Today, there is a great interest in the belief that green medicine is safe and dependable when, compared with that of synthetic drugs that have adverse effects. To determine the potential and promote the use of herbal medicine, it is essential to intensify the study of medicinal plants that find place in folklore. Therefore, such plants have to be investigated for better understanding with their properties, safety and efficacy. In the present study the Asiatic bush beech, *Gmelina asiatica* was selected to evaluate the phytochemical, antioxidant, antihaemolytic, antidiabetic, anticancer, antibacterial, larvicidal and pharmacognostical properties in the leaf and stem. Almost the whole plants are being used in traditional medicine for treatment of various diseases.

Anatomical studies of *G. asiatica* leaf showed echinate epidermis cells, trichomes, anomocytic type of stomata and calcium oxalate crystals, which may be considered as distinguishing characters to evaluate the taxonomy of the plant.

The medicinal properties of *G. asiatica* leaf is due to the presence of secondary metabolites in it. In the present study the medicinal properties of this plant is explored to identify its bioefficacy. Phytochemical screening revealed the presence of alkaloids, carbohydrates, glycosides, coumarins, quinones, saponins, steroids, terpenoids, proteins, phytosterols, tannins and flavonoids in the leaves of *G. asiatica*. As per quantitative analyses tannin and flavonoids were found to be 0.042 µg/µL and 0.045 µg/µL respectively in the ethanolic extract.
FTIR analysis showed the presence of eight functional groups like hydroxyl groups, normal polymeric groups, carboxylic acids, alkenyl groups, phenol or tertiary alcohol, alcohols, aliphatic bromo compounds, aryl disulfides and aliphatic aromatic compounds. GC-MS analysis was carried out using ethanol leaf extract and essential oil isolated from *G. asiatica* leaf. GC-MS spectra strongly indicated the presence of 50 bioactive phytochemical compounds in ethanol extract and 8 compounds in essential oil. These compounds were responsible for the antimicrobial, antioxidant and anticancer properties of this plant.

Antihaemolytic effect of the ethanolic extract of *G. asiatica* leaves and the standard Quercetin at 250 µg/mL presented the best profile of haemolysis inhibition with percentage activity of about 14.47 and 62.7% respectively.

Ethanolic extract of *G. asiatica* leaf was tested for their radical quenching ability against DPPH, ABTS, superoxide and hydroxyl radicals. *G. asiatica* leaf extract and quercetin showed DPPH radical scavenging activity with IC$_{50}$ value of 4.42µg/ml and 18.37µg/ml; superoxide scavenging activity with IC$_{50}$ value of 237.82µg/ml and 9.03µg/ml; hydroxyl radical scavenging activity with IC$_{50}$ value of 14.73µg/ml and 6.26µg/ml and ABTS assay the IC$_{50}$ value 12.12µg/ml and 9.39µg/ml respectively. The leaf sample had obvious scavenging activity in a concentration dependent manner.

*In vitro* anti-diabetic activity of *G. asiatica* leaves showed good inhibitory activity against α-amylase and α-glucosidase enzyme and the percentage inhibition varied from 9.78% to 43.48% and 1.88% to 23.466% respectively at concentrations ranging from 100 to 500µg/ml.
The ethanolic extract of *G. asiatica* leaf showed remarkable anticancer potential against human breast cancer (MCF-7 cancer cell line). The extract at the dosage ranging from 7.8 to 1000µg/ml induced a marked cytotoxicity in which depends on concentration. The percentages of viability of cells were estimated as 57.6 to 8.2%.

The larvicidal activity in petroleum ether, chloroform, ethanol and acetone extracts of *G. asiatica* leaf extract were tested in 100µg/ml and it showed activity against third instar larvae of *Aedes aegypti* and *Culex quinquefasciatus* after 24 h exposure. Chloroform leaf extract of *G. asiatica* was highly effective against third instar larvae of *A. aegypti* and *C. quinquefasciatus*. Thus results are very promising in creating new effect and affordable approaches to the control of *A. aegypti* and *C. quinquefasciatus* larvae of dengue fever and filariasis which can acts as ecofriendly larvicides and biopesticides. This serves as a safety method to the individual and communities against mosquitoes. It is a natural weapon for mosquito control.

Antibacterial activity in the aqueous, petroleum ether, chloroform, ethanol and acetone leaf extracts of *G. asiatica* exhibited moderate activity against the tested bacterial strains. The results revealed that, the zone of inhibition ranges from 0.33-9.66mm. The maximum inhibitory activity was against *Actinomyces howelli* and minimum against *P. aeruginosa*. Kanamycin was used as the reference standard. The minimum inhibitory concentration in aqueous, petroleum ether, chloroform, ethanol and acetone extracts of *G. asiatica* leaf against *A. howelli, B. circulans, S. aureus S. pyogenes, E. coli, P. aeruginosa* and *P. vulgaris* ranged from 25-40µl/ml and minimum bactericidal concentration was 30-45µl/ml.
The antibacterial activity of essential oil in the leaves of *Gmelina asiatica* exhibited a very less activity against *Bacillus circulans*, *Pseudomonas aeruginosa* and *Actinomyces howelli* and does not show any inhibitory effect against *Streptococcus pyogenes*, *Proteus vulgaris*, *Staphylococcus aureus* and *Escherichia coli*.

*Gmelina asiatica* is a unique plant containing a rich and rare collection of phytochemicals. It is unparalleled in curing multitude of disorders and has great interest for its potential role in maintaining human health. Thus, the present study strongly establishes the medicinal properties of the common bush beech, *G. asiatica*, and scientifically validates folkloric use of this plant as a remedy for various diseases. The results obtained from phytochemical screening, antioxidant, antimicrobial and anticancer activity of *G. asiatica*, indicate this plant function as a ‘natural herbal medicinal source’ which can be used in pharmaceutical industry.

Additional efforts in molecular level will be carried out to establish the exact mechanism of therapeutic actions of the plant extracts. For the development of better therapeutic agent for clinical assessment, detailed pharmacology and toxicology, including genotoxicity and reproductive toxicology studies need to be performed in order to generate data on the potential short and long-term toxicities as well as affirmed pharmacological actions. The discovery and the application of such natural drugs will play a key role in human as well as veterinary medicines in future.