anti androgenic activity, Anticonvulsant activity, Wound healing activity, antitumor / anticancer activity, Chemo preventive activity, Ant diabetic activity, Radio sensitization activity, Anti ulcer activity, Anti angiogenesis activity, Cytotoxicity activity and many more.

2.3. Medicinal plants importance and its requirement to the current world
Nature is the one source can provide all the needs for any type of the living system. The natural plant cells were the only mechanism to convert natural light to energy, stored in different form of food and medicine (organic molecules). Hence the natural resources has to be safely handled and protected; otherwise the communication between the solar energy to eatable product formation could be forbidden, this could lead the world to distractions. There are many research have been on usage, safe handling, enhancing, economical value, future of natural plants. All the plants were economically, medicinally and for food most important. As per Ayoka A.O et al (2008), all the parts of the plants viz., root, stem, wood, wood ashes, bark, gum, leaves, fruit, flowers and its juice were used many medical applications.

2.3.1. Embelia Ribes (Embelin) as Cosmetics
Many researches were carried out in the area of cosmetics and its applications for safe usage of the cosmetics. All the body parts of human have to be taken care by a good cosmetic, without any allergy / side effects. The aim of all research work is that to obtain such a good cosmetics. The effects of the cosmetics applications on human parts were the separate research, where conducting the merits and demerits statistically. All the cosmetics manufacturing and applications were to abet the FDA procedures and regulations in terms of handling and safety. All the research was turned now a day towards the natural products for safe applications of cosmetics. Embelia ribes (embelin) plant also used as cosmetics since from ancient time, many research publications were carried out for its usages and safe applications. Let us discusses through the research evidence for embelin molecule proper applications and its benefits.

This Embelin molecule has been used for many other direct applications viz., As a pest control activity in the storage of wheat Harish chander et al 1987. Currently mankind are being used many Ayurvedic formulation has contains embelin molecule as a key ingredient for inflammatory and non-inflammatory related applications Prakash Paranjpe et al (1995). Apart from medical usage this molecule acid forms had been used as a good hair dyeing product Samatha et al (1996). The molecule is not only used as medicine and hair application product, it is also being used as an important key role in the skin care cream effectively and also used as a formulating agent in the drug tablet formulations Anand Kumar BH et al (2001). The human being are fighting to get a strong and degradable polymer for usages and this embelin molecule used to prepare the such a polymer Renuka R et al (2001), which is so creditable of this molecule one again. The embelin molecule also possess the anti-inflammatory nature in rat (toxicology study) reported as Chitra et al (2011). Apart for the main molecule embelin medical properties, its derivatives also proven some of the medical properties, hence the embelin derivatives will be next generation drugs as per Viault G et al (2011). Since the natural reactions are being kept on changes, modification of the original molecule will have some additional adverse effects with respect to its basic chemical properties.
Now a day’s cosmetic playing important role in human life, which has been used for enhancing the appearance such as hair color as per current requirements like block, brown and etc. Apart from hair dying skin is one of the important visible organs in human body. Due to the climatic conditions the skin appearance changed has been changes as it is won, to controlling this required some natural cosmetic agent. Embelin is one of the natural product has been used as a cosmetic agent since long time. Embelia extract has been used as a dying agent for cotton, nylon and wool to get orange and red in fabric is one of the cosmetic usage, and also embelin aqueous and organic extract being used in the herbal formulation; for some of the skin care cream as per Radhakrishnan et al (2011)

As per Bouguerra et al (2015), Eryptosis is a programmed cell death of erythrocytes observed in the erythrocyte cell membrane. The erythrocyte cell end of its cycle after got damaged or aged; this activity is stimulated by embelin molecule. These activities were achieved by embelin through stimulates phospholipid rapidly on the erythrocyte cell membrane with on effect of a creamed formation. Hence the embelin molecule inducing functions of eryptosis the respective study was conducted on cell surface level. Fluorescence detection methods were used to determine the removal of the aged / damaged cell. In this mechanism the Phosphatidylserine exposure on to the cell surface and ware estimated from binding of annexin V cells and, cell volume.

As per Radhakrishnan N et al (2011) the plant fruit (E. Ribes) were collected form south part of Tamilnadu (Tuticorin) in India and was dried in the absence of sunlight, grinded and extracted through organic solvent n-Hexane s by soxhlet extractor about six hours. Concentrated the extract by vacuum rotator vapor, resulting solid mass was purified by recrystallizations process by using ethanol (C2H5OH) and chloroform (CHCl3). The structure of the purified mass was confirmed as Embelin by characterizations using electronic spectra (UV Visible) for is lambda max and FT-IR spectra analyses to confirm the functional group (two hydroxyl group para position to each other, alkane ring residue and the keto oxygen para to each other). All this parameters was compared against the reference embelin molecule. The embelin molecule has the properties of destruction of red blood cells into hemoglobin and this
into red blood cells releases to blood plasma, these processes called Hemolytic activity; hence the embelin molecule has the Hemolytic activity and this properties were confirmed by the releasing amount of hemoglobin by UV-Vis spectrophotometer at 540nm and for this ED 50 also calculated Embelin molecule also has the properties of tyrosine activity, which was confirmed by the spectrophotometric analysis at 475 nm followed by the enzyme activity analysis. Hence the embelin molecule could be used for pharmaceutical and cosmetic applications.

In addition with this in metal estimations the embelin molecule is used as a cathode agent in the secondary battery using ZnCl2-NH4Cl electrolyte. In the processes of estimation of actinide series metals uranium & thorium and the transition series metals copper & cadmium as reported by Kalaiselvi D et al (1999). E.ribes and the plant parts extract is being used as a skin care product and cosmetic agent as per Radhakrishnan et al (2011) since ancient time.

2.3.2. Embelia Ribes (Embelin) as Therapeutic Applications

In the earth every life behind the good food and compactable cloths and many more; To sustain the life health is very important and for these aspects only humans being were running routinely to find a safe and healthy life. Medicine is the tool to repair / alter the biological functions as desire health conditions. All the soul aim is that living happily without any health issue during lifetime; this is the only aim among all the living system. After food health is very important to achieve all other life requirements. Due to natural and habituations the anti-organism is penetrated in to the living system and creating unusual symptoms through unbalancing activity due to the antibody survival. In the living system, Human is one of them, who want to live with healthy physically and mentally. To live healthy, has to be away from disease and should know to prevent the diseases. All the disease was created by many known and unknown organism. He has understood some and trying to understand other systems; which creates diseases. There are many known organisms were creating disease viz., Cancer, cutaneous, endocrine diseases, eye diseases, intestinal diseases, infectious diseases, infectious pathogens, genetic, neurological,
voice, vulvovaginal, liver, heart disorders and mental illness, like all the parts and organs of the human system would infected due to one many other organisms. Better treatments were required without any side effect for all. Human beings were hunting such a treatment and finally found a path through the usage of phytochemicals. Embelia Ribes is one of the medicinal plant, was used many therapeutic application since long time by human being. Let us discuss the usages of embelin molecule through some of the recent and past research findings.

In medical history many yon the Helminths infected human or animal is treated by Indian traditional way by using the (E. ribes) embelin molecule as per Ved Prakash et al (1987). Root-knot is a parasite attack among many lives; the embelin molecule is used to treat the root-knot problems well as per Mojumder V et al (1990).

Uma et al (2008) stated that the aqueous extract of E.ribes directed orally to the diabetic rats with particular ratio of dosage with respect to body weight, the drug has antioxidant activity against streptozotocin. And also the molecule ethanolic extract has the hypoglycemic effects on diabetic rats as per Uma B et al (2008).

Embelin molecule is also active for anti-tumor effects in human prostate cancer cells. It is also suggested that the molecule had been enhancing combinatory inhibition on tumor suppression and angiogenesis. Hence suggested for therapeutic treatment of hormone-refractory prostate cancer as per Yao Dai1 et al (2014)

There are many research evidence says that the embelin molecule is being used, as an active compound to treat cancer cells. As per Chun et al (2015), the embelin induced apoptosis of PC3 cells whenever required, and the embelin molecules in prostate cancer cells.

Embelin molecule also inhibits cell viability in pancreatic (PC-1 and PANC-1) cancer cell lines as per Shankar S, et al (2014) and also observed that the Shh-protein inhibits the anti-proliferative effects by the molecule. Some of this research papers explains that the collected information’s were proposed that the embelin molecule inhibited cell proliferation and induced apoptosis in pancreatic tumor tissues through
inhibition of PCNA, Ki67. This molecule also has a property of activation of caspase-3 and cleavage of PARP.

As per Lee JH et al (2013), the embelin molecule plays many functions; like, carcinogenesis (TAT3) and metastasis of various human cancers, suppress constitutive STAT3 activation through induction of PTEN, and the molecule down-regulated the expression of STAT3-regulated gene products. The STAT-3 is a latent cytosolic transcription factor; which was closely associated with survival, proliferation, chemo resistance, and metastasis of tumor cells and also the STAT 3 was mediated through the inhibition of activation of JAK1, JAK2, and c-Src kinases. Thus, overall, embelin molecule utility results suggest that CPS is a novel blocker of STAT3 in terms of overall activation and consequently may have a potential in negative regulation of growth, metastasis, and chemoresistance of tumor cells.

Plants had been a main source of food, medicine and for everything since from ancient days. Nevertheless human health management systems had been built by usage experience of human being through generation by generation. All the plant parts had been used for various medical requirements traditionally. Now a day’s human fine the active molecule of the plant parts and starts to estimate the amount of the effective molecule from its parts. Accordingly the parts have been extracted and used as a medicine. The plant E.ribes has been used traditionally for many type of medical usages for over 5000 years as per Souravi B et al (2014) and the plant conception rate is increased vertically as per recent treat of usage. Even though all the parts of the plant has been used for medical purpose, hence the medicinal plants has to be protected by captivating necessary steps, like plant cultivation record, conception record and for more. E.ribes is a hopeful target plant to create newer and different drugs in forthcoming generation usages like new compounds namely embelinol, embeliaribyl ester, Vilangin and embeliol these molecules also extracted from embelin parts (fruits), which has to be further studied for its proper applications said by Souravi B et al (2014)

In general antibiotics are used to mild moderate for skin treatments. The skin is resistant to benzoyl peroxide. The antibiotic resistance development in P. acne is limiting the treatment of topical antibiotics. A study results revolted that the cream
contains extracts of Azadirachta indica, Cassia fistula, Embelia ribes, Curcuma longa Tinospora cordifolia, Eclipta alba, Andrographis paniculata, and Triphala. Produces best results among grade II children without any local or systemic side effects as per **Kumar B.H. A et al (2001)**.

The almighty Nature has been a real source of medicinal molecules and has been used since more than thousands of years. Even in the modern world many new molecules has been introduced from the plant molecule source also. The plant molecules have been providing to generate an impressive drug molecule. Many plants have been used for antifertility and abortifacient plant has been used as contraceptive management since ancient physicians of India as per **Umadevi B et al (2013)**. The woman (human) has to decide risk factor by using artificial and natural drug usage, because of all human body many not accesses all the combination of molecules. Hence the alternative way would be run along with nature and hence the plant molecule is one of the rich sources even for birth control.

**Thakur et al (2011)** indicated that the tribal are being used more than 37 wild species of plants for their daily ethnomedical usages in the Srimour district of Himachal Pradesh in India and these tribal are believes that the root, stems, barks, leaves, flowers, buds, fruits and seed has been used for many remedies of their day-to-day medical usages. Hence all the plant parts had been consumed or used for one or other medical usages since ancient times by human beings.

As per **Meena et al (2015)** Embelin molecule also used in the Siddha Formulation, one of the Siddha formulation, Kandhaga Rasayanam contains embelin seeds around 30 mg per milliliter of the Kandhaga rasayanam. In this Rasayanam the embelin molecule has been used for the treatment of analgesic, antibacterial and wood healing activities; since the embelin does not have any narcotic effect, effectively used in the formulation of Kandhaga rassyanam. The seeds of Embelia ribes along with 15 other Raw material in the production processes. All the raw materials have been purified as per the Siddha literature methods. Especially the ethanol extract of embelin has more wood healing properties at the concentration of 30mg/ml (3000ppm). Along with the 15 raw materials sufficient quantities of sugar ghee and honey are also added as an antioxidant and preservatives in the
formulations. Hence Siddha formulations are also effectively embelin molecule has been used in for various therapeutic uses, the natural resources of the molecule would be concentrated by large volume of usage of this molecule in various forms.

