



Medicinal and antimicrobial properties of pigeon pea

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Abstract

Pigeon peas, scientifically known as *Cajanus cajan*, are renowned for their extensive health benefits, including promoting growth, aiding blood pressure control, reducing anemia risk, and enhancing heart health. With a high protein and folate content, they support growth and development, particularly in low-resource regions affected by anemia. Additionally, their nutrient composition aids in energy production and immune system strengthening. The legumes are also beneficial for heart health and digestion due to their potassium, fiber, and low cholesterol levels. Furthermore, *Cajanus cajan* exhibits significant antimicrobial properties against various pathogenic organisms, highlighting its potential as a natural remedy for infections. As a widely consumed staple globally, pigeon peas hold promise for enhancing health and addressing dietary deficiencies.

Keywords: Pigeon pea, *cajanus cajan*, antimicrobial, health benefits, nutrition

Introduction

Pigeon peas are linked to a broad range of notable health benefits, including promoting growth, supporting blood pressure control, reducing anemia risk, and enhancing heart health. They may also support weight loss, aid digestion, bolster the immune system, increase energy, and relieve inflammation. Scientifically named *Cajanus cajan*, pigeon peas are a legume of the Fabaceae family. These tropical seeds are often combined with grains such as maize or sorghum, or processed into flour for bread. Due to their mild flavor, they are typically blended with other ingredients in recipes. Their value has established them as a staple crop globally.

Health Benefits of Pigeon Peas

Over time, these legumes have earned a strong reputation for specific health benefits. Let's explore the key advantages offered by pigeon peas. Potassium, a principal mineral in pigeon peas, is a known vasodilator that relaxes blood vessels and may lower blood pressure. For individuals with hypertension, integrating pigeon peas into the diet can be advantageous.

Pigeon Pea in Growth and Development

Pigeon peas are an essential dietary staple in many regions due to their dense protein content. A single cup of cooked peas may provide 11 grams of protein. Protein is crucial for growth and tissue repair, serving as the framework for cells, muscles, and bones, as well as for regular healing and regeneration in the body.

The high folate content in pigeon peas has physiological significance. Folate deficiency is linked to anemia and certain neural tube defects in developing fetuses. Anemia remains a prevalent health issue in many tropical and low-resource regions, underscoring the importance of pigeon peas in these areas. A single cup of pigeon peas is reported to provide over 110% of the recommended daily intake for folate. All parts of the pigeon pea plant, including leaves, seeds, and peas, have traditionally been used to address inflammation. Organic compounds in these peas may rapidly ease swelling. A paste made from mashed pigeon peas was commonly used as a traditional remedy for piles

(hemorrhoids). Rich in nutrients yet low in calories, saturated fat, and cholesterol, pigeon peas are diet-friendly. Dietary fiber and nutrients in pigeon peas can help maintain satiety, boost metabolism, and deter weight gain by converting most nutrients into energy rather than fat.

Pigeon pea to Boost Energy and Potentially Strengthen Immune System

Pigeon peas efficiently convert nutrients into energy, largely due to their B vitamin content. Niacin and riboflavin facilitate carbohydrate metabolism and may prevent fat accumulation, thereby supporting sustained energy. These benefits are for individuals facing demanding work or climates that diminish energy. Consuming raw green pigeon peas retains the highest levels of vitamin C, since cooking can reduce levels by about 25%. To boost, choose uncooked peas. Vitamin C stimulates white blood cell production and acts as an antioxidant, promoting robust immunity.

Pigeon pea to help and Promote Heart Health and improve digestion

The interplay of potassium, fiber, and low cholesterol makes pigeon peas well-suited for promoting heart health. Potassium reduces cardiac stress by lowering blood pressure, while fiber helps regulate cholesterol and reduce atherosclerosis risk. Like other legumes, pigeon peas provide abundant dietary fiber, which facilitates digestion. Fiber increases stool bulk and ensures regularity, reducing inflammation, constipation, bloating, cramps, and diarrhea. This part examines the antimicrobial activity of *Cajanus cajan* L. in more depth.

