

Therapeutic Potentiality and Nutritional Value of *Gynura procumbens* in Recent Scientific Reviews

Ranjan Bhowmick*, Pragya Shrivastava

Department of Life Science, Rabindranath Tagore University, Raisen, India

Research Article

Received: 01-Nov-2024, Manuscript No. JAAS-25-151630; **Editor assigned:** 04-Nov-2024, Pre QC No. JAAS-25-151630 (PQ); **Reviewed:** 18-Nov-2024, QC No. JAAS-25-151630; **Revised:** 19-Mar-2026, Manuscript No. JAAS-25-151630 (R); **Published:** 26-Mar-2026, DOI: 10.4172/2347-226X.15.1.005

***For Correspondence:** Ranjan Bhowmick, Department of Life Science, Rabindranath Tagore University, Raisen, India;
Email: ranjanbhowmick01@gmail.com

Citation: Bhowmick R, et al. Therapeutic Potentiality and Nutritional Value of *Gynura Procumbens* in Recent Scientific Reviews. J Agri Allied Sci. 2026;15:005.

Copyright: © 2026 Bhowmick R, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

ABSTRACT

Gynura procumbens (Lour.) Merr. (Family Asteraceae) is a medicinal plant commonly found in tropical Asia countries such as India, China, Thailand, Indonesia, Malaysia, Bangladesh and Vietnam. Traditionally, in many countries, this plant is used for the treatment of a wide variety of health ailments such as blood pressure maintenance, kidney discomfort, Liver and skin problem, rheumatism, diabetes mellitus, Heart disorders, cell damage repairing, cancer, constipation and hypertension. Getting a positive result for many years from these population it has been scientifically studied by many researchers to know the therapeutic potentiality of *G. procumbens* for treatment of various diseases making it a target for pharmacological studies aiming to validate and provide scientific evidence for the traditional claims of its efficacy. This review aims to gather all the required information on the therapeutic potentiality as biological activities and nutritional value of *G. procumbens* to satisfy the traditional believe on this herbal plant.

Keywords: *Gynura procumbens*; Medicinal plant; Biological activity, Therapeutic potentiality; Herbal plant

INTRODUCTION

There are lots of herbal flora have already been diagnosed as blessing of nature to mankind for the main supply of conventional drug treatments [1]. They're big reservoir of numerous effective chemical substances with capability healing houses which might be very a lot vital and effective in present medical technological know-how [2]. Regarding those medicinal residences of those plants, our contemporary scientists are very lots interested and excited and globally admitted and general that the natural elements are essential for international fitness prevention and protection without creating any aspect effect if justified with clinical method and in comparison to modern-day synthetic drugs [3]. For that reason, all styles of pharmacologist or biologist are operating for the looking or invention of safe and powerful natural treatments. Though these herbs have been used by all cultures for the duration of records and thus natural medicinal drug is the oldest shape of health care recognised to mankind, it changed into noted that all medicinal plant life are not secure to intake or to use in remedy because of it's toxicity [4]. Everywhere in the world, mainly in lots of growing international locations, there is a commonplace antique fantasy that natural drugs are non-toxic and secure however in line with Zhang et al., the traditional makes use of flora may also reason destructive outcomes in people or animals [5].

My subjected medicinal plant named *Gynura procumbens* belongs to family Asteraceae is a fast growing evergreen herb which is usually discovered in tropical Asia countries which includes China, Thailand, Indonesia, Malaysia, and Vietnam [6]. Historically, and presently in India, Bangladesh, Myanmar and so forth [7]. In Malay, *Gynura procumbens* is called Sambung nyawa, which means "prolongation of existence," while in chinese, it's far known as Bai Bing Cao, meaning "a hundred ailments." This small plant typically grows to a height of round 1 to 3 meters, featuring a fleshy stem with a purplish tint [8]. The leaves are ovate-elliptic or lanceolate, measuring 3.5–8 cm in length and 0.8–3.5 cm in width, while its flowering heads are slim, yellow, and about 1–1.5 cm lengthy [9]. *G. procumbens* is widely utilized in diverse nations to deal with severe health situations, inclusive of kidney issues, rheumatism, diabetes, constipation, and high blood pressure [10]. The plant is valued for its wealthy chemical composition, which contributes to its massive therapeutic capability [11]. The leaves incorporate vital lively chemical components which include flavonoids, saponins, tannins, terpenoids, and sterol glycosides. It carries several constituents inclusive of kaempferol, quercetin, kaempferol-3-O- β -D-glucopyranoside, kaempferol-three-O-rutinoside, rutin, chlorogenic acid and 3,5-dicaffeoylquinic acid methyl ester, terpenoid, tannin, alkaloid, saponin, and astragaloside [12]. Many researches and research notably reported that ethanolic leaves extract of *Gynura procumbens* extract is ideal required herbal source of bioactive compounds encompass alkaloids chlorophylls, carotenoids and unstable oils [13]. It can have beneficial health effects for intake and will be similarly studied for makes use of in meals enterprise, fitness product, pharmaceutical and medicinal programs [14].