As per Vishnudas et al (2015). Embelin is one of the important plant among 7500 species which were used in India since ancient days. About 2000 plants has been used in Ayurveda worldwide in this also embelin is one of the main plant usage. Embelin molecule one or the other form of the plant has been used in various medical procedure like Ayurveda, Folk, Homoeopathy, Unani and helminthiasism worldwide. Hence the Embelia ribes is a medicinal plant in the medical world.

As per Mishra N et al (2013), there are more than 20 Ayurveda medicine has been used one or the other form of Embelin molecule used in the market products. As per the market products listed like Ardrakakhandavaleha, Eranda paka, Krimighna kashaya churna, Vidangadi churna, Taramandura guda, Guduchi lauha, Abhayarishta, Kumari asava, Manibhadra yoga, Pippalyasava, Kaishore guggulu, Vyoshadi guggulu, Saptavishantika guggulu, Eladi ghrita, Kasisadi ghrita, Chandraprabha vati, Vidanga lauha, Vidanga taila and many more. In a fertility clinical trial proved that the combination product of embelin shows a good results with mild side effect among 254 women covering 4694 cycles, as an oral dosage concentration 1g/day study. In another clinical study the embelin formulated drug administered orally as1 g/day (0.5g once and after 12hours 0.5g dose) to 281 women for 15 days (4th to 18th day of menstrual cycle); found a good contraceptive activity among the patients. Hence the formulated embelin molecule had been worked without any side effect in human beings.

As per Devi P et al (2014), E-ribes has much natural chemical content plant. It contains alkaloids, quinine, proteins, saponins, triterpenes, coumarins, resins, tannins and Embelin (2, 5-dihydroxy 3- undicyl-1, 4-benzoquinone) and this molecule content plant (e-ribes) causes sperm motility including the quantity and quality of semen, lowered the hormonal level and has morphological and histological changes in testis.
Ayurveda is one of the Indian heritages medical therapeutic usage since lone time; which was developed generation by generation and hence well-defined medical usages has been followed. Acharya Vagbhat in Ashthanga is one of the categories in Ayurveda which is a herbal formulation of some of the Indian plants parts; in this formulation including six herbals. Embelia ribes Burm. f is one of the important role as per Singh S et al (2014) and stated that drugs of Nishadi Vati also one of the category of Ayurveda and this herbal formulation contains total seven herbs including Embelia ribes Burm. F, where used 4/7 parts of the Embelia Fruit has been used effectively. Also added more about that the Embelia ribes has been proven as a prodigious pharmacological impending, hence used as a folklore medicine, treatment of various ailments. The Embelin molecule nature is one of the basic reasons for all its medical activities. The Quinone is the basic molecule structure of Embelin molecule (2, 5-dihydroxy-3-undecyl-1, 4-benzoquinone), hence the embelin molecule has many clinical properties like antioxidant, antitumor, anti-inflammatory, analgesic, anthelmintic, antifertility and antimicrobial activities as per Sudani R et al (2011), and stated that the Embelia Ribes species is an Indo-Malaysian species, mainly found in India, Sri Lanka, Singapore, and Malaysia. In India it is found in central and lower Himalayas, Arunachal Pradesh, Assam, Bengal, Orissa, Andhra Pradesh and Madhya Pradesh where widely held.

The embelin molecule in any form is highly active in nature, the aqueous extract of Embelin has significant reduction of rate of heart beat, systolic blood pressure (minimum and maximum), blood glucose content, blood glycosylated content and blood hemoglobin content, including the serum lactate dehydrogenase and increase in blood glutathione levels as compared to pathogenic diabetic rats even dosing 100-200 mg/kg concentrated aqueous solution, single dose at 40mg/Kg of body weight as per Bhandari et al (2008). In addition with this the aqueous extract intentionally decreased the levels of pancreatic lipid peroxides and enhancing the volume and concentrations of pancreatic oxide dismutase, catalase and glutathione. The embelin molecule in aqueous form of dose also acting as an antioxidant by controlling free radical formation in the rate biological system. Hence the embelin molecule aqueous extract at low level concentrations also acting as a multi therapeutic usages.
The ethanol crude extract at the concentration 30mg/ml of Embelia leaves has the remarkable wound healing activity. But the Embelin fortified at the concentration of 4 mg/ml along with the 0.2% sodium alginate gel, the wound healing processes that is the epithelialization of the incision is very fast comparatively. Hence the tensile strength of the incision wound was significantly increased by the ethanol extract. This was explained by Kumara Swamy et al (2007). In addition with that the part of healing processes like increasing cross-linking of collagen fibers is faster even in the absence of monocytes.

One of the major risks of human life is the facing and getting treatment for cancer disses; that even the current life style changes a lot to invite the cancer to human body. Accumulation of the fats and gaining the overweight among the females are unavoidable one in the modern life, because of many small electrical and electronic applications has been used at every home; which helps readily assess to prepare the daily kitchen needs to the overall family members. The home applications are made for the working women’s and to maintain the time in their day today life preparations; but the house maker (housewife) also indented to use this home applications and has been easily prepared all food / eatable items with in limited time. Hence the eating habits among the house makers are increased body weight and the bounded to cause cancer that even breast cancer. The physical processes of causing the over weight is due to the MCF-7 breast cancer cell. The Michigan Cancer Foundation-7 (MCF-7) breast cancer cells are suppressor by XIAP, and the XIAP is inhibited by Embelin molecule at even very low concentrations 40, 60, 80, 100, 120μg/ml for 24 hour dosages as per Mishra N et al (2015). The treatment results are that the rate of cell viability decrease with increase in concentration of embelin and hence confirmed that the embelin molecule is suppressed the cancer cells. All this study was carried out as per standard In-vitro cytotoxicity assay method. Embelin molecule which were used in the study was extracted through a highly volatile organic solvent method, purified and characterised by various analytical complementary technique like, H-NMR (for proton position confirmation in this molecule), FT-IR (for confirmation of functional group in the molecule), Mass Spectrum (for confirmation of its molecular weight). The MCF-7 cancer cells are procured from a reliable source for this study purpose. Hence embelin molecule is one of the best cancer preventing molecules.
As per Palanuvej et al (2013), the embelin is one of the parental medicines in India. Various parts of the world has been cultivations the Embelia ribes plants. The embelin content in the plant varies from location to location and the content of the embelin drug varies from season to season with respect to part to parts of the Embelia ribes f. plant. The concentrations of embelin molecule (percent) availability were carried out fifteen different sources of Embelia fruits throughout Thailand. A rapid easy analytical method Thin Layer Chromatography (TLC) validated method was used to determine the embelin content. Embelia Fruits were extracted by soxhlet extraction system by using hexane solvent. The TLC-method used the combinations of various solvents (mobile phase) with different proposition as n-butanol, n-propanol and ammonia (with normality 4), with the ratio as 1:7:2 respectively. Along with the embelin content other testes were carried out for mass ratio calculations viz., Moisture Content (Azeotropic Method), Loss on Drying (LOD), Total Ash content, Acid Insoluble matters, Ethanol Soluble matters and Water Soluble matters. Quantitative TLC method used a known concentration of standard solutions and for the different source of sample extracts were eluted in the same TLC plats. The TLC plats were examined at 254nm wavelength absorption; the respective absorbance based area has been quantitated and determined. The results observed that the contents were 1.64 ± 1.02 % wt/wt and 1.54 ± 1.10 % wt/wt.

The natural product of Embelin (2,5-dihydroxy-3-undecyl-1,4-benzoquinone) derived from the plant Embelia, has been studied more and more to get complete biological activities in depth. As per Dharmapatni AASSK et al (2015) studied to investigate the effect of Embelin, as an inhibitor of X-Linked Inhibitor of Apoptosis Protein (XIAP), on inflammation and to study the bone erosion in a Collagen Antibody Induced Arthritis (CAIA) in mice. To determine these properties used 4 groups of mice including CAIA untreated and treated mice. The dose has been provided on day basis only with the strength of 10mg/kg body weight along with Prednisolone for CAIA mice as low & high dose were ferreted as 50mg/Kg body weight per day. The observations were that the low dose mice were found that the Joint inflammation, Bone erosion and serum carboxy-terminal collagen crosslinks (CTX-1) ELISA; hence
the low dose embelin suppressed inflammation also observed the reduced serum CTX-1 in the mice. Hence a low dose Embelin suppressed inflammation and the mice serum (CTX-1 in CAIA mice), indicating a potential usage of Embelin to treat pathological bone loss processes.

Embelia ribes seeds were used many type of formulations as per Vijay D et al (2013), an amount of 100 grams of the embelia ribes seed were used to formulate the Vidakana Choornam. Vidakana Choornam is one of the ancient traditional traditional Ayurveda formulations. In the formulation other two plant products (Moringa oleifera and Piper longum were used. The plant of Moringa oleifera root barks were washed in water dried and powdered and from the Piper longum; unripped fruits were dried and powdered, sieved through muslin cloth. All three powders were mixed with equal ratio; completely and stored in a air tight containers. The albeno rats were dosed with one teaspoon of the mixture products along with milk on daily basis for 21 to 30 days. The results of Vidakana Choornam treatment to the rats against carbon tetrachloride and found that the reduction in Bilirubin level in serum, Serum Glutamate. Hence the Embelia ribes contains Vidakana choornam has to be used for the liver disorder treatments.

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<th>Ser-Cholesterol (mg/dl)</th>
<th>Ser-Triglycerides (mg/dl)</th>
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As per Sara MM et al (2014), the embelin molecule has been used since long time as an anti diabetics drug, which were extracted from leaves of E. tsjeriam-cottam. The extractions were carried out from a dried leaves of Embelia tsjeriam-cottam by methanol solvent. This methanol extract were dosed to the wistar albino rats for 28 days orally and observed the blood cells of the rat and found that the embelin (50 mg/kg) treated diabetic groups blood cells found that the re-granulation formations and hence the embelin molecule irrespective
of the source has the property of preventing the effect on β-cells which cusses the diabetics in nature in the leaving system. All this setup of study were carried out a standard grouping as 6 and regular dosing of rats and observation regularly and sacrificed to check the blood cells as per regular practice. The statistic calculations were performed as per the standard practice.

A bacterium is a very small single-cell microorganism, this microorganism either is not a animal or a plant, it is a group of system doing themselves all its requirements. There are three types of different shapes of bacterium presenting in the earth sphere. The shapes are Spherical (like a spear), Rod shaped and Spiral. Some these microorganisms are harmful to living system and some they are helping to the living system. As a requirement of the living system the harmful microorganism has to be prevented for a better growth. Some of the diseases are cholera, rat fever, Undulant fever, enteric fever, urinal infections, enteritis in the intestine, wound infections, bacillary dysentery, plague, whooping cough, Influenza, abscesses and many more disease created by this harmful bacterium. Hence these bacterium activities have been controlled for better life of human. Hence the Embelin is one of the good natural molecules to suppress or prevent its activity in the living system as per Guanamani A et al (2011) embelin molecule is one of a remarkable bactericidal activity against Gram +ve and Gram –ve organisms. Embelin used for this ware extracted from the Embelia berries which was purified, well characterized and used for this study. Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal concentration (MBC) of embelin molecule against microorganisms were determined.

