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THE IMPACT OF PULSES' PHYTOCHEMICALS AND BIOACTIVE COMPOUNDS ON HEALTH

A. Meharajbegum
Department of Physics, Mailam Engineering College, Mailam, Tindivanam, Tamil Nadu.

Vikas K. Anakal
Department of Energy Engineering, Faculty of Engineering and Technology (Co-Ed), Sharnbasva University, Kalaburagi, Karnataka.

G. Jahirhussain
Department of Botany, Government Arts College (Autonomous), Karur, Tamil Nadu.

M. I. Niyas Ahamed
Department of Biochemistry, Sacred Heart College (Autonomous), Tirupattur, Tamil Nadu.

C. Kiruba Rani
Department of Biochemistry, Vellalar College for Women (Autonomous), Erode, Tamil Nadu.

N. Pragathi
PG and Research Department of Foods and Nutrition, Marudhar Kesari Jain college for Women, Vaniyambadi, Tamil Nadu.

***Corresponding author**

Abstract

During its sixty-eighth session on December 20, 2013, the United Nations General Assembly declared that 2016 would be recognized as the International Year of Pulses (IYP). The Food and Agriculture Organization (FAO) of the United Nations was designated to oversee the implementation of the International Year, in partnership with governments and various organizations. Pulses are a significant reservoir of various phytochemicals and natural bioactive components that are essential for maintaining good health. These grains are highly nutritious, including abundant amounts of protein, complex carbohydrates, soluble dietary fiber, and may be kept for extended periods without any significant loss in their nutritional content. In addition, pulses possess nitrogen-fixing capabilities that enhance soil fertility and exert positive effects on the ecosystem. However, their advantages are frequently undervalued. This mini-review provides

a concise overview of the health advantages associated with phytochemicals and bioactive components found in pulses.

Keywords: Protein, complex carbohydrates, soluble dietary fiber

Introduction

Pulses have been an important source of nutrition for people for millennia. They have been incorporated into typical meals in a variety of different ways, and they have also been used as staple foods to satisfy core requirements for protein and energy. The word "pulse" comes from the Latin word "puls," which is a type of porridge. The word "pulse" is found in the English language. Pulses are leguminous crops that produce between one and twelve grains or seeds of varying sizes, shapes, and colors within a pod on an annual basis, as stated by the Food and Agriculture Organization of the United Nations (FAO). Pulses comprise legumes. There are eleven primary types of pulses that are included in the definition. These include dry beans, dry broad beans, dry peas, chickpeas, dry cow peas, pigeon peas, lentils, bambara beans, vetches, lupins, and other pulses that are not specifically named out. Lentils that are harvested while they are still green for food, such as green beans, are specifically excluded from this list. Lentils, peas, chickpeas, and beans are the kind of legumes that are more frequently ingested [1-5]. To combat obesity, as well as to prevent and treat chronic disorders such as diabetes and cardiovascular illnesses, legumes are introduced into a diet that is both nutrient-dense and well-balanced. As a technique of reducing the likelihood of developing cancer, the consumption of dietary pulses is supported by a number of prominent organizations, including the World Cancer Research Fund International, the American Institute of Cancer Research, and the Federal Department of Health (Canada). As a result of the interesting qualities and nutritional composition of pulses, the United Nations has declared the year 2016 as the "International Year of Pulses." In the framework of sustainable food production, as well as for the sake of food security and nutrition, the fundamental objective of the International Year of Plants 2016 is to raise public awareness of the nutritional benefits that pulses offer. Through a discussion of the vital phytochemicals and bioactive components that may be found in pulses, as well as the effects that these substances have on health, the purpose of this paper is to increase public awareness [6-9].

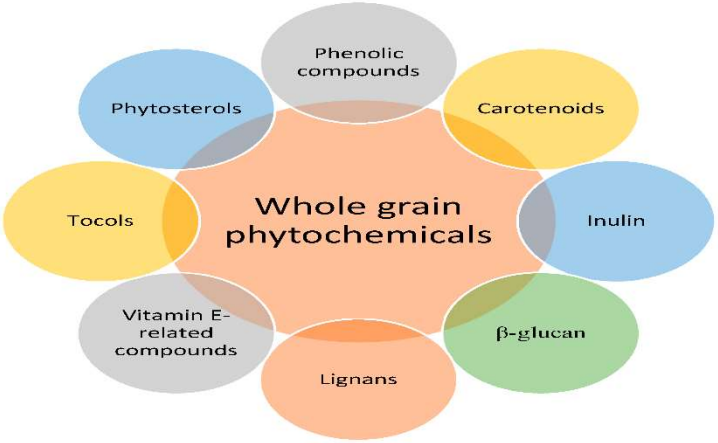

Figure 1: Impact of Fermentation on the Phenolic Compounds and Antioxidant Activity of Whole grain