MATERIALS AND METHODS

Nutritional value of *G. procumbens* as on reviewed

According to the report of D. puangpronpitag et al., *Gynura procumbens* is a genuine source of carbohydrate, protein and other minerals which can develop the required nutritional value for living cells [15]. As the found nutritional value of *Gynura procumbens* extract was containing with the contents of moisture was 7.08%, protein was 4.51 g/100 g dry weight and lipid was 0.023 g/100 g dry weight, carbohydrate was 0.0537 to 0.1968 μ g glucose equivalent/100 gm dry weight at EGE 0.1 μ g mL⁻¹. These results explored that *Gynura procumbens* extract is a valuable protein source and that they can create positive effects on free radical scavenging and iron chelating which can be used as preliminary information and develop further to be commercially useful in food industry or health products as medicinal food [16]. The Fourier-transform infrared spectra of polysaccharide samples were studied by Choi et al. In addition, Saiman et al. Studied and analyzed the metabolite content in the root culture of *G. procumbens* for *G. procumbens* biomass containing bio-active compounds and then explore the leaf explants-derived adventitious root culture act as an alternative culture system [17].

Therapeutic importance of *Gynura procumbens*

It is widely used in many different countries for the treatment of a wide variety of health ailments such as kidney discomfort, skin and liver problems, rheumatism, diabetes mellitus, constipation, cardiac disorders and hypertension as *G. procumbens* a valuable plant that contains various chemical constituents that show excellent therapeutic effects [18]. Several studies reported that ethanolic leaves extract of *Gynura procumbens* extract is good natural source of bioactive compounds include alkaloids, chlorophylls, carotenoids, and volatile oils [19]. It may have beneficial health effects for consumption and could be further studied for uses in food industry, health product, pharmaceutical and medicinal

applications [20].

G. *Procumbens*'s pharmacological constituents used in therapeutic application

G. procumbens is a valuable medicinal plant resourced with many good chemical constituents that show excellent therapeutic effects. The leaves contain important active chemical constituents such as flavonoids, terpenoids, tannins, saponins, and sterol glycosides. It contains several constituents including kaempferol, quercetin, kaempferol-3-O- β -D-glucopyranoside, kaempferol-3-O-rutinoside, rutin, chlorogenic acid and 3,5-dicaffeoylquinic acid methyl ester, terpenoid, tannin, alkaloid, saponin, and astragalinin.

Kaewseejan et al. also identified five phenolic acids in Hydroxybenzoic Acids (HBA) phenol that are gallic acid, protocatechuic acid, HBA, vanillic acid, and syringic acid. 4 phenolic acids, inclusive of caffeic acid, p-coumaric acid, ferulic acid, and sinapic acid had been detected in Hydroxycinnamic Acid (HCA) phenol Rosidah et al. carried out an experiment and generated HPTLC profiles chromatograms of methanol extract, butanol and EAF fraction. Required solvent device was ready as ethyl acetate: methanol: water (100:13.5:10) (v/v). Anticipated identity changed into finished at 365 nm and 254 nm. outcomes confirmed that kaempferol-3-O-rutinoside and astragalinin are the most consultant phenolic compounds in Ethanol Fraction (EF) and n-Butanol Fraction (BF). Junoh Kim et al. identified kaempferol-3-O-rutinoside, quercetin-3-O-rutinoside, and isobioquercetin compounds in ethanolic extract on the TLC plate. In different study, estimation of total flavonoid compound extraction from *Gynura medica* leaf was scientifically investigated using response surface methodology. In this experiment high performance liquid chromatography Diode Array Detection (DAD)-electrospray ionization-Mass Spectrometry (MS) system and solvent for the mobile phase was water-0.1% acetic acid (A) and acetonitrile (B) were used. The gradient elution was 0-30 min, linear gradient 10-30% B; 30-45 min, and linear gradient 30-60% B. The flow rate was 0.8 mL/min and the column was operated at 30°C. Noticed peaks were seen with the DAD at 347 nm. Seven peaks of flavonoid compounds were separated and identified by the MS value coupled with the ultraviolet spectrum data.