As per Kantham Srinivas et al (2010) the embelin derivative has the properties which suppress the cell division (anti-mitotic) processes. The embelin derivative molecules are 2-hydroxy-5-methoxy-3-undecylcyclohexa-2,5-diene- 1,4-dione, 5-ethoxy-2-hydroxy-3-undecylcyclohexa-2,5-diene-1,4- dione, 2-hydroxy-5-propoxy-3-undecylcyclohexa-2,5-diene- 1,4-dione, 5-butoxy-2- hydroxy-3-undecyl benzo-1,4-quinone, 5-allyloxy-2- hydroxy-3-undecyl benzo-1,4-quinone, 5-benzyloxy-2-hydroxy-3-undecyl benzo-1,4-quinone. This molecules has the significant growth inhibition of Bengal grams and in Allium cepa at the 125, 250, 500, 1000 µg/ml concentrations embelin derivatives
Oxygen is one of the important molecule for any living system, which is being used as an oxidation purpose, in other words to burn the fatty molecules to get energy at cell levels reaction. Production of energy is more important to live physically, at the same time the oxygen has a set of non-bonded lone pair electron which has been acted as origin of the free radical generation in the living system. This free radicals are highly reactive and hence causes many more reaction in the living system like cancer, heart disease growth of tumor inhibition of the cell ect. Hence to control oxidation processes after some extent required some anti-oxidant system. embelin (2,5-dihydroxy-3-undecyl-1,4-benzoquinone) molecule has some of the anti-oxidantent properties as per Joshi R et al (2007) that the free radicals of DPPH inhibited by the hydroxyl radical induced deoxyribose degradation. It has been also found to inhibit lipid peroxidation due to the free radicals in rat liver (area of mitochondria) also suppressed by the hydroxyl group of embelin molecule. Hence for the oxidant (free radical) reaction, embelin molecule can be used as competitive antioxidant in living system.

Hemoprevention is a property of a drug or molecule interferences in the processes of disease treatment. As per Poojari R et al (2010), Embelin is an active molecule in the hemoprevention against N-nitrosodiethylamine (NDEA) induced rat liver damage (due to CCL₄) treatment. This hemoprevention processes has been observed even at 1 ppm/g body weight of rate. The prevention has been due to the embelin dosage that induced to increase enzymes like transaminase, glutathione-S-transferees, glutamate, pyruvate, glutamate (oxaloacetate) transaminase, phosphatase (basic), gamma-glutamyl transpeptidase, lipid peroxidase as well as hypoproteinemia, hypoalbuminuria and glutathione depletion. Hence that the embelin molecule acting as a chemopreventive agent.

Many medical roles with a single molecule performance could be a rare phenomenon. But embelin molecule is differs and serves many therapeutic usages. The Rheumatoid Arthritis (RA) is one of the chronic inflammatory autoimmune diseases due to chronic inflammation and synoval hyperplasia which leads to joint destruction and the joint could even lost its function. As per Kalyan et al (2015), Adjuvant arthritis rat study shows the treatment of embelin at various concentrations
with various body weights, observed that the effects of Embelin on hind paw swelling in rats. The study revolves many other observations in the treat group of rats’ such as Radiological Evaluation, joint destruction, mRNA expression, delayed-type hypersensitivity, anti-Mycobacterium IgG antibody and hind paw swelling of the treated rats.

As per Poojari et al (2014), the prostate cancer is one of the second general causes of cancer, which causes huge loss as human deaths happening around the world. The Androgen Deprivation Therapy (ADT) puts initial stages of cancer in remission. Enhancing the hormonal therapies help in controlling advanced prostate cancers for some time, after that the system fails to respond, evolve resistance slowly through some other mechanisms, and undergo genetic degradation of rate system. It is proved that the embelin molecule prevents the prostate cancer activity as per genomic triad with a co-clinical strategy were justified.

Unnikrishnan et al (2015) stated that the embelin is one of the key active molecules in the antipyretic herbal formulation. Jwarahara Kwatha is one of the herbal medicines used by human since ancient time, which has 65 natural molecules embelin is one of the molecole. This herbal is being used for Antipyretics treatments. As per Chakraborty et al (2013), Embelia ribes is one of the important plants and its derivatives were used for skin, affections and wound healing in living systems. The plant consists of many organic molecules like alkaloid, christembine and many organic volatile oil in the Embelia plant system. The different combinations of the entire organic chemical with different ration were effective such a wide range of therapeutic applications.

Many researches has been in prorogues for identification, extraction and pre-clinical usage and monitoring the phytochemicals. As per Masao Hattori et al (2013), many in vivo metabolites are used and found that more potential anti-viral agents. Viral activities were creates many disease to human being and it is very dough task for human being, hence it is essential to prevent the viral activities. The HIV and HCV are the viral systems were treated by the phytochemicals such as lignans, triterpenes, chlorogenic acid derivatives and farnesyl hydroquinones. The HIV-1
viruses were inhibited by triterpene and a farnesyl hydroquinone. The embelin molecule derived from Embelia ribs were treated for the HCV PR inhibitor, embelin, inhibited the enzyme with an IC50 even at 4.1 ppm concentration of the embelin content. Hence the embelin molecules were used as inhabitant of virus efficiently.

Aqueous extract of Embelia ribes contents many water soluble organic substances which were found that many therapeutic uses in general. As per Bhandari and Ansari et al (2008) the Embelia ribes extract reduces the muscular strength of rats and the rate blood serum LDH levels significantly increased in the dosed rat blood cells. In addition with this is where noticed that the TBARS level in frontal cortex and hippocampus were found higher in the rat blood system the ischemic (MCAO) group comparatively. After the Embelia ribes aqueous extract dosed sham rats and this level were low compare to the MACO group of rats in this experiment. The aqueous extract dosages were given for different body weight of different types of rats as per standard method of dosing and diagnostic processes. Hence the aqueous extract of Embelia ribes dosage in to normal rat does not changes anything in the brain cells of the rate like activity of endogenous antioxidant enzymes and oxidative stress. But it helps restoring the altered antioxidants enzymes activity and helps to decrease lipid peroxides in frontal cortex through prevention of production. The extract also decrease the LDH, cholesterol, triglycerides, LDL-C and lipid peroxide. So the embelin molecule and it water soluble organic matter collectively working as an important potential drug molecule for neuro-protection treatments.

Embelin is also identified as a benzoquinone-derivative chemically. Maximum the molecule extracted for its Embelia ribes plant. Many research reported that the embelin molecule has the antibacterial activity and it inhibits bacterial activity in the living system. The embelin molecule and its 2, 5-isobutylmine salts combine has been working as a anti-inflammatory agent and it were found some type of the mixture of molecules induce paw edema and cotton pellet granuloma in the living system as per Aditi Chaudhuri et al (2014). After the treatment some of the biological system like Total WBC Count, Neutrophils, Lymphocytes, Eosinophil, Monocytes and ESR counts are changed significantly in the Allergic Rhinitis. So the treatment of embelin molecule at any form a significant reduction in the symptoms
like sneezing, nasal congestion, itching of nose, postnasal drip and rhinorrhea and also observed that the ESR, and AEC reduced significantly.

2.3.3. Embelia Ribes (Embelin) for Obesity Treatment
The eating habits were changes from reign to reign with respect to climate among human beings. The college students were the part of the young generation and their energy and enthusiasm is a unique tool and important assert for developing country. The students eating habits could change their enthusiasm to complete their tasks. A study about college students in the Belgian (European) university studied by Deliens et al (2014) and estimated that the students were influenced by the food more and more due to the factors like taste preferences of all type of foods, self-discipline lost due to the loneliness and uncontrolled by parents and friends or relatives; time depended works and more over to convenience among students. Overall the above the physical lonely environment likes food and time availability and easily accessibility, demanding on search of food with respect to food products. This kind of attitude has been increasing due to the continuous social media advertisement in all the possible way like in-door TV, cellphone network and outdoor Banners, bills and many more with attractive color and design. The advertising media has been hired for famous or students hero (timely changes) to enhance the product sales; hence all the students community is influenced to any time food habits and this leads to the overweight or obesity among the younger generation; at the last when students become the earning family head of a family struggling to reduce the overweight or pending mony to reduce his cholesterol, hence the weight losing product like embelin content molecule has been very important to the society without any side effect.

2.3.4. Embelia Ribes (Embelin) Wood Healing Activity
Many molecules may have same properties of therapeutic usages in various chemical environments. The vilangin and embelin had been found same type of attenuates angiogenesis in nature as per Narayanaswamy et al (2014). In his study about the in vitro and in vivo processes has been used to monitor the biological activity of vilangin and embelin. The chorioallantoic membrane (CAM) assay concludes that the vilangin and embelin has the similar properties in nature for Inhibiting of Angiogenesis in the living system. Further both the molecules has the
inhibitory effects with the 0.1 and 1.0 μg/ml concentration like wound healing activities through the biological activities like single cell migration, endothelial ring formation and nitric oxide production.

2.3.5. Metal complexes of Embelin and its medical applications

Metal complex products are very old in nature and more essential for the formation of life on this earth. Chlorophyll is one of the magnesium metal complex products existing in the leaf system of plant; used for photo synthesis activity and this is the origin of all souls for everything. Some metal complex reactions are very important in the living systems like, blood function in the co-ordination of the iron complex (Hemoglobin). Vitamin B12 is the other complex to keep active the biological systems. Hence studying the metal complex reaction is essential to realize and actual usage of any biological systems. Embelin molecule has two hydroxyl groups along with two keto oxygen in its basic structure, hence tend to form a metal complexes chemically. Since the embelin basic molecule has many medical potentials, the embelin metal complexes were also has the same type of medical properties. Copper metal one of them, which forms a co-ordination bond through hydroxyl oxygen and the keto-oxygen of embelin molecule.

As per Gnanamani et al (2013) findings that the biological profile of Copper (II) embelin complex was inferior than the embelin activity. Hence embelin alone is a good bioactive nature than the copper II complex of embelin w.r.t. the activity of radical scavenging. Chepkwony et al (2014), Structure Determination of Nickel-Embelin Complex, IOSR Journal of Applied Chemistry (IOSR-JAC), 2278-5736.Volume 7, Issue 7 Ver. I. (July. 2014), PP 21-24. The entire metal complex will decompose at a particular temperature. The embelin-cobalt II complex Co[(C_{17}H_{25}O_{4})_{2}Cl_{2}]_{8} under goes thermal decomposition provides embelin and cobalt chloride from its embelin-cobalt II complex as per Usha rani et al (2013). The embelin used to synthesis to derive embelin-cobalt metal complex ware extracted from the Embelia ribes, which ware procured from the Indian local market, purified physically and powdered and chocked in n-hexane for 7 days and used the soxhlet assembly for extraction processes. During the extraction the level of n-hexane ware excesses above the powdered berries of Embelia.
The flask and its contents were refluxed about two hours. Then the content were filtered while it is in hot by vacuum pump support. The filtrate were collected to room temperature and the embelin remains as yellow color precipitates. Further the processes were repeated to get more pure embelin molecule. The second processed embelin (crude embelin) were recrystallized in the chloroform, repeated the crystallization processes with chloroform to get more pure form of the embelin. This wet embelin were dried to get golden crystals of embelin. This pure impure molecule / atomic was confirmed the molecular structure through the analytical complementary techniques were FT-IR and X-ray diffraction. Further the melting point was determined and compared the standard melting point. The percent purity were determined through the TLC technique against the standard embelin molecule. The analytical complementary technique (FT-IR, XRPD, TGA & DTA) were confirms the following metal complex Structure of Dichlorobis(embelinate)cobalt(II) structure as per Usha rani et al (2013)

As per Gnanamani A et al (2014), phytochemical are an excellent source of clinical use even for the pancreatic issues. An oral dosage controls blood glucose levels through different mechanism. Embelin metal complexes penetrate through pancreatic alpha-amylase and control the diabetic complications in the human systems. This mechanism occurred through the hydrogen bonding of embelin molecule. The conclusion is that the embelin metal complex controls the diabetics’ cells without any side effect. A standard Docking studies were carried on the human pancreatic alpha-amylase and with embelin metal complex molecule as per the CDOCKER protocol. The confirmations of the all 10 ligands through CDOCKER interaction energy determination study. In this study found that all the six complex of embelin were determined the energy levels and found that the zinc complex has more energy comparatively.

Embelin forms a metal complex not only with Zn, Co, Cu and Ni with respective oxidation state. It also forms a metal complex with rhodium and Iridium as per Therrien B et al (2014). Six new penta methyl cyclo pentadienyl Rh(III) and Ir(III) metal complexes were synthesized and confirmed the metal co-ordination complex
structure of the molecule by Proton NMR analysis. The metalla-rectangles were synthesized and isolated in a salt form, purified with good yields.

