

A review on antihyperlipidemic activity of plant profile of *Quinoa Chenopodium* and *Cynodon dactylon*

Remark	HDL Cholesterol	LDL Cholesterol	Triglycerides
Good	50 or higher	Less than 130	Less than 200
Borderline	40-49	130-159	200-399
High	Below than 40	More than 160	More than 400

Table no. 1

INTRODUCTION

In both industrialized and developing nations, hyperlipidemia and cardiovascular ischaemic disorders rank high among the top causes of death and disability. Dyslipidaemias and excessive cholesterol mostly cause ischemic disorders. When there are excessive amounts of lipids (mostly cholesterol and triglycerides) and/or lipoproteins in the blood, it is referred to as hyperlipidemia, hyperlipoproteinemia, or dyslipidemia. Blood lipids include a variety of fatty substances, the most prevalent of which are cholesterol and triglycerides. Involved in cellular structure and function, cholesterol is a circulating lipid in the circulation. In a nutshell, triglycerides (TG) are the fuel that the body either uses right away or stores in fat cells. TGs may be absorbed from the intestines or produced in the liver from dietary sources. Epidemiological evidence suggests that high optimum of HDL (Table no. 1) in the blood have a protective influence, while scientific evidence shows that high levels of cholesterol and low-density lipoprotein (LDL) in the blood cause atherosclerosis in humans (Sharma et al. 2007).

Numerous factors contribute to the development of atherosclerosis, including endothelial damage, hyperlipidemia, inflammatory and immunologic factors, plaque erosion or rupture, hypertension, and smoking. Atherosclerosis frequently remains asymptomatic until plaque stenosis reaches 70 to 80% of the vessel's diameter.

Atherosclerosis originates after underlying endothelial damage occurs, which appears to stem from the loss of nitric oxide within the endothelium. This process leads to increased inflammation directly around the site of dysfunction, permitting the accumulation of lipids within the innermost layer of the endothelial wall. The lipids are then engulfed by macrophages, leading to the establishment of "foam cells." This cholesterol build-up within the "foam cells" causes subsequent mitochondrial dysfunction, apoptosis, and, ultimately, necrosis of the underlying tissues. Smooth muscle cells encapsulate the pack of "foam cells" or debris, which produces a fibrotic plaque that inhibits the underlying lipids (debris) from being destroyed. (Fredrickson et al. 2023)

Medicinal uses of plants, either in their entirety or in part, are known as herbal remedies. Herbal medicine is an integral part of many different medical systems, including traditional Ayurvedic, Homoeopathic, and Naturopathic practices. Herbal remedies have made use of plant parts for thousands of years, including seeds, foliage, stems, bark, roots, flowers, and extracts from all of the above. Herbal medications may be found in many forms and often need some kind of preparation prior to use (**Winslow et al. 1998**). The most common ways to acquire them are in bulk as dried plants or plant pieces, or insecurely packaged for use in herbal infusions and teas. Fluid extracts generally as maceration products and hydroalcoholic tinctures are more potent preparations of plant remedies. The specifics of the plant's active chemicals dictate the best way to prepare it (**Bodhisattwa et al. 2011**).

When it comes to treating conditions like diabetes, liver disease, and degenerative disorders associated with ageing, traditional medicine makes extensive use of polyherbal preparations. The efficacy of combination treatment in treating complicated disorders involving several pharmacological targets is now well acknowledged. In order to address a wide range of illnesses, modern polyherbal formulations using extracts, active fractions, and active principles are necessary, building upon historic understanding

of polyherbal preparations. Research in pharmacology and toxicology must determine the necessary components and the exact proportions of these components. Research on the results of different combinations of ingredients and permutations is essential (**Subramoniam; Annals of Phytomedicine. 2014**)

According to polyherbal treatments, the pharmacological substances that are included within them are synergistic, potentiating, agonistic/antagonistic, and they operate together in a dynamic manner to create therapeutic effectiveness with minimal adverse effects (**Esmail et al. 2015**).

Plant Profile

Quinoa chenopodium

Quinoa (*Chenopodium quinoa*) is a plant of the Amaranthaceae family and its main origin is South America, dating back several millennia. Quinoa was first cultivated over 5000 years ago and due to its nutritional content and health benefits it is known as “the mother of all grains”. It has nutritional and medicinal value. Quinoa plant has a whole grain structure and is an excellent source of

protein and contains an essential amino acid (lysine), which is not found in cereals. The bioactive compounds of quinoa include phytosterols, phytochemicals, dietary fiber, vitamin E, zinc, and iron with high antioxidant and anti-inflammatory properties that play an important role in reducing the risk of cardiovascular disease (**Ruben et al. 2017**) Active components abound in quinoa as well; polyphenols, flavonoids, saponins, polysaccharides, peptides, and ecdysone balance nutrition, improve body function, control blood sugar, lower blood lipid, boost anti-oxidation and anti-inflammatory action, and prevent and treat cardiovascular diseases. For older persons as well as those with chronic conditions such as diabetes, hypertension, hyperlipidemia, and heart disease, quinoa is thus very appropriate. Quinoa is superior than other grains and has become a very nutritious food fit for human consumption because of its whole nutritional worth and edible functional qualities (**Zhang et al. 2024**)

It was staple food for the Incas region people and still a prominent food source for their indigenous

descendants. The world's main producers are Bolivia, Peru and the United States. In 2008, these two countries accounted for 92% of quinoa produced in the world. In India, Andhra Pradesh and Uttarakhand are emerging as the main cultivators of quinoa. In 2013, Uttarakhand signed a horticulture research agreement with Peru to grow quinoa in the state and research institutes in Andhra Pradesh have successfully developed local varieties of the crop (**Singh et al 2016**).

Cynodon dactylon

Cynodon dactylon Family: Graminae, is a creeping grass found in warm climates all over the world between 45 degrees_ south and north latitudes. *C dactylon*, commonly known as Dhub grass considered sacred for praying lord Ganesha, is available throughout the year. The juice of the plant is astringent and is applied externally to fresh cuts and wounds. It is also useful in the treatment of catarrhal ophthalmia, dropsy, hysteria, epilepsy, insanity, chronic diarrhea, and dysentery (**Dilipkumar; Acta Poloniae Pharmac. 2008**) The plant is a folk remedy for anasarca, calculus, cancer, carbuncles, cough, hypertension, snakebites, stones, gout, fever, skin diseases, and rheumatic infections. It has also

antioxidant properties and central nervous system depressant activities and is also used as an antidiabetic and antiviral agent (Neeli et al. 2007). The rhizome is used as an anti-inflammatory, diuretic, antiemetic, and purifying agent, and also in treating dysentery (Singh et al. 2008).

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