RESULTS AND DISCUSSION

A review on therapeutic applications and medical significance of *Gynura procumbens*

Antihypertensive and cardioprotective activity: It is a long time fact that the hypertension is one of the maximum big danger aspect for numerous cardiovascular sicknesses. Many researches are already mounted that *G. procumbens* is a secure remedy of this problem. The treatment with *G. procumbens* extract has led to sizeable lower in coronary heart charge, strong poor chronotropic, and poor ionotropic results at rats' right atrium and left atrium respectively. It's far said; *G. procumbens* can decrease the systolic blood pressure and suggest arterial stress in hypertensive rats. Angiotensin (Ang)-converting enzyme performs crucial position in blood strain regulation. The peptide hormone with mighty vasoconstrictive effects converts Ang I into Ang II with a purpose to be reactivated. curiously, the blood stress-reducing effect of *G. procumbens* changed into related to its inhibitory impact on angiotensin-changing enzyme pastime. No longer best that, *G. procumbens* has also direct inhibitory impact on the activity of Ang II. This changed into shown inside the look at that mentioned the inhibition of Ang II-caused contraction of aortic rings treated with fraction of *G. procumbens*. As per the mechanism of action, thru endothelium-established pathways *G. procumbens* in all likelihood antagonizes the vasoconstrictive effect of Ang II that contain the activation of nitric oxide and prostaglandin release. This take a look at additionally expressed that the reduction of inhibitory impact of *G. procumbens* aqueous fraction on Ang II-induced contraction in the presence of cyclooxygenase inhibitor and endothelial nitric oxide synthase inhibitor. This was also supported by any other studies finding which informed that the improved serum nitric oxide stage in hypertensive rats can be handled with *G. procumbens* extract. Any other controlling mechanism of the vasodilatory effect of *G. procumbens* is inhibition of extracellular Ca^{2+} inflow. Vasocontraction due to phenylephrine, calcium and potassium chloride was proven to be antagonized by using *G. procumbens* extracts. This changed into in all likelihood due to the blocking off of receptor-operated and/or voltage based calcium channels in addition to opening of potassium channel. As an antihypertensive agent with cardioprotective interest *G. procumbens* probably serves to its potential to target various mechanisms which includes the renin-angiotensin system and calcium influx in hypertensive situations. In a word, the *G. procumbens* can be use as healing agent in cardiovascular disorders associated with tension in circulatory machine.

Antihyperglycemic activity

Because of numerous motives specially existence style, meals deliver and genetics, resulted expanded sugar degree in blood, Diabetes had been said as one of the common diseases will come as epidemic form for current humans in for the duration of the arena as per reported through WHO. Usually diabetes happens because of low degrees of insulin in the frame, which leads to excessive glucose degrees in the blood. Herbal therapies with *G. procumbens* is quite encouraged to the affected person to minimize the viable side effect of current artificial pills and we may want to lessen the incidence and hazard of diabetes. A study become carried out to determine the anti-diabetic and seasoned-fertility impact of *G. procumbens* on streptozotocin-caused male rats inside 14 days and showed that aqueous extract of *G. procumbens* has a seasoned-fertility impact and own anti-hyperglycemic pastime. However, it showed no impact when publicity to clonal pancreatic cells. An investigation resulted that postprandial hyperglycemia is alleviated by means of *Gynura procumbens* extract in diabetic mice investigated the effect of *G. procumbens* remedy on insulin level. Numerous experiments by way of *G. procumbens* extract effects showed the stimulatory effect of insulin-secreting cellular strains. In some other examine, there were no incredible exchange has been observed in plasma insulin stage in diabetic rats handled with the extracts, suggesting that the hypoglycemic hobby of *G. procumbens* does no longer depend upon insulin tropic hobby but may additionally instead be because of its greater-pancreatic effect.