Cajanus cajan L. has exhibited notable antimicrobial activity against multiple pathogenic organisms. Extracts from the plant's leaves, seeds, and roots have demonstrated antibacterial effects, particularly against *Staphylococcus aureus* and Gram-positive bacteria. Reported minimum inhibitory concentrations (MICs) range from 0.380 to 0.409 mg/mL against selected bacterial strains. The leaves of *Cajanus cajan* L. contain various bioactive constituents such as flavonoids, stilbenes, isoflavones, coumarins, and triterpenes, which are implicated in pharmacological

activity. The antimicrobial effects of *Cajanus cajan* L. are attributed to these compounds, which also participate in ending radicals and reducing factors associated with the etiology of chronic diseases.



Fig 1: Leaf of *Cajanus Cajan*

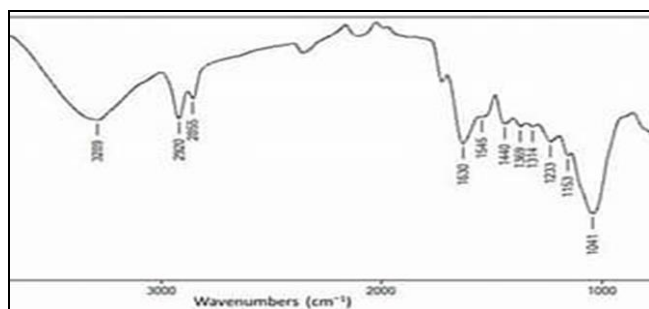


Figure 2 Phytochemical Characterization and Antioxidant Activity of *Cajanus cajan* Leaf Extracts for Nutraceutical Applications

Having reviewed the antimicrobial properties, we now address the challenges and approaches in the study of natural antimicrobial compounds, including the evaluation of *Cajanus cajan* and related legumes.

Let us consider the results: *Phaseolus vulgaris* extract showed the strongest antimicrobial activity, while *Vigna unguiculata* had the weakest. These findings inform our understanding of the broad-spectrum potential for these widely consumed plants. Pigeon peas are a nutrient-rich legume that offers numerous health benefits, particularly for heart health and digestion. Here's a table summarizing some health benefits:

Health Benefit	Nutrient
Supports Heart Health	Potassium, Magnesium
Aids Digestion	Dietary Fiber
Boosts Immunity	Vitamin C, Antioxidants
Helps Manage Diabetes	Low Glycemic Index
Promotes Healthy Weight Loss	High in Protein, Fiber
Strengthens Bones	Calcium, Magnesium, Phosphorus
Good for Anemia Prevention	Rich in Iron, Folate

These benefits make pigeon peas a valuable addition to a balanced diet, especially for those looking to improve their heart health and digestive system.

Clinical limitations: it is associated with synthetic chemotherapeutic agents have prompted the pharmaceutical and food sectors to explore novel natural antimicrobial compounds, particularly phytochemicals. The antimicrobial properties of *Cajanus cajan*, *Phaseolus vulgaris*, and *Vigna unguiculata* were evaluated against selected bacterial and fungal isolates. Ethanolic seed extracts were obtained from air-dried plant material and collected in sterile test tubes. Antimicrobial susceptibility was assessed using the agar well diffusion method on *Listeria ivanovii*, *Escherichia coli*, *Aspergillus fumigatus*, and *Candida albicans* isolates.

Results: Results indicated that *Phaseolus vulgaris* extract exhibited the strongest antimicrobial activity among the evaluated extracts. In contrast, *Vigna unguiculata* demonstrated the lowest antimicrobial effect. MIC assessments revealed that *C. cajan* inhibited all tested strains at the concentrations studied. *Phaseolus vulgaris* inhibited 75% of isolates, while 50% were inhibited by *Vigna unguiculata*. Antimicrobial activity declined as extract concentration decreased. The plant's capacity to inhibit both bacteria and fungi indicates broad-spectrum antimicrobial activity. Although further studies are necessary to confirm our findings, these results are notable, especially given that these plants are widely consumed and could join the list of valuable natural remedies for infectious diseases.

Conclusion: Pigeon peas (*Cajanus cajan*) stand out as a valuable nutritional resource, offering numerous health benefits such as supporting growth, improving cardiovascular health, and combating anemia. Their rich protein, folate, fiber, and potassium content not only promote overall well-being but also contribute to immune strength and digestive health. Moreover, their antimicrobial properties suggest potential as a natural remedy for infections. As a widely consumed staple, pigeon peas hold significant promise for enhancing nutrition and addressing dietary deficiencies, especially in regions where resources are limited. Their multifaceted health advantages underscore their importance as a beneficial dietary component.

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