The metallic derivatives of rhodium and iridium were stable in room temperature conditions. The metal derivatives were significant solubility in polar solvents and insoluble in non-polar solvents. The rhodium and Iridium metal rectangles are stable in room temperature and the biological study has showed that the rhodium derivative has a better activity than the iridium analogs. The molecular structures of embelin-derived dinuclear complex are as follows:-

Both the metal derivatives were observed a very good selectivity for cancerous over noncancerous tiny bio-cells. The action of the lipophilic side chains coupled with the +ve charge of the tetra nuclear complexes which were proposed a cytotoxic activity involving the mitochondrial machinery, as proven through various biological experiments. The metalla-rectangles [3](CF₃SO₃)₄-[8](CF₃SO₃)₄ were structured as follows:-
The cobalt-embelin complex were synthesized with the purified embelin. As enhance properties of embelin is has affinity with XIAP BIR3 as like that the Smac peptide as per Nikolovsk-coleska et al (2004) and also showed that embelin molecule is a fairly potent, non-peptide, cell-permeable, small-molecule inhibitor of XIAP.

Embelin molecule has many therapeutic uses with respect to its multi reaction nature alone and along its associated phytochemicals combination in the extract. Embelin molecule form metaloxyl complexes due to its two hydroxyl group through losing two protons. As per Sailaja et al (2010), the embelin molecule, by losing its hydrogen atom / protons, acts as a bidentate ligand giving five membered chelate rings. This metal complex synthesis required embelin were isolated from embelia ribe seeds by soxhlet assembly and petroleum ether used as a solvent. The embelin was purified and confirmed the melting point as 142°C and the Zinc chloride ware arrange from a standard source. The Dichlorobis (embelinate) Zinc (II) ware synthesized as the anhydrous zinc chloride and embelin ate the ration of 5:10milli moles of the substance were dissolved about 20 ml of ethanol and mixed to complet homogeneous solution. A volume of about 10ml of analytical grade acetone ware added in to the matrix solution and allowed to stir about 30min. The mixture solutions ware filtered and separated the precipitated, washed with ethanol and dried in room temperature about 25°C. The dried complex were analysed by FT-IR, TGA, DTA and
XRPD for its structural confirmations. All this study confirms that the embelin molecule forms a co-ordination complex with zinc molecule.

\[ 3\text{Zn(emb)2 Cl2} \rightarrow 3\text{ZnCl2} + 3\text{(emb)} \]
\[ 2\text{ZnCl2} + \text{O2} \rightarrow 2\text{ZnO} + 2\text{Cl2} \]

Dichlorobis (embelinate) Zinc (II) complex structure as per the complementary analytical technique.

As per Rani et al (2010), Embelin molecular structure has two hydroxyl group and two quinone oxygen. This two hydroxyl hydrogen are more acidic in nature and these two dissociable protons in highly acidic media. The proton exists as LH2 at 2.0-4.0 pH range existing as LH+ at 6.0-8.0 pH range. Hence a metal complex derived with embelin molecule with relevant metals and suitable pH range. It is confirmed that the metal complex reaction ware not a polymeric reaction by monitoring the protonation constant value. The experiment setup was like a titration with controlled addition with a help of a calomel electrode. The titrations were performed at 30. ± 0.1°C through a 86% of DMSO in water, the ionic strength ware maintained as 0.17 mole / litter by sodium chloride ionic solution. A solution of about 0.05 mole/litter of embelin was dissolved in DMSO and aqueous solutions of Co(II), Ni(II), Cu(II) and Zn(II) chlorides ware prepared about 0.05 mole/litter along with 0.05 mole/liter of diluted hydrochloric acid solution. The titrated metal complex solution were filtered and dried in room temperature about 25°C, the sample ware analysed by various complementary analytical technique used for structural confirmations through the interpretations and suggested the metal complex structure as
An adult living system might have crossed many stages like fertilization, birth, babyhood, childhood and manhood. All these stages of human life have major physical changes due to the function of hormones in the systems. Many hormones are segregated by many glands; all the collection gland functions are
called endocrine system. All the activities like metabolism, growth, tissue cells function, sexual feeling and function, reproduction organ changes, sleep, and many other things required hormones including disease and its treatments too. Many of the hormones are activated or regulated by Ayurveda drug as per Kamat et al (2012) stated that the dried berries of Embelia ribes has an anti-fertility activity and shows that that a significant anti-implantation activity in rats. A specific steadiness of hormonal gains (estrogen and progesterone) is required for fertilization or egg implantation. Embelin admitted orally and found, in rats cause a disturbance in the hormonal levels and thus prevent implantation, since specific hormonal equilibrium of estrogen and progesterone is required for egg implantation. Hence the embelin molecule usages in one way or other can control the fertilization requirements.

Embelin and its derivatives has many therapeutic usages including many Biological activities, The embelin derivative 1,4-benzoquinone derivatives 5- O-ethylemblelin and 5- O-methylembelin were studied and found that has antiproliferative activity in the human tumor cell lines comparatively. This hydroxyl derivative of embelin also has the antimitotic and anticancer molecules targeting microtubular proteins as per Xu M et al (2005). The derivatives 1,4-benzoquinone derivatives 5- O-methylembelin and 5- O-ethylemblelin has the similar chemical properties and possess the same clinical properties. The 1,4-benzoquinone derivatives 5- O-methylembelin ware obtained while embelin treated with methylene chloride along with aqueous sodium hydroxide in the presence of tetra butyl ammonium bromide and for ethoxy derivative treated with ethylchloride respectively.
As per Jain Sapab et al (2014), Obesity and gastrointestinal problems the embelin molecule has been used. The obesity is one of the major problems in fast growing current life style. Many natural products or parts of the plants molecules has been used clinically and found satisfactory results without any side effect. This obesity will lead to dangerous cardiovascular disease and this has to be taken care as early as possible without any side effects. Ayurveda provides many molecules and it has wide scope of research to disclose many clinical mysteries.

2.3.6. Patent Information’s related to Embelin and its Derivatives
The Embelin molecule is being used widely and the research papers are being published more and more this shows the utility of the drug molecule is being enhanced a lot in the resent times. Hence the patterning of this molecule also increased widely quit more in the world market.

Japan was filed patterned as embelin used as a preventer for tooth decay problems as a form of active ingredient as per Tsuneo N et al (1986). As per Oliver Yoa-Pu Hu et al (2006), patent filed by Taiwan inventors related to expand the specific inhibitors of cytochrome (P450) isozyme which contains embelin as an active ingredient. Another patent filed by Chinese scientists inventors as per Zhengfang Y et al (2008) related to application of embelin in used in the role of inhibiting angiogenesis. One more patent filed by Americans scientists, which is related to naturally available which is chemically synthesized small molecule antagonists of XIAP family proteins that contain embelin as one of active ingredient as per Chen J et al (2011).

2.3.7. Analytical Methods for Embelin and its related molecule
Many analytical method has been developed to determine the embelin molecule in various substrate like seed powder, plant parts extract (aqueous / organic) through the as its detection and separation and detection methods. As per Shruti Rastogi et
al (2014). A HPLC method developed for determining the embelin form crude extract. The method consists of a HPLC equipped with a VU-Vis detector at wavelength 288nm. Solvent and Mobile phase ratio Methanol: 0.1 % TFA (B) as isocratic elution with the C-18 column (250 X 4.6), 5µ particle size. The RT of the embelin molecule detected at 7.2 min. The method abets all the requirements as per ICH guideline such as Accuracy, linearity, precision. Robust of the HPLC method were confirmed with under required test conditions of variation of mobile phase, flow rate and others. The LOD was found to be 1.51µg/ml and LOQ was found to be 4.57µg/ml, the Robustness of method were within range w.r.t. flow rate (±10%), wavelength (±2 nm) and HPLC Instrument column compartment temperature (±5°C) and the entire repeatability % RSD also with in validation limits. This method suggested for routine Quality control activities for determining the Embelin in crude extracts of Embelia ribes, which is more demanded in the herbal and Ayurveda industry.

The embelin molecule is extracted with different solvent I, Acetone, methanol, chloroform and hexane, analysed by revers phase HPLC at 260 nm detection by UV-Vis detector and found that all the different solvent extracts are eluting the same RT of embelin molecule which are observe the linearity, precision and other validation parameters as per Maheshwaran et al (2013), hence Reverse phase HPLC system will be used embelin and its derivative analysis effectively. In addition with this method, Embelin and Curcumin were analysed by RP-HPLC method from its formulations, and succeeded for estimation of these molecule including all the validation parameters as per Kachhadiya KH et al (2014). Hence the embelin, embelin derivative, embelin formulations are also be analysed by RP-HPLC method.

Embelin molecule is also extracted from its fruits by different solvents like chloroform, ether and alcohol solvents in the presence of big molecule like sterols, tri-terpenes, saponins and tannis, saponins, alkaloids, flavonoids, sterols, triterpenes. A TLC method used to separate the embelin molecule in the tissue culture solvent as per Syed Asadulla et al (2013)
Controlling of glucose / sugar in the living system is due to the function of kidneys, if the kidney caused by diabetes, the sugar or glucose level in blood will be increased, which could not, controlled by the kidney. The kidney disease also called nephropathy, where caused two type of diabetes formed due to the kidney cells lost its function and the separation of unwanted glucose molecules will not separate and hence the glucose level will increase in the blood sugar. As per Uma Bhandari et al (2013) treated the embelin ethanolic extract as it is to the wistar rats. In this study a high fat diet and low dose streptozotocin ware practically induced and treated with embelin ethanolic extract wistar rats and found that the body weight of the high fat diet rat group comparatively with the control group of wister rat. As a part of this experiment found that the serum insulin levels ware reduced considerable level and this controls the body weight of the experimental rat in the study. In this study the embelin extract prepared from the Embelia ribes with ethanol and monitor the concentration of embelin with HPLC validated method accordingly the dose concentrations ware prepared for the experiment.

Population were the main criteria for everything and thing, requirement of food and facility have been increasing along with the increasing the population; hence controlling the population has to be controlled because of the limitations of the resources availability. In recent days of requirements is that to get a safe drug molecule to control the fertility and this let the intuition of finding efforts to identify the natural plant source of molecule to complete the controlling of fertility processes. As per Gupta R.S. et al (2006), there were 105 numbers of plant sours were identified as controlling the antifertility activity in males. The antifertility activity through usage of embelin molecule in rats was identified through the reduction of the rats’ testosterone level. Hence to handling the future population density can be handled through the usage of the Embelia ribes (embelin) plant effectively.

The Embelia extract has around 35 bioactive molecules and has been used more than 75 ayurvedic formulation and preparations as per Sathe V.P et al (2015). The research article also provides that the embelin molecule is extracted and detected in the other plant of the same family called Embelia drupacea. HPTLC studies were carried out to estimate the amount of embelin molecule present in the plant Embelia drupacea. The dried fruit were made in to powder and dissolved in methanol solvent
through sonication. The slurry of the content was centrifuged to separate the filtrate (a clear fraction). The filtrate was diluted further to get 75 ppm (μg/ml) of embelin content. An TLC chamber filled with the solvents mixture of chloroform, ethyl acetate and formic acid in volume by volume ration as 5:4:1. A saturated TLC Silica gel 60 F 254 plat were spotted with the help of Camag Linomet 5 sample applicator under nitrogen spray, the Embelia drupacea methanol extract and standard solution of embelin (extracted from Elmebila ribes) of known purity. The TLC plate were allowed to elute and dried to room temperature, the TLC plate were scanned at 348 nm with Camag TLC Scanner IV; the area of relevant embelin were determined. This method were validated as per the ICH guideline requirement and reported that the Embelia drupacea content 2.05% (2.05 g/100g of the sample). The extract were studied by HPLC validated method and found the same range of results. Hence the embelin molecule also present in the Embelia drupacea plant. This kind of identifications will be alternative source of the embelin molecule and useful for future therapeutic applications.

As per Sathe V P et al (2015), various parts of the E. ribs has different amount of the potential drug (embelin) estimated by HPTLC method of analysis. Among the same parts different located plants shows different amount of the active molecule was detected. Hence the embelin molecule is synthesized in various parts of the plant in various stages of the molecule.

The embelin and its formulations were analysed by various method of analytical technique as per Mulgund et al (2013) the Churna Formulation content by Embelia ribes were analysed by HPLC equipped with PDA detector, and the results were also ensured by HPTLC analytical technique. In the HPLC analytical method developed with three type of HPLC columns viz., Perkin Elemer make, C18, 250 × 4.6 mm length with 5 micron particle size; Thermo Hypersil Gold make, C18 bonded, 250 × 4.6 mm length with 5 micron particle size and the third column make is Chromatopak, C18 bonded 250 × 4.6 mm length with 5 micron particle size, with two type of HPLC grade organic solvents (methanol and acetonitrile).