In addition, a development of interest become seen within the presence of insulin. In every other, *in vivo*, test additionally confirmed a greater uptake of glucose by using muscular tissues of diabetic rats. On glucose uptake, the consequences showed the direct impact of *G. procumbens* extract. Whilst *G. procumbens* changed into used collectively with *Azadirachta indica* or *Andrographis paniculata*, Synergistic effect with more potent hypoglycemic effect became additionally determined. The synergistic impact is believed to be associated with the various variety of energetic compounds gift within the extract mixture. Here the presence of bioactive concepts is indicated and counseled which own insulin mimetic residences in *G. procumbens*. Except those outcomes there are several important researches were finished to establish the antidiabetic advantageous impact of *G. procumbens* in therapeutic applications.

Anticancer

Now a day's cancer is a noticeably enormous disease that can severely influences a first-rate portion of the human population. To get rid of it's future impact opportunity remedies from diverse medicinal flora with anticancerous pharmaceutical homes are cautioned. right here It experiment shown many beneficiary potentiality of *G. procumbence* in opposition to cancerous cellular. It's far shown that inhabitation of the preliminary phase of carcinogenesis may be resulted with the therapeutic use of *G. procumbens*. Ethanolic extract of *G. procumbens* induced a substantial lower in expression and pastime of cytochrome P450 enzymes consisting of CYP3A4, CYP1A2, and CYP1A1 that could result in drop in the conversion of the respective procarcinogens to most cancers triggers. It's miles mentioned that, *G. procumbens* can be used as an powerful chemotherapeutic agent against a huge variety of cancer cellular types, and it exerts its anticancer activities through the modulation of diverse factors of carcinogenesis together with most cancers initiation, cellular proliferation, metastasis, and angiogenesis. Cotreatment studies of *G. procumbens* and chemotherapy tablets also had been carried and reported suitable effects. In a test, cotreatment of with aggregate other tablets consisting of doxorubicin or 5-fluorouracil delivered with *G. procumbens* result in sturdy synergistic effect in opposition to breast and colon cancer cells. In preferred, the blockade of angiogenesis pathways will bring about inhibition of growth, invasion, and metastasis of tumor cells. Approximately 80% lower in azoxymethane-brought about aberrant crypt foci in rats stopping colon cancer while handled with ethanolic extract of *G. procumbens*. *G. procumbens* was shown to exhibit antiangiogenic activity because the treatment caused inhibition within the expression of Vascular Endothelial Growth Component (VEGF) and prevented the formation of new blood vessels on fertilized bird eggs. In a recent study it's far expressed that extract of methanol, ethanol, and ethyl acetate had been examined on U-87 cellular line by MTT-primarily based anti-proliferative assay. effects showed the excessive anti-proliferative impact on U-87 cell line of the methanol extracts of *G. procumbens*. However, in other experiment, it confirmed as the therapeutic co-remedy of *G. procumbens* extract an adversarial effect with cisplatin is carried out and failed to further suppress most cancers cellular proliferation. Therapeutically *G. procumbens* has lengthy been used as traditional treatment for cancers along with leukemia, uterine, and breast cancers and management turned into confirmed to lead to excessive suppression of oral carcinogenesis.

Wound healing enhancement activity

Therapeutic traditional application of *G. procumbent* extract significantly increases the rate of wound healing, by increase regulation of collagen expression and promote angiogenesis. As per the investigation by *G. procumbens* may contents the necessary flavonoids be responsible for wound-healing activity because it lessens lipid peroxidation and promotes the strength of collagen fibers.

Studies showed that antioxidants could play a significant role in the wound healing process and can be an important contributory factor in the wound healing property. Antioxidants have been reported to show a significant role in the wound healing process and expressively improve wound healing and protect tissues from oxidative damage. *G. procumbens* contain a wide array of free radical scavenging molecules and flavonoids were the major naturally occurring antioxidant components in this plant.

