

in China in 1990 [Foster]. Its goal was to confirm the scientific data and treatment of Chinese *Rhubarb* utilized by Chinese Pharmacopeias [15].

Taxonomical Description

Despite the fact that the species in Palmata family can be effectively distinguish from those in different segments by the palmate lobed leaves, the distinctions among types of Palmata family are questionable and for the most part dependent on the profundity of leaf division, that is, the leaves of *Rheum officinale* are lobed and that of *Rheum palmatum* are half-separated, while, that of *Rheum tanguticum* and *Rheum laciniatum* are separated and direct, individually. It is outstanding that morphological characters are impacted by ecological factors and may shift during various developmental phases of plants. During our field review, *Rheum palmatum* and *Rheum tanguticum* were observed harder to be distinguished than *Rheum palmatum* and *Rheum officinale*. Many middle of the road characters among parted and half parted leaves can be seen with the expansion of populaces. In fact, *Rheum Tanguticum* is at first distributed by Regel as an assortment of *Rheum palmatum* [20].

Chinese *Rhubarb* can deliver as high as a “six to ten-foot jointed stalk,” with inexactly spread groups of blossoms along the tips that develop red in color from their regularly white or yellow blooms. Its leaves are fairly “huge, spiked, and hand - molded,” developing in width of at any rate a few feet. It is important to understand that only those types of *Rheum* with lobed leaves are certified for their medicinal use. Therefore, garden rhubarb, *R. Rhubarbarum*, just as some other assortment of species with either “undulating or ‘wavy’ leaves” are not founded for any medicinal reason. Moreover, one can decode Chinese *rhubarb* by its somewhat thick, deep roots while the perennial garden plant is composed overwhelmingly of “flashy buds and rhizome.”

Phytochemistry

Plants contain a variety of secondary metabolites such as tannins, terpenoids, alkaloids, flavonoids, phenols, steroids, glycosides, saponins, and anthraquinones which confer them a wide variety of pharmacological properties. It is, therefore, essential to identify the phytochemical constituents from medicinal plants employed in the traditional system for the treatment of various ailments. Moreover, examinations concerning antimicrobial exercises of medicinal plants can result in the alternate assets of therapeutic agents [21].

Medicinal plants are currently in extensive significance view because of their unique attributes as a big supply of healing phytochemicals that could result in the improvement of novel drugs. The vast majority of the phytochemicals from plant sources, for example, flavonoids and phenolics have been accounted for to have positive effect on health and cancer prevention. Modern Mediterranean and DASH (Dietary Approaches to Stop Hypertension) integrate a wealthy diet of phytochemicals from fruit and vegetable sources as the plant-based diet proved to extend the lifespan in Okinawan people, which has the largest number of centenarians. High content material of flavonoids and phenolics in medicinal plants has been related with their antioxidant exercises that play a role in the prevention of the development of age-related disease, especially cause by oxidative pressure. With respect to the gainful phytochemicals in medicinal plants, the research on medicinal plants especially is as significant as the exploration on ordinary medications [22].

Significant phytoconstituents of the plant include anthraquinones (aloe-emodin, physcion, emodin, chrysophanol, and rhein) and stilbenes (resveratrol and piceatannol) which holding anti-cancerous activities against prostate cancer, breast cancer, colon cancer, lymphoma, and leukemia. It is reported that phytoconstituents, oxanthrone esters (revandchinone-1, revandchinone-2, revandchinone-3, and revandchinone-4) demonstrated noteworthy antimicrobial activity against different microorganisms, namely, *Staphylococcus aureus*, *Bacillus subtilis* (Gram positive), *Klebsiella aerogenes*, *Chromobacterium violaceum*, *Pseudomonas aeruginosa*, (Gram negative), *Rhizopus oryzae*, and *Aspergillus niger*. Ethanolic extracts of the rhizome display antidiabetic and gastroprotective activities [23].

Anthraquinone is the most important class of phytochemicals, which is accountable for its pharmacological activities. These constituents are fundamentally present in rhizomes and roots. The predominant members of anthraquinone class consist of aloe-emodin, chrysophanol, emodin, rhein, and physcion, which might be proved as anticancer agents [24].

Rheum palmatum contains 5–10% tannins (gallotannin, catechin, and procyanidin). Tannins are phenolic compound discovered in numerous herbs and normal nourishments, for example, tea and sorrel. Tannins are astringent and are traditionally utilized for assortment of oozing or wet skin conditions. Therapeutically, tannins have been employed to deal with inflamed mucus membranes and diarrhea [25].

Pharmacological properties

Many plant species belonging to different families have been reported to have aptitudinal traditional medicinal usage by different communities of peoples across globe. However, nowadays, we have new and different medicines for these diseases, which unfortunately are accompanied by various side effects. Subsequently, there is a dire need to have the active principals of natural origin which can be utilized for the treatment and additionally counteractive action of illnesses/infections with no side effects. Thus, there has been an increasing interest for characteristic plant items as these are increasingly good and safe to the human body with practically no harmful symptoms [26].

Antioxidant activity

Natural constituents such as polyphenols, phenolics, tannins, flavonoids, and terpenes possess antioxidant property to scavenge “free radicals” [27]. Antioxidant ability of phenolic compound is usually due to their reducing properties. Study regarding medicinal plants and vegetables revealed that plants are the great source of anti-oxidant properties. In biological systems, these plants are capable of applying against several oxidative stresses [28]. Since oxidative-stress is one of the reasons for the progression and development of certain lethal disorders and life-threatening diseases such as atherosclerosis, cancer, diabetes, neuronal degeneration, hepatotoxicity, and hyperlipidemia. Antioxidants from plant basis might be valuable in disease anticipation and treatment. Rather than commonly applied antioxidants such as butylated hydroxyl toluene (BHT) and butylated hydroxyl anisole (BHA) which have been limited, because of their toxicity and DNA harm induction-potential. Aqueous and methanolic root extracts of *Rheum* plant are reported to have anticancer and antioxidant potential [29]. In Chinese medicine, *Rheum palmatum* is utilized in the treatment of malignant growth and liver infirmities. The compounds such as maesopsin and marsupsin acquired from the root/rhizome extracts of *Rheum* are found to have antioxidant activity [11]. According to research based study, it has been reported that anthraquinone derivatives, for example, emodin, aloe-emodin, chrysophanol, rhein, and physcion have anti-angiogenic activity, by averting blood vessel development in zebrafish embryos [30].

Nephroprotective activity

The impacts of toxic-metals on the kidney have been recognized for a long time. Nephrotoxicity may happen because of therapeutic or occupational exposure to these toxic metals. Heavy metals will in general collect in kidneys where they may create a wide range of functional and morphological impacts [31]. The nephroprotective activity of both the portions (water-insoluble and water-soluble) of alcoholic root extract of *Rheum* has been built up. The defensive impact of water-dissolvable extract is articulated on every one of the sections (S-1, S-2, and S-3) of the proximal tubule of kidney against mercury chloride, cadmium chloride, and potassium dichromate-induced nephrotoxicity in rodents. The water-insoluble part was found to have defensive impact on S-2 section only. The impact has been proposed due to the tannins present in the portion [32].

Antibacterial activity

Antibacterial activity of a crude-extract from *Rheum palmatum* and its chief bioactive compounds (emodin, aloe-emodin, rhein, physcion, and

