

Chapter 8

Pomegranate Seeds: The Antioxidant Marvel and Its Therapeutic Journey

Sayedna Sania Seher

National University of Science and Technology, Islamabad, Pakistan

Nida Ali Ali

National University of Science and Technology, Islamabad, Pakistan

ABSTRACT

Pomegranate (Punica granatum) seeds are famous for their rich phytochemical composition, especially for antioxidant polyphenols. The therapeutic potential of pomegranate seeds and their bioactive ingredients is discovered in this abstract. The main bioactive components of pomegranate seeds like polyphenols, ellagic acid, and anthocyanins, exhibit antioxidant qualities. These components are crucial for neutralizing dangerous free radicals, which reduces inflammation and oxidative stress. Pomegranate seeds have a variety of therapeutic advantages. These include benefits that are neuroprotective, cardioprotective, anti-diabetic, anti-inflammatory, and anti-cancer. Pomegranate seeds also have antimicrobial qualities, improve immunological function, and regulate lipid metabolism. Promising indications have been presented by experimental research and trials to support the health-promoting properties of pomegranate seeds. These studies suggest possible uses in the treatment and prevention of diseases like diabetes, cancer, heart disease, metabolic disorders, and neurological disorders.

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Table 1. List of abbreviations

Abbreviation	Explanation
SOD	Superoxide Dismutase
EGCG	Epigallocatechin Gallate
LDL	Low-density lipoprotein
HDL	High-density lipoprotein
AMPK	AMP-activated protein kinase
LOX	Lipoxygenase
COX	Cyclooxygenase
CRP	C-reactive protein
NSAIDs	Non-steroidal anti-inflammatory drugs
WAT	White adipose tissue
BAT	Brown adipose tissue
AMPK	AMP-activated protein kinase

INTRODUCTION

Pomegranate (*Punica granatum*) (R.-F. Wang et al., 2004) emerges as a true marvel, with its jewel-like seeds harboring a treasure trove of bioactive compounds that gained the attention of researchers and health enthusiasts alike. The focus of this chapter is to unravel the importance of pomegranate seeds, exploring their status as an antioxidant marvel and tracing their therapeutic journey through the realms of science and medicine (Ge et al., 2021).

Pomegranates have gained high regard by many different cultures, originated in ancient Persia. Pomegranates have been associated with longevity, fertility, and good health. They are prized for their culinary appeal as well as their alleged therapeutic qualities. But it is only recently that researchers have explored the depths of pomegranate seeds and found a wealth of bioactive substances that add to its potential for use as a medicine. Pomegranate seeds' high level of antioxidant capacity is the central finding of this search. The protectors of cellular health, antioxidants are crucial in scavenging free radicals and oxidative stress. Because of their complex combination of polyphenolic chemicals, pomegranate seeds are one of nature's most prevailing agents against oxidative imbalance (Kaseke, Opara, & Fawole, 2021).

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