Antimicrobial activity

In many study that is established that the antimicrobial properties of *G. procumbens* may be used therapeutically. The antiplasmodial pastime of *G. procumbens* was first pronounced by Vejanan V, et al. The studies show that in all likelihood through direct inhibition of GSK3 or oblique action on pi3K/Akt pathway, *G. procumbens* extract famous chemo-suppression consequences toward malarial parasite lines of *Plasmodium falciparum* 3D7 and *Plasmodium berghei* NK65. The antimicrobial hobby of ethanolic extract of aerial plant components has been set up to expose virucidal and antireplicative activity towards herpes simplex virus HSV-1 and HSV-2. This was showed in a medical trial on sufferers with continual herpes labialis in which treatment with *G. procumbens* herbal gels decreased the quantity of sufferers inflamed with HSV. *G. procumbens* extract also exhibits chemo-suppression outcomes towards malarial parasite strains of *Plasmodium falciparum* 3D7 and *Plasmodium berghei* NK65. Different test showed that *G. procumbens* extract also used for antifungal activity towards fungi which includes *Candida albicans* and *Aspergillus niger*. The outcomes showed evidence that validates the conventional use of *G. procumbens* within the treatment of infections via pathogens which includes herpes simplex virus and malaria parasites.

So the growing occurrence of resistant traces of malaria, viruses, fungus and additionally bacteria to currently available drugs makes the look for alternative therapeutics from natural medicinal plants like *G. procumbens*.

Sexual and reproductive function

Now a day, Infertility is serious health issue due to busy and irregular life style of modern age and also one of the complication of diabetes which can be treated with *G. procumbens*, as the treatment with *G. procumbens* significantly increased sperm count, sperm motility, and reduced the percentage of sperm mortality of diabetic rats. Study was also demonstrated *G. procumbens* has the aphrodisiac properties as evidenced by an increase in mounting frequency of diabetic rats following the treatment. In term of enzymatic activity, *G. procumbens* was found to promote testicular lactate dehydrogenase activity. This finding can be correlated to improved fertility because lactate dehydrogenase is known to play a crucial role in spermatogenesis. Overall, studies clearly suggest that *G. procumbens* may be use therapeutically to improve the reproductive function of infertile diabetic males, particularly through an increase in sperm counts, quality, and motility.

Anti-inflammatory activity

G. procumbens is a folk medicine and has excellent anti-inflammatory activity prevent the increase in ear thickness of mice caused by croton oil-induced inflammation. When the ethanolic extract is tested, it showed significant therapeutic application of ethanol extract on the wounds of tested animals showed quick dermal healing signs, less scar width, and considerable faster healing rate when compared with control group treated with saline. In an experiment, immunomodulatory activity of *G. procumbens* was tested using mice splenic cells. Ethanolic extract of *G. procumbens* at dose 0.1 and 1.0 µg/mL caused greater proliferation of CD4+CD25+, CD4+CD62L-, CD4+CD62L+, CD8+CD62L-, and CD8+CD62L+ T cells but lower proliferation of B220+ cells when compared to the higher dosage at 10 µg/mL. However, it was shown to promote high proliferation of B cells at dosage of 10 µg/mL. These results have demonstrated that the concentration used in the experiment is the determining factor for whether *G. procumbens* acts as an immune stimulator immune suppressant. As the immune system are closely linked to inflammatory effect of cell, the immune system plays a crucial role in the pathogenesis of the inflammatory disorder known as atherosclerosis which can be treated successfully using statins—drugs with anti-inflammatory properties in therapeutic application.