An explanation

Because of their low-fat content and high levels of complex carbohydrates, vegetable protein, and minerals like phosphate, pulses are a source of food that is among the most nutrient-dense foods available. In terms of dietary fiber, pulses are an extremely valuable source. The anticarcinogenic qualities of pulses have been demonstrated to have a direct connection to the components of pulses, such as dietary fiber and folate, according to academic research. A wide variety of naturally occurring bioactive chemicals, including as lectins, enzyme inhibitors, oxalates, oligosaccharides, phytic acid, and phenolic compounds, can be found in sufficient quantities in pulse grains. In individuals or animals that consume these amazing seeds on a regular basis, these chemicals perform important metabolic tasks.

Research conducted in the scientific community has shown that ingesting pulses on a regular basis (three or four times per week) might increase human well-being and reduce the risk of coronary heart disease (CHD). A positive effect on glucose and blood lipids can be exerted by the processes that are responsible for this function that appears to be protective. Also, pulses, especially beans and lentils, are a wonderful source of minerals, especially iron. Pulses are a type of legume [10-16].

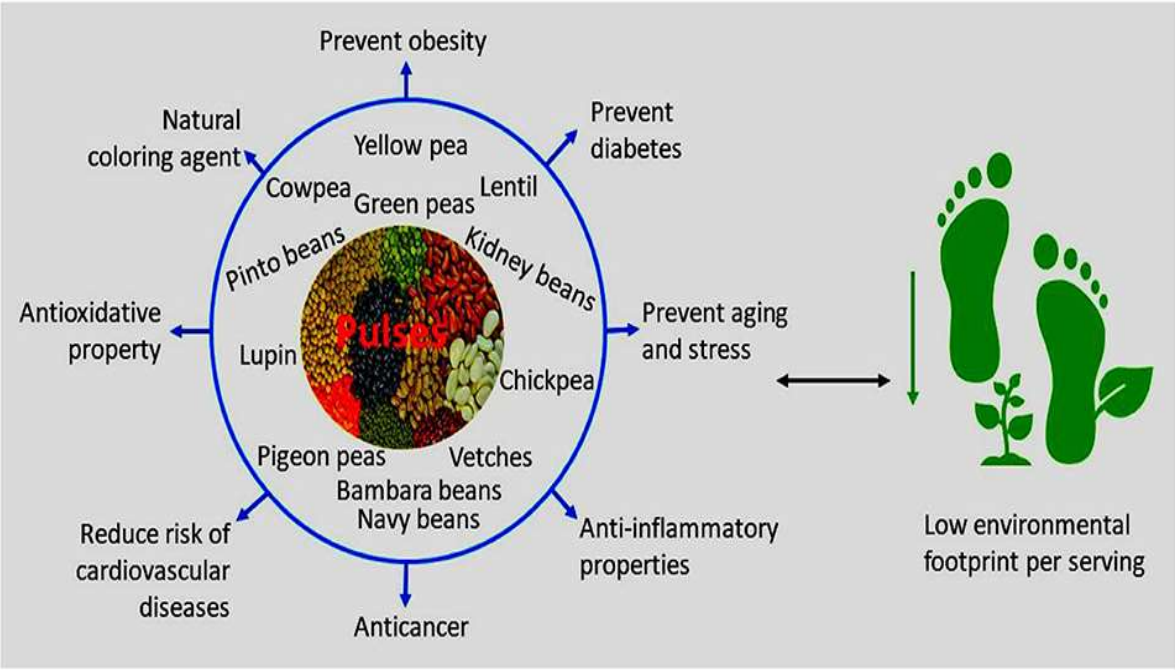

Figure 2: The Effect of Processing on Bioactive Compounds and Nutritional Qualities of Pulses

The principal polyphenolic compounds that can be found in pulses are tannins, flavonoids, and phenolic acids. Phenolic concentration is exceptionally high in black gram, lentil, and red kidney beans. Compounds that are classified as molecules are organic compounds that have at

least two phenolic groups. These molecules are often structured in complex structures and have a high molecular weight. The capacity of these compounds to scavenge 2,2-diphenyl-1-picryhydrazyl (DPPH) free radicals demonstrates that they possess exceptional antioxidant activity. These molecules are the product of the secondary metabolism that plants undergo. The digestibility of proteins can be decreased by some phenolic compounds, the bioavailability of minerals can be restricted, and the evolution of a number of degenerative diseases can be put on hold.

Plants are the principal source of phenolic acids, which are aromatic chemicals that are produced by plants. For the most part, legumes include flavonoids, which belong to the class of polyphenolic compounds known as phytochemicals. A variety of cardiovascular, neurological, and oncological disorders have been seen and analyzed in relation to them. In addition to exhibiting beneficial physiological and biological properties, flavonoids and phenolic acids have the property of being antioxidants [17-20].