The mobile phase eluted with three different pH values as 3.0, 5.0, and 7.0 were operated the HPLC system to determine the embelin content in the Churna
Formulation. With the final optimized HPLC method, three market formulations were analysed and eluted the peak at 5.6 min, the same is confirmed with the standard embelin molecule analysis by the same method. Hence the HPLC method elution about 5.6 min of the respective peak is time and cost effectively method, which helps to identify the embelin in the given herbal product rapidly. The entire developed method parameters set up proceeds to get the recovery is about 100% and the % RSD is less than 1.2% for inter and intera-day of sample analysis.

The HPLC linearity regression observed as 0.9989, recovery of embelin minimum 99.61% and maximum 101.2%. The method Limit of Detection (LOD) observed as 1.94g/ml and Limit of Quantitation observed as 5.891g/ml. Other validation parameters were checked and found as per ICH guidelines, section Q2 R1, edited year2005. In the HPTLC method regression is 0.9994, recovery of embelin was in the range of 99.09- 100.21%. The LOD was 61.28 ng/spot and LOQ was 185.71 ng/spot. Both the HPLC & HPTLC methods were validated as per guidelines requirements and found suitable to usage. Hence the HPLC-PDA and HPTLC methods were simple, sensitive and reliable for analysis of embelin in Embelia ribes and other churna formulations.

Many analytical methods have been developed for identifications and quantification of a desired molecule in the given matrix. HPTLC is one of the analytical techniques to measure fast and simple method. As per Damle M C et al (2015) embelin molecule (chromophore) were identified by a Uv-Vis range of spectra scanning by a TLC method to estimation and for stability of the molecule in the Embelia tsjeriam matrix. In this method mobile phase used in the ratio of 6.0:3.5:0.5 volume/volume of toluene : Ethyl acetate : Formic acid respectively; for better separation and identification of embelin molecule in the sample matrix. The absorption bands were estimated at 291nm wave length. In this TLC method all the validation parameters were found well within the limits as per the ICH guideline requirements. The linearity correlation coefficient calculated as 0.997, The LOD and LOQ were 6.09ng/band and 18.48ng/band respectively for the 200-1000nono gram sample concentrations of embelin content. Hence this TLC method was convenient to estimate the amount of embelin in any matrix.
In recent days of qualitative and quantitate analysis of embelin molecule were increased many fold, as per Gondaliya A V et al (2014), Embelin molecule along with Berberine hydrochloride salt by HPLC analytical instrument by a single run. Berberine is a isoquinoline alkaloid molecule which were derived from the Berberis aristata plant roots and stem-bark. Embelin is the molecule extracted from the Embelia ribes. The HPLC equipped with a UV-Vis detector and monitored the elution of embelin and Berberine hydrochloride salt with the following Instrument conditions:

<table>
<thead>
<tr>
<th>Instrument Parameter</th>
<th>Actual used in the analysis</th>
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<td>Standard concentration</td>
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<tr>
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<td>Column Dimensions</td>
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<td>Detection wave length (nm)</td>
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<td>Detector (Type)</td>
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<td>Mobile Phase</td>
<td>0.1% trifluoroacetic acid in water as mobile phase (A) and HPLC grade Methanol (B) with Gradient system</td>
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<tr>
<td>Injection Volume (µL)</td>
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</tbody>
</table>

### Chemical and structural formula - Embelin

![Chemical Structure of Embelin](image)

### Chemical Formula and Structure of Berberine hydrochloride

![Chemical Structure of Berberine hydrochloride](image)
The HPLC method were well separated the said two molecules and the analytical statistical were comply as per the ICH guideline requirements. The linearity, repeatability (precession), LOD & LOQ values were well within the limits of analytical validation requirements. Hence embelin molecule can be detected along with other alkaloid molecule (Berberine hydrochloride) also with in a single run.

The awareness of safety usage of the drug molecule was increased among the peoples because of the side effects of the drug usage. The awareness let to increased usage of natural plant product or derivatives in various forms. The Kaishoraguggulu is one of the Ayurveda products used for many therapeutic usages, which contains Piperine, Guggulusterone along with embelin molecule. Any concumable or drug products required analysis and confirmation practically. HPLC analytical methods were developed as per Ganesh Muguli et al (2014) for the separation, detection and quantification of embelin, piperine and guggulusterone from the kaishoraguggulu product. The product was dissolved in the known volume of methanol and analysed with the following

2.3.8. HPLC instrument conditions:

<table>
<thead>
<tr>
<th>Instrument Parameter</th>
<th>Actual used in the analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPLC column temperature</td>
<td>35°C</td>
</tr>
<tr>
<td>HPLC Column (Name)</td>
<td>Chromolith C18</td>
</tr>
<tr>
<td>Column Dimensions</td>
<td>100 X 4.6 mm, 5 microm</td>
</tr>
</tbody>
</table>
The method eluted the embelin at 16.0 min, piperine at 6.0 min and guggulsterone E-Isomer at 8.38 min, guggulsterone Z-Isomer at 10.87 min. This method and the column were separated the geometrical isomers of guggulsterone from the mixture of embelin, hence this method is unique for the estimations of embelin, piperine and guggulsterone E & Z isomers through a single run.

All the validation parameters linearity, limit of quantification (LOQ), limit of detection (LOD) and recovery including the Inter & intraday precession were well within the limits as per the ICH guideline requirements.

2.3.9. Embelin and related Derivatives and its medicinal properties and analysis
Research publication regarding the embelin derivative an effective HLPC method published by Ayyavoo et al (2014), a reverse phase HPLC Method has been elaborated with some of the validation parameters. Many molecules are synthesized by using embelin as a base molecule, like esters cylco derivatives, substituted cyclo derivative and the entire modified molecule proved as one or more medical usages for human beings. Embelin hydroxyl group and adjacent hydrogen atoms used for substitution to get, aldehydes, and cyclic enantiomers and these molecules were active against Gram-positive bacteria, including ultiresistant Staphylococcus aureus clinical isolates as per the publication by Rosalyn et al (2013). Embelin molecule also acts as an NF-κB blocker and potential suppressor of tumor genesis as per Radhika P et al (2014) and more that the research paper clarify that the molecule also exhibits potent cytotoxic, antioxidant and cancer chemo preventive effects.

The embelin derivatives (2-hydroxy-5-substituted-3- undecylcyclohexa-2,5-diene-1,4-diones) has some other clinical properties, which is different compare to its parent molecule. The 5-hydroxy derivative of embelin molecule has anticancer properties as per Kantham srinivas et al (2010). Antimitotic activity is that the processes of arresting or impacting the cell division properties at molecular level. The embelin derivatives at 5th position viz., Benzyloxy, allyloxy, butoxy, propoxy, ethoxy and methoxy derivatives of 2,5-dihydroxy-3-undecylcyclohexa-2,5-diene-1,4-dione; possess Antimitotic activity as per Kantham S et al (2010).

Many other embelin derivative could be used as Buchwald, H. et al, (Oct. 1980) controlled manner for certain medical treatments. Another feature of these embelin derivatives has Drent et al. (Apr. 1993) inhibition of lipases at cell levels. In some other usage like lowering the Liu et al (1994) plasma triglycerides, increased the lipoprotein density.

2.3.10. World Market Requirement of Embelin molecule

The plant E. ribes is cultivated inn many parts of India, as per Mhaskar et al (2011), Embelia ribes plant availability in forest area map in India viz., the northern Western Ghats of Maharashtra and the western sea areas of south India are identified. There are many practical issues regarding regaining the plant and its various stages of
adulteration, fruits, stamps and others among the peoples. The demand of embelin in Mumbai market was in the year 2000 recorded as very high and sloped down till the year 2015; because of the usage not regularized among the human beings.

Hence the E-ribes has high trade budding and its utilization in the Indian local market was greater, that is the usage of quantity more than 100 tons per year. In the year 1990 to 2000 the claim for E-ribes increased many fold as these years average the export were detected as 250 tone year Nayak S.U et al (2009), due to their resemblance, the fruits of E. ribes are used as an adulterant in black pepper and exported to other countries in larger amount There are few market survey on medicinal plants are available as per Nayak S.U et al (2009), that the Embelia ribes crude drug market, replaces by some or other adulterants because of non-availability of the genuine drug. The E. ribes were replaced by the Embelia robusta Roxb. These two species are botanically same but different drug content among this two species as per HPLC analysis results of phenolic acids. The HPLC results stated that the content of phenolic acids in E-ribes is more that the E-Robusta especially cinnamic acid which has the prosperity of anthelmintic. Medicinal plants are ranked by Subrat N et al (2002), the top 20 medicinal plants traded in India in value terms was listed out and the plant E-ribes was rank as in 7th position among top 20 medical plants in India.

The International markets of medicinal markets as per Bekele E et al (2007), Europe imports about 25% (132,000 tones) of all the medicinal plants; about 27,000 tones plant material comes from Africa only. The study says that the around 90% of medicinal plants are harvested from the wild. In Asia, China is an important market player for medicinal plant. Where China alone, some 800 million people use around 5000 species of plants medicinally, so the annual demand estimated around 700,000 tones. Another important country in Asia is India, where produced Ayurveda medicine, a volume of 70% share of the formal medicine market in India, which serves the need of > 600 million people in the world. This service is enhanced due to on line marketing now a day.

As per Sinha et al (2014), the drug molecule Embelin derived from Embelia ribes is one of the important medicinal plant used in the history if Indian medical since
ancient time. Even though many medicinal plants has been used this plant is one of the multi therapeutic usage for human treatment because of many natural chemicals has been detected in the extract of Embelia ribes. The Embelia seed has rich content of the active molecule embelin. Due to the rapped usage of this plant and the increasing demand of this molecule in market, parallel the adducting of the molecule also increased to meet the market requirement. As per market survey E. tsjeriam-cottam was commonly sold as E. ribes. Therefore, development of large scale medicinal plant is very important and urgent to meet the current requirement in the world.

As per Radhakrishnan et al (2014), numerous usage of the embelin molecule with respect to various medical applications, the research publication also increased since last 99 years of the embelin medical usages. In India, Embelia ribes are used for numerous therapeutics usages since long time as a traditional medicine. Hence the Indian Government has been set up a board for medicinal plat as “National Medicinal Plants Board”, and which has been functioning under the Ministry of Indian System of Medicine and Homeopathy. This board will carry out enhancements of medicinal plants usage and its handling knowledge over all in India. The board declared that the Embelia ribes is one of the important plants among the 32 medicinal plants. This E. ribes is one of plant economically important based up its commercial need. This only plant and its parts have been used around 20 Ayurveda formulation drugs as per Patwardhan et al (2004) and so Embelin molecule has been one of the prime drug molecules in Indian traditional Ayurveda.

Hence natural plants are one of the main sources to study, understand and discovery a new molecule (drug) development for future mankind requirement. All the plant extracted molecules are thoroughly screened for many applications like pharmacology, the molecule reaction kinetics chemistry and the pharmacology and clinical therapeutics has been studied and observed the results. All these molecules also thoroughly checked for its chemistry in the area of molecule confirmations, structure confirmation, synthetic path ways and confirmations by using modern complementary technique like separation (automated), identification, quantifications and validation of analytical method for its reproducibility. A powerful search engine
also been used to determine to the rediscover the active molecule among the plants in the plant kingdom as per Patwardhan et al (2004).

Protein is the very important system to keep live of the biological system; protein were responsible to carried out may important biological function in the living system like catalyzing metabolic reactions, replication of DNA, transporting molecule from one place to another place. Protein consists of one or more poly peptide, this peptide were consist of more that or a group of amino acid. Hence the amino acid is the basic molecule for the construction of any type of proteins. Designing entirely new proteins processes were called De Novo protein design.