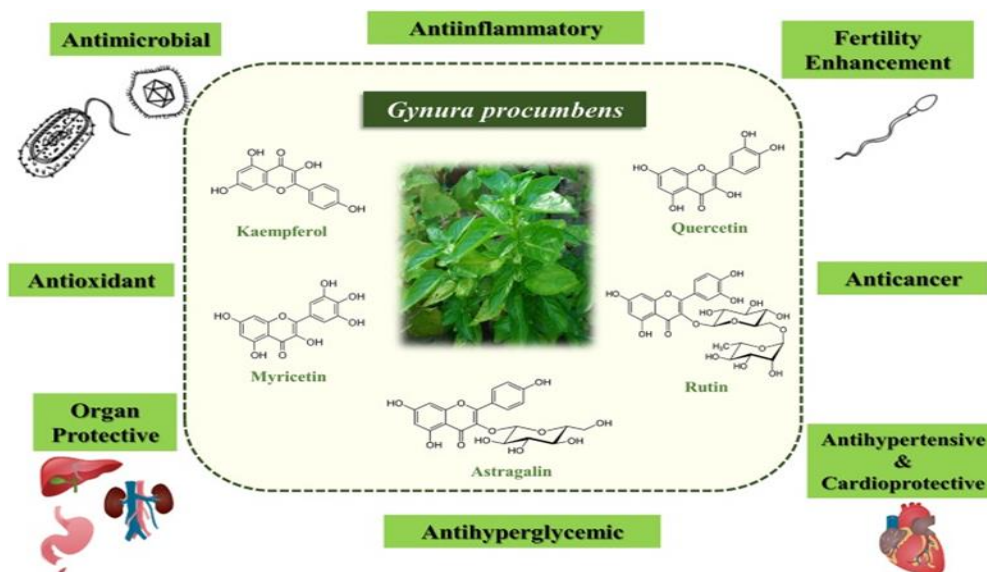
Antioxidant activity

The herbal flowers with antioxidants play a critical position in promoting health by neutralizing harmful unfastened radicals within the body and lowering oxidative pressure related to the treatment of numerous continual illnesses and getting older trouble. The have a look at showed that *G. procumbens* has notable antioxidant assets. In an experiment, different extracts of *G. procumbens* were assessed via DPPH assay to degree its loose radical scavenging potential. Right here lipid peroxidation is a commonplace end result of oxidative pressure, the antioxidative effect of *G. procumbens* become uncovered whilst it inhibited lipid peroxidation with the median effective awareness of 2.75 mg/mL. The administration of methanol extract before oxidative pressure induction turned into capable of opposite the elevation of plasma lipid peroxidation in tested animals found out that the basis extract has the highest antioxidant interest whilst in comparison to the opposite components of the plant. Among special sorts of the extracts, the ethanolic extract of *G. procumbens* exhibited the best percent of DPPH inhibition. Along with ferric reducing assay, Trolox equal, β -caroten–linoleic acid, and xanthine oxidase inhibitory assays, there are several antioxidant assays verify the antioxidant belongings of *G. procumbens*. So, in keeping with a lot of these studies it can be determined that the *G. procumbens* can be used therapeutically to enhance the subjected health circumstance.

Organ protective effect

Many researchers have confirmed that the *G. procumbens* can protect several internal organs with its photochemical potentialities required for its therapeutic use. Previous research on *G. procumbens* also showed gastroprotective effect. Mahmood et al., reported that administration of the ethanolic extract significantly lessened the areas of ethanol-induced gastric ulcer in rats; with a reduction of submucosal edema and infiltration of leukocytes. This search has encouraged the researchers to further explore the protective effect of *G. procumbens*. In another study on skin damage, the antiphotaging property of *G. procumbens* has been tested and was found to cause a significant inhibition in the expression of matrix metalloproteinase induced by ultraviolet irradiation in human dermal fibroblasts. The results obtained could be associated with ROS scavenging activity of *G. procumbens*. It causes inhibition of mesangial cell proliferation and DNA synthesis. The suppression of regulator proteins for cell proliferation was found to be responsible for this observed effect. In addition, as it was shown to attenuate the ethanol-induced lipid accumulation in mice livers, *G. procumbens* was found to have a hepatoprotective effect by modulating lipid metabolism-related genes, specifically via MAPK/SREBP- 1c-dependent and independent pathways. Based on these findings, *G. procumbens* has significant potential as an organoprotective agent; mainly due to its antioxidative properties which exert a regulatory effect at the level of gene expression. *G. procumbens* also applicable therapeutically in neurological treatment as neuroprotective agent (Figure 1).

Figure 1. Phytochemicals and therapeutic use of *G. Procumbens*.



The details of most of the pharmacological activities of *G. procumbens* have shown in Table 1. A similar type of study and data collection was also done in previous research papers.

Table 1. Overall pharmacological activities of *G. procumbens*.