A naturally occurring substance that can be found in pulses is called phytic acid, which is also referred to as myo-inositol hexaphosphate. Because of its antioxidant characteristics, it is able to decrease the amount of minerals that are readily available. Through the formation of compounds with iron, it also protects DNA from being damaged. Hydrolases, including proteases, amylases, glycosidases, lipases, and phosphatases, are ineffective against the protein inhibitors that are found in pulses. When it comes to lectins, these are the principal sources that are found in ordinary human meals. One of the key proteins that may be found in lentils is a protein that has the potential to bind itself to the membranes of cells. It has been demonstrated that the plant lectins that are present in pulses have a substantial impact on the domains of cell biology and immunology. There is a strong connection between particular lectin-binding patterns and the biological activity of these patterns in a variety of cancers, according to the findings of a number of experiments [21-26].

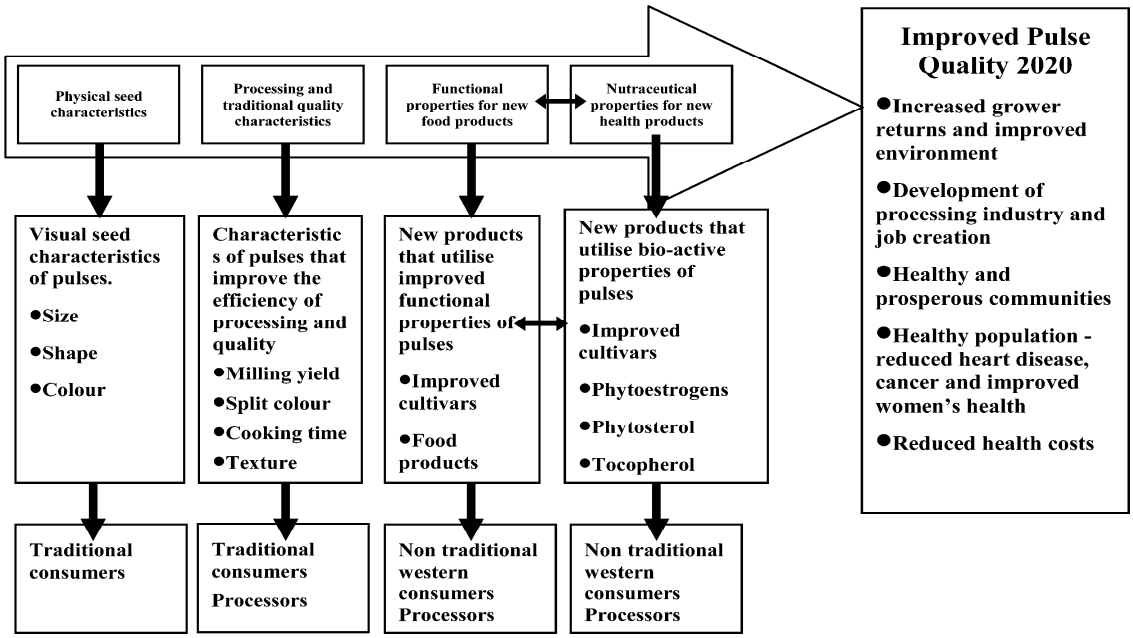

Figure 3: Phytochemicals for Health, the Role of Pulses

The digestion of proteins and the absorption of nutrients can be hindered by specific enzyme inhibitors and lectins, which can lead to antinutritional effects. The process of cooking, fortunately, is efficient enough to eradicate these effects completely. In pulses like beans, chickpeas, and lentils, the seeds and underground organs contain a natural component known as galactooligosaccharides (GOS). These GOS are short chains of galactose molecules that are an essential component. Galactooligosaccharides (GOS) have been the subject of clinical research that has studied their laxative activity. GOS may be able to treat constipation in elderly people who have infrequent bowel movements, according to the findings of the study. The benefits of GOS, on the other hand, are negligible in people who have regular bowel function, and it may even cause flatulence in these individuals. These same molecules, on the other hand, have the ability to provide a defense against cancer and boost prebiotic action [27-30].

Conclusions

Pulses have played an important role in human nutrition in many different parts of the world throughout the course of ancient history. On the other hand, an exciting area of research known as human subject's research is currently included in their material that has not been disclosed. Pulses have been shown to have a significant role in the metabolic and physiological processes of the human body, as demonstrated by recent clinical interventions. An abundance of nutritional, phytochemical, and naturally occurring bioactive compounds can be found in pulses, according to research. In light of this, pulses are an excellent food option that can help contribute to the maintenance of physical health.

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