Embelin is one of the systems to bind the amino acids to generate new type of protein as desire. Embelin were works as a binding tool as per Hecht M.H. et al (2012), stated that the binding affinities of the embelin molecule were better than the paromomycin, streptomycin and saclofen as per the biophysical assay results. A novel protein were synthesized by using embelin molecule as a binder of amino acid and the structural confirmations of the embelin presence in the protein sequence were confirmed by using a complementary analytical tools like Circular Dichroism (CD) Spectroscopy technique, Surface Plasmon Resonance (SPR) analytical technique, Hetero-nuclear Single Quantum Coherence (HSQC) NMR., PFGSE NMR and Estimation of KD, Mass Spectrometry and Isothermal calorimetric titration. Hence embelin molecules were used in many areas of biological functions as medicine, and binder in the protein synthesis.

The Embelia ribes not only has many organic molecules in it, it also has many minerals as per Indrayan A.K. et al (2005) the Embelia seeds were rich content of magnesium, neutrino, carbohydrate, mineral with low amount of protein. Some of the other medicinally valued seeds were also has different ratio of minerals, portions, fat, fibers, vitamin and carbohydrate. Different tropical regions plants has different content of minerals and other contents, the study were conducted the Uttaranchal, India and the contents were reported. Hence the herbals and medicinal plant content were very season to season with in the same tropical conditions.
In the world land locations were very important and the temperature and humidity contains were vary from equator to the polar of the earth. The tropical lands are and the rest of the land area has much difference in term of climatic conditions.

Climatic conditions were decided the nature of the forest / plant cultivations. India is located such a different climatic conditions in the world land location. Embelia ribes plants were naturally grown up in the Himalaya to Kongan, Deccan, Western Ghats and South area of India at the altitude of >1600meters. The Embelia ribes; fruit price were Indian Ruppy 100 in the year of 2001. As on December 2015 the 100% organic medicinal herbs Vidanga (Embelia ribes) powder costing about Indian Ruppy 1742.

The export quantity increased due to its demand in usages and the peoples were started to use the natural products for a safe medical purpose. Hence the embelin molecule demand was increased to 17 fold in the 14 years of time. The information were provided in the web site https://www.zauba.com/export-EMBELIA+RIBES-hs-code.html

As per Patwardhan et al (2011), during the period of 1990–2000 Embelia ribes export were increased tremendously as 250 tons per year. In the year 2000 Mumbai market faced a demand of the Embelia ribes. All the parts of the plant were used effectively for medical usages and the seed of Embelia has been used as an adulterant in black pepper (Indian king of species).
### 2.3.11. Details of Export Data of Embelia ribes:

<table>
<thead>
<tr>
<th>Date</th>
<th>Description of Embelia (exported)</th>
<th>Unit</th>
<th>Total Quantity</th>
<th>Per Unit (INR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Dec-15</td>
<td>Capsules (Embelia Ribes) 20 mg</td>
<td>Pack</td>
<td>1,990</td>
<td>149</td>
</tr>
<tr>
<td>2-Dec-15</td>
<td>Embelia Ribes Red</td>
<td>Kg</td>
<td>200</td>
<td>847</td>
</tr>
<tr>
<td>9-Oct-15</td>
<td>100 % Embelia ribes (Powder)</td>
<td>Kg</td>
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<td>1,742</td>
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<tr>
<td>8-Oct-15</td>
<td>Capsules (Embelia Ribes) 20 mg,</td>
<td>Pack</td>
<td>1,000</td>
<td>191</td>
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<tr>
<td>14-Sep-15</td>
<td>Embelia Ribes Extract</td>
<td>Kg</td>
<td>0</td>
<td>6,843</td>
</tr>
<tr>
<td>14-Sep-15</td>
<td>Embelia Ribes Seeds Extract</td>
<td>Kg</td>
<td>0</td>
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<tr>
<td>14-Sep-15</td>
<td>Embelia ribes fruit powder 80 PSD</td>
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<td>8-Sep-15</td>
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<td>237</td>
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<td>8-Sep-15</td>
<td>Embelia Ribes Crush</td>
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<td>Pack</td>
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<tr>
<td>27-Mar-15</td>
<td>Embelia Ribes(Kernels)-Vidanga</td>
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<td>100</td>
<td>842</td>
</tr>
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<td>100 % Embelia ribes (Powder)</td>
<td>Kg</td>
<td>12</td>
<td>972</td>
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<td>Embelia Ribes Powder</td>
<td>Kg</td>
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</tr>
<tr>
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<td>Embelia Ribes Extract</td>
<td>Kg</td>
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<tr>
<td>16-Feb-15</td>
<td>Capsules (Embelia Ribes) 20 mg</td>
<td>Pack</td>
<td>500</td>
<td>226</td>
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</table>
2.3.12. **Embelia Ribes (Embelin) future Requirements**

As per Rasool Hassan et al (2012), now a day's physician and all hunting for a "Alternative Medicine" and this term became very common over the world wide. The plant kingdom is the only source for new molecule thinking in different dimensions; this is the only belief for a safe alternative in future. Any synthetic molecule production held multi fold of processes and this involves many raw materials and any raw material is the main product of some other processes. Hence presence of impurities like, in-organic impurities, organic impurities, residual solvent, enantiomers, acids, base, salts, moistures, and reaction impurities, like addictive molecules, oxidative and reductive products and many more unwanted or impurities are bounded with the required molecule that is use full molecule / drug. These unwanted molecules cause more side effects and this side effect could major diseases among living things. Hence the plant source of the drug molecule will be better form of drug; this could be purified for effective usages. Hence the plant could be the future sources of medicine for human beings.

As per Souravi et al (2014), Embelin molecule is one of the multifunctional drug has been used since old times. All the root, berries and leaves of Emelia ribes has been estimated as high commercial value because of its multi medical functional and also has been used many herbal formulations. The drug has been used for innumerable therapeutic actions such as pharmacology analgesic activity, anthelmintic activity, antianxiety activity, antibacterial activity, anticancer activity, anticonvulsant activity, antidepressant activity, antifertility activity, antifungal activity, antimitotic activity, antioxidant and neuro protective activity, anti-genotoxicity activity, anti-histamic activity, cosmetic agent, cardio protective activity, wound healing activity, nephron-protective activity, anti-diabetic activity, toxicity studies and Nano-medicine. All these multifunction’s of embelin (2, 5-dihydroxy-3-undecyl-2, 5-cyclohexadiene-1, 4-benzoquinone) molecule is possible; because of its chemical structure and its biological activities. This innumerable properties of embelin molecule inducing the future work on its derivatives and biological activity determinations along with various multi formulations of drug molecule; which could be so essential and an alternative medicine for human beings.

As per Syed A et al (2013), the Embelia ribes Burm F.is plant, has claiming plant on wood / tree ect..It has been known as so commonly known as false black pepper or
vidanga. This plant E. ribes were grows almost all the semi-evergreen parts of India at an altitude of 1,500 meter. This plant is there are many other names as per various languages and including the various local languages. Various parts of the plant parts have been used around 75 Ayurvedic medicines were prepared; hence the other hand the plant production has been regularized to meet the excesses medical conception due to its multi spatiality of function. Cultivation of E. ribes is quite difficult processes due to various natural reasons like slow germination, poor seed viability and poor rooting from stem cuttings. Due to this reason Medicinal Board, Government of India, New Delhi, has been taken action for the large scale of cultivations of some important medicinal plants including E-ribes. Embelin based rat study reported that the molecule shows 85.71 % of potent oral contraceptive. As embelia have the properties of non-steroidal and non-hormonal moiety could be used for many other medical activities. Hence the Embelin has to be studied to understand many other functions in future research work and this scope will be more and more in coming days.

One of the main application of the Embelia ribes is that the healing properties as per Asadulla et al (2011) and stated that the plant located and cultivated an altitude of 1600 m in the area of Himalaya to Konkan, Deccan, Western Ghats and in South pars of India. This plant has been physically described as a large, scandant shrub with long trim; flexible, trite branches and the bark were sprinkled with lenticels. These parts of the plant contains many chemical molecules like embelic acid, volatile oil, fixed oil, resin, tannin, christembine (a type of alkaloid), many phenolic acids like caffeic, vanillic, chrorogenic, cinnamic and cumaric acids. All these molecule combinations are the strength being selected the Embelia as a good medicinal plant; which has solves many medical therapeutics issues among human beings. All the scope of the molecule biological activities, antimicrobial including, antitumor, anti-inflammatory, analgesic, and anthelmintic, antifertility & antioxidant has to be well studied with different combinations of concentrations.

Embelin molecule used in wide range of clinical applications including Tapwarm treatment, carminative, stimulant, antioxidant, anti-spermetogenic, antibacterial, anticancer activity and many more applications. The Embelia plant fruit Embelia ribes contains more amount of embelin concentrations including many other organic
molecules like, fatty ingredients; alkaloid, resinoid, tannins and tinny amount of volatile oils. All these combination of organic rich content extracted in water and other organic solvents (petroleum ether, Diethyl ether, and methanol) and studied against the antifungal as per standard method of analysis (susceptibility test method NCCLS M27-A2) and found that the methnolic extract of the embelia ribes has more antifungal effect thane the petroleum ether, diethyl ether), the water extract does not have any significant effect against the antifungal activity as per Suthar M et al (2009). The antifungal activity were checked against the extract concentration.

A standard fungal strains were taken for the study, the (Minimum Inhibitory Concentration) MIC values of fungal strains were analysed and quantified as per NCCLS and EUCAST methods. The percent growth of fungal strain were determined against the extract concentration every day and found that the methanol extract more effective than the other extract of embelia ribes. Hence the embelin molecule has been treated for the antifungal activity efficiently. There is scope of doing further work to determine that the solid (dusting powder form) of the embelin in day to usage for controlling the antifungal activity.

2.3.13. Microbial Activity of Embelia Ribes (Embelin) and its related Compounds

As per Suthar et al (2009), the embelin molecule has been used for the treatment fungal activity this was confirmed by the fungal strains study. Pathogenic fungal strains taken from a known Microbial Type Culture Collection, (MTCC) and some other stains are Aspergillus fumigatus-2550 also used. The Minimum Inhibitory Concentration (MIC) values of the fungal strains were determined by using NCCLS and EUCAST methods. In this study sub cultured the freeze dry powder for the respective growth medium. The growth was determined through the absorbance data and calculated to get the percent growth, plotted to get the MIC and also estimated the MIC 50 by calculation method. The embelin molecule extracted through water has no active against the fungal species, whereas the solvents Diethyl ether, Petroleum ether and methanol extracts were produced the less MIC values, but the growth of fumigatus A 2550 was inhibited by solvent petroleum ether ether extract at 350 ppm concentration. The 0.4-1.5ppm of the Amphotericine B was found as
effective against all species. Hence, embelin molecule has to be extracted in a suitable solvent which has to be used fungal activity.

Any plant molecule extraction is a multi-step processes and purification technique has to be used to get a more pure compound. Special rout of the processes has to be selected, which has to be cost and time effective and viable to the day-to-day processes. Embelin molecule also proved that it has the properties of antibacterial activity as per Radhakrishnan et al (2011) The molecule derived from E.ribes by using the n-hexane solvent, purified and charactrisation by NMR, Mass, FT-IR,TGA, DSC and UV-Vis complementary analytical technique as per the standard analytical methods.. The A 1000 ppm of embelin solution prepared by DMSO solvent and used for Minimum inhibitory concentration (MIC) was determination as per micro dilution method. A minimum bactericidal concentration (MBC) also executed to determine the lowest concentration of an antibiotic required to kill microorganism. In the MBC determined as 10 µl of 1000ppm embelin solution will enough to kill the microorganism. This excrement (MBC) was carried out on a fresh Mueller-Hinton agar plates and identified the growth of bacterial organisms and determined the quantity. Also found that the MIC index values were > 4 and < 32 and hence concluded as bacteriostatic.

Antibacterial activity also reported by Sailaja B.B.V et al (2011), the embelin metal complex has antibacterial effect. Embelin and its metal complex viz., cobalt (Co(C17H25O4 ) 2Cl2), Nical [Ni(C17H25O4)2Cl2], copper [Cu(C17H25O4)2Cl2] and Zinc [Zn(C17H25O4)2Cl2)] complex were taken for the evaluation of antibacterial activity along with the control DMSO. The agar diffusion methods were used in this study. The three metal complexes were prepared 100, 150 and 200 µg mL-1 concentrations and used in the petridis plate at controlled environment along with the DMSO control. The antibacterial effect of embelin (dissolved in dimethyl formamide) has more than the other three metal complex of embelin. Hence the antibacterial effect of embelin molecule alone is effective than its metal Ni, Cu & Co complex.
As per the embelin molecule has the antimicrobial activity on Pseudomonas aeruginosa and Escherichia coli as per Alam Khan et al (2010). The Embelia ribes plat fruit dried, extracted through soxhlet apparatus along with petroleum, prepared the ethanolic extract and used for the study after the phytochemical analysis of the other organic molecule present in the extract matrix. Found that the extract consist of tannins, saponins, sesquiterpenes, alkaloids, and phlobatamins as per the analytical results. The conclusion was that the combination of this entire organic molecule might have joint effect working as a good antimicrobial agent of embelin molecule.