Activity	Type of extract	Mode of action
Antihypertensive and cardioprotective	Methanolic leaf extract (Butanol fractions and subfractions)	It causes anti-contraction activity on the left atrium by promoting relaxation.
	Ethanollic leaf extract (Butanol fraction)	It decreases mean arterial pressure and also decrease in heart rate in rats.
	Ethanollic leaf extract (Aqueous fraction)	It decreases contraction of rat aorticring by activating AngI and AngII. <i>In vivo</i> , vasorelaxant effect is potentiated and blood pressure dropping effect of bradykinin resulted.
	Ethanollic leaf extract (Aqueous fraction)	Lessened stands for arterial pressure of hypertensive and normotensive rats with inhibition of ACE activity.
	Ethanollic leaf extract (Aqueous)	It causes vasorelaxation of isolated aorta, negative ionotropic effects in the left atrium, negative chronotropic effect in right atrium.
Anticancer	Ethanollic leaf extract	It showed decreased total of azoxymethane induced aberrant in rats.
	Ethanollic leaf extract	in DMBA treated rats, it acts as repressed tumor incidence.
	Ethanollic leaf extract	It causes as anti-proliferative effect on liver cells of rats prompted by DMBA.
	Ethanollic leaf extract	It acts to reduce the proliferation of mammary gland epithelial cells.
	Ethanollic leaf extract	It shows decreased DMBA-induced breast cancer development in rats.
		It causes blockade of VEGF receptor through inhibition of COX-2, tyrosine kinase, and MMP activity.
	Ethanollic leaf extract	It reduces COX-1 activity, tyrosine kinase, and MMP activity.
	Ethanollic leaf extract (Ethyl acetate fraction)	It acts to inhibit colon cancer cells proliferation and potentiated efficacy of 5-FUbutantagonism effect with cisplatin.
	Ethanollic leaf extract: Chick CAM embryo: Inhibition of angiogenesis.	
Anti-inflammatory	Ethanollic leaf extract	T cells: Increased proliferation B cells: Decreased proliferation.
	Ethanollic leaf extract	It causes to increase in T cells proliferation.
	Ethanollic leaf extract	It enhanced wound healing rate: Less inflammatory cells at granulation tissue, more collagen with angiogenesis.
Antihyperglycemic	Aqueous leaf extract	It causes high α -glucosidase inhibition activity, amplified activity of GK and PDH.
	Ethanollic leaf extract (Ethyl acetate, n-butanol, aqueous)	It lowers fasting blood glucose levels indiabetic rats.
	Ethanollic leaf extract	It causes fasting of blood glucose levels reduced in diabetic rats.
	Ethanollic leaf extract	Blood glucose level gets reduced; improve pancreatic islet condition, increased insulin expression.
	Ethanollic leaf extract	Fasting blood glucose levels get reduced indiabetic rats. Pancreatic secretion improved.
Antimicrobial	Dichloromethane, ethyl acetate fraction leaf extract.	Antibacterial activity against gram-positive and gram-negative bacteria, antifungal activity.
	Ethanollic leaf extract and aqueous extract	Destroying growth of malarial parasites and upsurge survival time of infected mice.
	Aerial ethanolic extract	Virucidal action againstHSV-1 and HSV-2, reduced infection of HSV 1 in clinical trial patients with recurrent herpes labialis.
Sexual and reproductive	Aqueous leaf extract	Increased sperm count, improved sperm mortality, increase testicular LDH
	Aqueous leaf extract	Increased sperm count, improved sperm mortality.

Commercial uses of *Gynura procumbens*

Especially Chinese industrialists are using this plant leaves in food industry, as an element incorporated into products such as tea, kimchi, coffee powder, chocolate, candy and chewing gum. Not only these, *G. procumbens* also is using in preparation of personal care and cosmetic products like hand-washing solution, hand sanitizer, oral sprays, facial masks and skin care creams. The patents show and support the essentiality and commercial utility of the new application required in modern human life.

CONCLUSIONS

In many medicinal plants that are highly beneficiary to mankind as therapeutic application, *G. procumbens* can be considered as a premium one. All the studies on these plants support this quotation. *G. procumbens* contains some very essential phytochemicals and antioxidants that can be applied therapeutically and have been used for various medical conditions of the human body for many centuries. Not only in any disorders, it also can be taken in a regular diet to get support with some nutritional elements required for our body maintenance. Its cardioprotective, anticancerous, antidiabetic and other therapeutic activities should be taken into consideration with preparing valuable drugs and supplements required for a healthy generation.

ACKNOWLEDGMENT

Ranjan Bhowmick would like to acknowledge Rabindranath Tagore University, Bhopal, MP, India for giving him the scope to write this paper and also thankful to Dr. Pragya Shrivastava for her cordial support with the required information to prepare this review.

AUTHOR CONTRIBUTION

Ranjan Bhowmick participates in data collection, drafting and revising it critically for important intellectual content.

CONFLICTS OF INTEREST

The author has none to declare.

REFERENCES

1. Abrika OS, et al. Effects of extracts and fractions of *Gynura procumbens* on rat atrial contraction. *J Acupunct Meridian Stud.* 2013;6:199-207.
2. Ketuly KA, et al. Acute toxicity study and wound healing potential of *Gynura procumbens* leaf extract in rats. *J Med Plants Res.* 2011;5:2551-2558.
3. Afandi A, et al. Antioxidant properties of *Gynura procumbens* extracts and their inhibitory effects on two major human recombinant cytochrome P450s using a high throughput luminescence assay. *Asian J Pharm Clin Res* 2014;7:36-41.
4. Agustina D, et al. Anticarcinogenesis effect of *Gynura procumbens* (Lour) Merr on tongue carcinogenesis in 4NQO-induced rat. *Dent J.* 2006;39:126-132.
5. Ainsworth EA, et al. Estimation of total phenolic content and other oxidation substrates in plant tissues using Folin-Ciocalteu reagent. *Nat protoc.* 2007;2:875-877.
6. Akowuah G, et al. Effects of *Gynura procumbens* leaf extracts on plasma lipid peroxidation and total antioxidant status in CCl₄-treated rats. *Nat Prod J.* 2012;2:247-251.
7. Akowuah GA, et al. Flavonoid identification and hypoglycaemic studies of the butanol fraction from *Gynura procumbens*. *Pharm Biol.* 2002;40:405-410.
8. Akowuah GA, et al. The effect of extraction temperature on total phenols and antioxidant activity of *Gynura procumbens* leaf. *Pharmacogn Mag.* 2009;5.
9. Algariri K, et al. Hypoglycemic and anti-hyperglycemic study of *Gynura procumbens* leaf extracts. *Asian Pac J Trop Biomed.* 2013;3:358-366.
10. Armaghanshafaie, et al. Evaluation of toxicological and standardization parameters and phytochemical investigation

- of *Ficus deltoidea* leaves. Am J Biochem Mol Biol. 2011;1:237-243.
11. Mahmood AA, et al. Anti-ulcerogenic activity of *Gynura procumbens* leaf extract against experimentally-induced gastric lesions in rats. J Med Plants Res. 2010;4:685-691.
 12. Ashraf K, et al. Comprehensive review on *Curcuma longa* Linn.: Phytochemical, pharmacological and molecular study: A review. Int J Green Pharm 2017;11:1-15.
 13. Ashraf K, et al. Phychemistry, phytochemical, pharmacological and molecular study of *Zingiber officinale* Roscoe: A review. Int J Pharm Pharm Sci. 2017;9:8-16.
 14. Chang CC, et al. Estimation of total flavonoid content in propolis by two complementary colorimetric methods. J Food Drug Anal. 2002;10.
 15. Hew CS, et al. The anti-cancer property of proteins extracted from *Gynura procumbens* (Lour.) Merr. PloS One. 2013;8:e68524.
 16. Choi SI, et al. *Gynura procumbens* extract alleviates postprandial hyperglycemia in diabetic mice. Prev Nutr Food Sci. 2016;21:181.
 17. Dwijayanti DR, et al. *Gynura procumbens* ethanolic extract promotes lymphocyte activation and regulatory T cell generation *in vitro*. J Trop Life Sci. 2015;5:14-19.
 18. Dwijayanti DR, et al. Immunomodulator testing on ethanol extract of *Gynura procumbens* leaves to *Mus musculus* adaptive immune system: *In vitro* study. J Exp Life Sci. 2014;4:10-14.
 19. Gofur A, et al. Gene p53 mutations after the induction of 7,12-Dimethylbenz (a) anthracene (DMBA) and administration of anti-carcinogenesis properties of *Gynura procumbens* in Sprague Dawley rats. Biomed Eng. 2015;1.
 20. Getie M, et al. Evaluation of the release profiles of flavonoids from topical formulations of the crude extract of the leaves of *Dodonea viscosa* (Sapindaceae). Pharmazie. 2002;57:320-322.