Chemically similar molecule like embelin has the properties of Quinone and its derivatives like alizarin, juglone, lapachol and lawsone at the concentration of 10 mg/ml has the Antimicrobial Activities effectively. In this study the antibiotic drugs like, ampicillin slats were used as positive controls. The experimental microbial plates were incubated at 37°C for 18 - 24 hours for bacterial strains growth and the 37°C for 24 to 48 hours for fungal strains. The mixture of the products has been observed as good efficiency against microbial growth and this inhibition were measured in triplicates and confirmed as per Chanida Palanuvej et al (2014). Hence the embelin molecule has very good inhibition against gram positive bacteria, gram negative bacteria, fungi, gram negative bacteria and gram positive bacteria.

Embelia fruits contain many organic molecule, the main content were quinone derivative molecule called embelin; the chemical name of the embelin molecule is (3-undecyl 2,5-dihydroxy, 1,4-benzoquinone) in addition with this the fruit seed contains alkaloids and a volatile oil vilangin (2,5-dihydroxy-4-undecyl-3,6-benzoquinone). Many biological activities have been determined and treated for anti-spermatogenic effect and urinary tract infections too as per Prasad M.N.V et al (2007).

2.3.14. Embelia Ribes (Embelin) and its related Compounds in Cancer treatment
The embelin has been used as an antimicrobial agent to the living system since ancient time. Isolated embelin from Embelia ribes has been found so effective on the action over grampositive (B. subtilis, S. aureus) and gramnegative (E. coli, P. vulgaris) organisms at the concentration of 100 µg/disc and found that the compound
Ilb was more active among all the test compounds followed by compound Ile, lld, lla as per Srinivas K et al (2010)

The bacterial activity experimental procedure were carried out by a well-known standard CUP-plate method. The antibacterial activity were more effective in some of the hydroxyl derivative molecules of embelin are 5-allyloxy-2- hydroxy-3-undecyl benzo-1,4-quinone, 5-butoxy-2- hydroxy-3-undecyl benzo-1,4-quinone and 2- hydroxy-5-methoxy-3-undecylcyclohexa-2,5-diene-1,4- dione molecules. All these molecules are also effectively acting as anticancer drug at the concentration of 20 µg/ml, 80 µg/ml, 100 µg/ml and 200 µg/ml against HBL-100 cell lines. It is concluded that the anticancer activity in the range of 31 µM to 171 µM of embelin molecule.

Embelin has multi face drug to treat many deceases, anti-cancer activity is one of them. In this anticancer study, an ascetic antitumor cell ware and induced by Ehrlich ascites carcinoma (EAC) tumor cells in to the healthy adult Swiss albino mice weighing 20-25 g body weight range and end of the study Tumor growth response factor ware calculated and found that the embelin potency with respect to anticancer cells well controlled in the mice. The study also determined that the body weight increased in the EAC tumor bearing mice due to the regular rapid increase in the ascetic tumor size. As per Prakash N.S. et al (2011), hence few natural products have been used as an anticancer drug.

As per Dai Y et al (2011), embelin molecule has the potency of inhibits prostate cancer cell growth as per the In-vitro study and proved that the molecule also sensitize cancer cells to radiation therapy, hence proved that the inhibition of the cancer cells through the 5 days post treatment cells at the concentration of 10 µM of embelin exert. A significant growth control greater than 45%, were recorded as 20 µM of embelin molecule kills >60% of the cancer cells. These therapeutic shows that the embelin has more cytostatic action rather than cytotoxic agent and the molecule favors suppressing cell proliferation through the cytotoxicity action at higher doses levels. The longer exposure time of this molecule shows growth inhibition significantly at P<0.001 whereas cell death P<0.05. This study mechanism proved
that the embelin works efficiently with combination of ionizing radiation which predominantly reduced cancer cell proliferation.

The XIAP (X-linked Inhibitor of Apoptosis Protein) provides tumors along with the Androgen Receptor (AR) as per **Danquah et al (2012)** and showed that the new anti-androgen called CBDIV17 and XIAP inhibitor based combination treatment can treat advanced prostate cancer. The combination of CBDIV17 system and embelin revolves in supra-additive anti-proliferative and apoptotic effects in the treated cells. Hence the experiment concluded that the CBDIV17 in combination with embelin can potentially treated for advanced pro-stated cancer cells. In this study the XIAP were detected by using human XIAP ELISA kit as described in standard methods. The In Vitro Cell Viability Assays results, Western Blot Analysis, All these experiments were carried out as per standard methods and standard reference test items

As per **Xiu-li-zhu et al (2015)** Embelin molecule inhibits cancer cells directly the pancreatic cancer progression and through apoptosis pathway. This molecule also indirectly restricting IL-6 associated inflammatory and immune suppressive cells in the human cells. In the 48 hours of rate dosage study, embelin molecules have taken 5, 10 and 20 milli Molar concentration. The cell viability ware about 82.31, 58.65 and 37.62% respectively. In the results found that there was a significantly reduced the cell visibility compared with DMSO, which was used as a control group about 0.1% solution. The study results revolve that the potency of Embelin in inhibiting the growth of T cell lymphoma cancer cells.

Cancer is one of the major diseases among human, and the treatment for this cancer also a costly officers. Since from ancient days mankind has been used many of the natural drug molecule for such kind of varies series diseases. Embelia ribes and curcumin are the natural compounds which have been used for cancer treatment separately. As per **Jagadeesh et al (2009)**, the combinations of embelin and curcumin ware used to treat the cancer and found successes results in vaster rat living system. The results state that the urea, creatinine and glucose content were normal in the treated group of rats comparatively with the untreated group of rats.
Hence the combination of the embelin and curcumin molecule system has a potential effect in the cancer treatment.

In the modern life style many known and unknown disease being created in the environment and to the living system. Among these some of the disease were very crucial and could not treat completely. Cancer is one of such crucial disease due to its nature. Cancer is a major cause of death and is expanding continuously among worldwide. As per Kaushik S et al (2014) In India every year about 5, 80, 000 cancer related death were recorded and around the world about 50, 000 new cancer cases being diagnosed. Cancer is a process of dividing cells continuously without any barrier in the living system. Hence the certain type of the cell counts increase suddenly, which caused biological functions. This sudden increase of cells ratio were developed a group of disease caused by cancer in the living system. The dangers disease cancers were treated by the phytochemicals successfully without any side effects. The Embelia ribes methanolic extract chemically has phenolic and other natural organic molecules such as alkaloids, lignans, terpenoids, quinines and phytochemicals (flavones, flavonoids, flavonol) were content in the extract. The cancer treated by the embelin derivatives such as 1,4- benzoquinone derivative 5-o-ethyl- embelin and the 1,4- benzoquinone derivative 5-o-methyl- embelin molecules were used for the therapeutic treatments for antimitotic and anticancer diseases as per Monika et al (2015).

The embelin has phenolic in nature due to the presence of two hydroxyl group in the molecular formula and confirmed structural formula; hence it has phenolic properties. In addition to this the molecule has Quinone structure also, hence has the Quinone chemical properties too. As per Wu-Yang Huang et al (2009), the natural phenolic phytochemicals were used for cancer prevention and therapeutic treatments, tis phenolic also has the properties for the medical treatment for antioxidant, anti-carcinogenic and anti-inflammatory infections. The phenolic structural categories have been used for anticancer mechanisms and support many research study.

2.3.15. Embelia Ribes (Embelin) extraction Procedures
Embelin molecule extracted from the fruits of Embelia tsjeriam-cottam, this is an alternative source of embelin. In practice, the conventional soxhlet method used to extract the embelin form ribes or tsjeriam-cottam, but a different water bath technique used to extract the embelin molecule, as per Basak et al (2015). In this method, the Embelia ribes (seeds) were powdered and dissolved in a methanol chloroform solvent in different ratio and extracted using the boiling point difference and separated by temperature variation property, the extraction procedure was carried out thrice and estimated the embelin molecule content by using UV-Vis spectrometer at 291nm.

TLC method also used for estimation of the embelin content and HPLC method also used for separation and quantification of the embelin molecule and all these methods, calculated amount of the embelin molecule in the Embelia tsjeriam-cottam seeds used for this extraction procedure. The methanol and chloroform solvents extracts has different amount of the embelin content in different filtrate of the water bath extraction. Concluded that the water bath method is more time saving method, even very less amount of sample will be used for extraction and very good yield of embelin molecule form the respective extract compare to the soxhlet method.

Any analytical work being associated with the current technology and it's oriented only. The extraction technique has been changes along with the technical up gradations. Now days, microwaves were used to cook food, this was the up gradation technique compare to the LGP cooking technique. Hence the extraction of plant related products were used this microwave technique for its extraction purpose. This technique not required much solvent hence the conception of the solvent were reduced and this were preventing the wastages of the resources and prevent pollution to the environment compare to the conventional extraction techniques. Many other benefits for usages of this technique, saving time and removal of the solvent (concentration) processes were reduced by this technique.

This technique also yields more products through minimizing the material wastages through the extracted low boiling organic solvents. The pressure were generated by microwave technique and that the developed pressure in the plant cells through the microwave the cell wall from inside bulged, due to the continuous stretching of plant
cells the increasing pressure facilitates leaching the active constituents from the plant cell location to directly to the solvent placed in it as per Yashwant Malode et al (2013). The Embelia ribes seeds were powdered in to the respective solved and the operation of microwave gets the content of the seeds in to the respective solvent. Hence the modern microwave technique is cost, time effective with high yield extraction technique.

In the molecular structure of embelin has two hydroxyl group, due to this hydroxyl group the molecule has the properties of phenolic like chemical properties. The hydroxyl group in benzene ring has the properties of amphiphilic. The hydroxyl group positions in the ring also have amphiphilic in nature. Embelin extract from its ribes contains more phenolic compounds along with the quinone derivative (embelin). This phenolic compounds has the polar group attraction (hydrophilic nature) and fat attraction (lipophilic nature), hence this phenolic compounds were also called amphiphile compounds. As per Stasiuk M et al (2010) the phenolic compounds were unique and used as a starting raw material for many pharmaceutical molecule syntheses. Some of the phenolic lipids were given as follows:-

![Structural formulas]
The phenolic lipid molecules amphiphilic nature let the reactions with many organic systems and the derivatives have to be studied for chemo-preventive and antitumor treatments. The phenolic compounds have the properties of inhibition on bacterial fungal, protozoan and parasite growth effectively. The Embelia ribes have many other molecules like an oxalis derivative has been identified. The oxalis derivatives have minimal inhibitory effect on the dermatophytic fungi Epidermophyton floccosum, Microsporum canis, M. gypseum, Trichophyton. Hence the phenolic lips have to be studied intensively with respect to the clinical treatments.

As per Radhakrishnan et al (2013), embelin monomer (single molecule) and dimer (Vilangin) form of molecules have the properties of wound healing (animal & human) and chemotactic activities like cell migrations human system. The research study used dermal fibroblast (in vitro) system model to determine the cell migration activities. As per the World Health Organization (WHO) the entire world medicinal plant contributions from India were 15-20% out of 20,000 medicinal plants from rest of the world. India is one of the important potential for herbal, ayurveda and other phytochemical plant, due to its tropical nature and awareness of the plant usages since long time. This usage has to be enhanced and kept more active to rest of the world through the plant handling many regulations of Indian Government.

One of the world admired plant is Embelia ribes due to its chemical nature of therapeutic usages and hence enhanced commercially in the world market. The Cell viability assay were estimated for different concentrations of embelin and vilangin with spectrophotometer at 540nm absorption for treated and control samples. The wound healing properties were quantified visible by photography technique. The
Single cell migration assay was determined by Boyden’s chamber method and all the Statistical analysis were performed through validated ANOVA software. Hence the study concluded that the embelin monomer (single molecule) and dimer (Vilangin) have been used for the anti-angiogenesis therapy, which inhibits wound healing and cell migration activities. The embelin and dimer form of the molecule structure as below:

As per Varma R.K. et al (2013), Embelia ribes has been used as an eye drops for Cataract disease for human since long time back. Eye is an important part in human system and the treatment of eye also so important, hence the Embelia ribes place a important place among the plant drugs. The WHO stated that the 40% of populations are blind due to cataract issue around the world and also stated that the infection rate would increase essentially in near future. Hence the use of the Embelia ribes was important, the Embelia seed were grinded along with other four plant seeds and a drop (liquid form) of the matrix derived for the cataract treatment. The medicine had been used.

In Ayurvedic classical text Ashtanga Hridaya as Anjana. The cataract issues were solved by using this plant seed extract drops twice a day followed by Triphala eye wash. The four mixed seed including Embelia ribes ethanolic extract were analysed to determine the content of Organoleptic, Microscopic, Physico-chemical and Phyto-chemical properties by a well validated analytical technique and for embelin molecule by HPTLC method and scanned at 254nm for respective color bands. The results were found that the extract / drops were safe to use medically. Hence the Embelia ribes is one of the important medicines for the eye treatment and has to be further studied for more effective applications.
Embelia ribes (methonalic extract) alone has the proprieties of anti-fertility and Piper longum (hexane fraction) has the proprieties of anti-implantations. Since the two plant parts have different potential the combinations of these plant drug has to be studied further as per Preeti Srivastava et al (2014). The two different combination properties consisted molecules have to be investigated further to determine the contraceptive processes as reported in Ayurveda. Hence the Embelia ribes with different combination of plant products have different therapeutic usages, further studies on multi combinations of the plant molecule has to be carried out to solve many medical issues in near future.

In the Embelia family ribes and basal family plants were content same type of organic molecules with different ration. As per Kamble G.S et al (2011), in the oxidative stress metabolic bio-processes, Reactive Oxygen Species (ROS) were released. This ROS segregation causes atherosclerosis, cancer such diseases. The ROS segregation could be managed by controlling the metabolic path way. The natural product content phenolic and flavonoids combined system could control the metabolic path. The methanol extracts

Embelia basal fruits were used to control the ROS segregation. In the plant e basal fruit contents of phenolic and flavonoids in rich manner, hence controls the antioxidant. Hence the Embelia basal natural combined molecules could be a potential source to handle antioxidant activity and this can be a new source of Antioxidant. Hence the Embelia basal scavenging oxidative system through its high content of phenolic system could be alternative for controlling the free radical generated in the biological system and hence prevent and controlled the damages of tissues in the bio-system.

As per Mohandas et al (2013), the Embelia ribes has been used for anthelmintic activity. The studies were carried out using the adult earthworm (Pheritima posthuma). The earthworm treated 15ppm of Piperazine citrate and 20ppm of albendazole as standard references and control warms treated with saline. The study absorbed for the symptoms of achieves paralysis and found that the Vidangadi churna induced a potent anthelminthic activity in the earth warms compare to control
group of earth warms. Hence the vidangadi churna has to be studied further to
determine the anthelminthic activity in details.

Embelia ribes has been used in many herbal and Ayurveda formulation as a key ingredient. Mustadi Taila is one the plant extract oil used for Dental treatments since long time. Embelia ribes is one of the ingredients in the taila. Mustadi Taila is a highly viscos oil liquid exit in brown color with a characteristic odor with acceptable taste. Embelia seed were used in this formulation along with other seven plant parts. All the raw materials were washed and dried without any other forging particle, all the dried item were pulverized separately, different combinations of the raw materials were mixed in a stainless vessel where the Kwata with water. The content was heated with mild flame until the water content reduced to one fourth of its volume. The extracted solution was filtered through a specified micron filter muslin cloth. The filtrate transferred in to a copper vessel and adds murchita tila taila, mixed well and the content heated to remove moisture completely and then the oil were filtered and ready to use. The oil product were checked for its content by TLC method, and other testes like iodine value, acid value, peroxide value, saponification value, specific gravity, Microbial Counts of Mustadi Taila and Heavy metal analysis including microbial content were checked to maintain the product quality. Hence Embelia has important role in dental care also.

Usages of the phytochemicals were increased day by day due to fewer side effects and economically feasible to common man. Before effective usages of the plant nature has to be well known to minimize overdosing and fast recovery. As per Wungsem Rungsung et al (2013) listed more than 33 medicinal plants along with respect to its botanical aspects and therapeutic potentials usages. Medicine were used to get recovery form infections, hence safety is the important aspect; the safety could be achieved through a quality product and estimate the correct efficacy of medicinal plants. In India there were more than 7500 plant species were being incorporated for medicinal purpose as per ethnic communities of India. Hence any plant has to be taxonomically authenticated before any medical usages.

One of the important Indian plants is Vidanga (Embelia ribes) content embelin chemical used for many therapeutic usages. The anatomy of Embelia ribes burm,
were appears as a large, whitish grey stem and long, slender, flexible, multiple branches with simple leaves were arranged alternatively, elliptic-lanceolate, shiny with silvery beneath of leaves. The flowers were found white or greenish borne appearance. The fruits are round in shape, small in size like a pepper size, the outer surface of the fruits were found wrinkled with faded red to black in color as above the ground appearance. Under the earth the plant roots were found brownish grey color with hairy reddish rootlets. All the parts of the plant were used for medicinal purpose in various form for various therapeutic usage like Sore throat, odontalgia, abdominal, inflammatory and mental disorders, constipation, headache, flatulence, indigestion, jaundice, snake bite and skin diseases and anthelmintic, diuretic, carminative and even for contraceptive too. Hence the multi usage of the Embelia ribes has to be well known for its medical application.

Many analytical techniques were used to understand the phytochemical nature after isolated form its plant parts. It is important to ensure the chemical composition of its content, for better usages. As per Sar S. K et al (2015) studied the thermal properties of Embelia ribes along with other medicinal plants by Thermo Gravimetric Analysis (TGA) analytical tool for understanding the thermal characterization like Loss on weight and thermal stability of the substances. The Embelia ribes were powdered and taken for TGA analysis with the temperature conditions as 30°C initially and raised to 400°C at the rate of 10°C raise and hold for a minute at 400°C. The thermal analyses were carried out in the nitrogen gas atmosphere (inert condition). At the initial to 100°C range of temperature; low volatile and water (moisture) were evaluated. At the 20-400°C range of temperature thermal degradation were observed for Embelia ribes sample; hence content of more organic composition in the substrate. Also concluded that a minimum rage of temperature could depredate the Embelia ribes sample, these properties supports to make formulated (medicinal) products at low temperature.

Hence this embelin molecule has to be very important to study further to enhance the usage of this molecule. The literature review of the Embelin and Embelin Ester benzoyl substituted has lowering lips properties. The Embelin is one of the natural drugs used for many medical utility; viz.; Radhakrishnan et al (2011) Antibacterial,

All the fat are not being used daily or burned daily, hence the fat is being accumulated; in the various parts and various levels in the body. Since the population of mankind is being in raising order, the obesity is being raising in the entire human populations. Those having Wong et al (2002) genetic disorder in the enzymes Krapp et al. (May 1996), Wong et al (1991) hepatic lipase and Ganesan et al (2010), Singh et al (2012), lipoprotein lipase will be facing these kinds of physical dissimilarities due to the irregular metabolism, hence it is believed that the regular Jaye et al (1999) metabolism is being processed by the function of lipase. Liver Hixenbaugh et al (1989) synthesising the poly Yadav et al (1998) lipase protein (lipase protein), where the fat lowering activity is processed.

The obesity will leads to many associated effects like, extra weight, diabetes, heart (cardiovascular) problems, thyroid and hypertension problems. Hence controlling of the obesity is also being importance task in the present circumstances. Controlling of fat accumulation has to be controlled, in terms of burning the extra energy / fat, through some inhibiting agent or aid participation. The aid / inhibiting agent has to be act at the cell levels. There are two important lipase are used for the accumulation, catabolism and reforming of Chappell, D. A. et al (1994), Winkler et al (1979) lipoproteins along with phospholipids. Hepatic lipase and lipoproteins are very active, multifunctional proteins on the surface of the peripheral tissue cells including on liver cells.
These two hepatic lipase and lipoproteins are called enzymes, which participate in reverse fat (cholesterol) transmission processes. These Gupta et al (1989) enzymes will transport the fat from Faustinella et al (1992) peripheral tissue to liver; where the liver will do the extraction processes are recycling the cholesterol / fat. There the polymeric or protein lipase will be act to Langer et al (1984), Langer et al (1983), Langer, (1990) release the drug in a controlled manner.

Any drug molecule has to be formulated in to small required concentration with aqueous solubility of acidic medium which were suitable to the digestive system. Solubility of any molecule based up its physic chemical properties and solvent nature. A suitable solvent and suitable solute solid / liquid form has to be selected. Highly required embelin molecule solubility in aquous media is very poor in general, for formulating this drug in to consumable lot micro processes has to be taken care. Actual drug requirement in the biological system were very important on required time. The drug requirement is based up the drug dissolution properties, which were termed as drug releasing rate as per the relevant pharmacopeias requirement. These entire requirements were based on the solid state nature of the embelin molecule.

As per Manoj M V et al (2014) the agglomerates form of embelin molecule has the high rate of releasing in to the buffer solution (as per requirement of pharmacopeias). In this study embelin Spherical Agglomerates prepared from the market embelin sample. Embelin sample were dissolved in to a known volume of acetone and stirred to get dissolved completely and for a clear solution, in to this true solution about 80% (with respect to sample weight) of the liquid hydrophilic polymer (PVP-K30) were added quickly. The mixture was stirred at 500 rpm through a motor pump about 15 minutes. The solution and its contents were allowed to stand; in the solution, fine crystals were began precipitate, where added Dichloromethane were added drop wise in to the container to generate the spherical agglomerates.

The crystals of embelin molecule were collected through filtration and confirmed the shape of the crystal embelin molecule by XRPD and other chemical method. The conclusions through the in vitro dissolution studies were enhance the solubility’s and
the dissolution rate of embelin molecule which helps the better formulation of the drug molecule. Hence the embelin spherical shape crystals has more solubility that the other shapes.

The redirected or reversed fats / cholesterol are processed in liver, the Lowe (1997), Giller et al (1992), Winkler et al (1990), Verger (1984) pancreatic acid (liver juice) play a vital role in the processes of removing and recycling of cholesterol. Where the insulin will be put in to the action by intestinal absorption of very long chain molecules like fatty acid of Goldberg et al (1988), Goldberg et al (1982) triglyceride and hence the extra fat will be reduced or controlled by lipid lowering agents. As defined Giller, T. et a1. (1992), Lipolytic enzymes are water insoluble in nature, hence the enzymes will interact on the water-lipid junctions, this nitration will all the area of pancreatic lipases and also on the homologous hepatic and Shimada et al (1993), Ranganathan et al (1995) lipoprotein lipases inter-phase junctions.

Embelin is one of the natural lipid lowering agents by the base molecule benzoquinon and its hydroxyl group along with its 11 carbon chain. This natural molecule is modified by substitution reactions of the hydrogen atom in the hydroxyl group of embelin molecule generally called as substituted benzene derivatives of embelin molecule. These molecules Upadhyay et al (2008) are used for Lipase mediated diseases. Some of this molecule is are taken up for HPLC method ICH et al (1996) development, the molecules are analysed and validated for parameters viz., Assay, Precision (repeatability, intermediate precision), Linearity and range.

time. Many of the metallic \textit{Rani et al (2010)} zinc (II), \textit{Rani et al (2010)} cobalt (II) and other metallic complex of embelins are being used as specific medical usages.

Many other embelin derivative could be used as \textit{Buchwald, H. et al, (Oct. 1980)} controlled manner for certain medical treatments. Another feature of these embelin derivatives has \textit{Drent et al. (Apr. 1993)} inhibition of lipases at cell levels. In some other usage like lowering the \textit{Liu et al (1994)} plasma triglycerides, increased the lipoprotein density.

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