

The Impact of Fiber in Animal Nutrition

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Description

Cowpea (*Vigna unguiculata* L. Walp) is a popular legume crop farmed primarily in Africa and used for human and livestock diets all over the world. Despite this, little study has been done on it, and it is the least used pulse crop in comparison to others. Therefore, the goal of this thorough paper was to provide insight and synthesis into the dietary and phenolic status of cowpeas, as well as their impact on human and animal diets. In addition, protein, lipids, carbohydrates, vitamins, dietary fibers, minerals, and vitamins are abundant in cowpea seeds, leaves, and green pods. Cowpea is a water deficiency tolerant crop that could be used as food for humans and feed for livestock with the bulk of their macro and micronutrients. It also contains anti-nutritional elements that could be inconvenient to human and non-ruminant animal nutrition.

However, various processing methods are employed to diminish or eliminate the negative effects of anti-nutritional components. Ruminants consume cowpea seeds for up to 30% of their diets. Raw cowpea seeds, for example, are included in the nutrition of ruminants, but they should not be used in non-ruminant diets without treatment. Its hulls are a low-cost prospective feed for chicken diets, with a maximum use of 15% in starter and finisher rations. Cowpea leaves and green pods are used to control or treat a variety of human diseases, including measles, smallpox, adenitis, burns, and ulcers, in addition to their nutritional benefits. Similarly, the seeds of the cowpea plant are important for the medication of different diseases, such as astringent, antipyretic, and diuretic. For liver and spleen problems, intestinal cramp, leucorrhoea, menstrual abnormalities, and urine expulsions, decoction or soup is employed. Cowpea may also fix up to 80% of the nitrogen in the soil, lowering the demand for and expense of nitrogen fertilizer. Commonly, cowpea plants and their by-products are important for less-expensive protein-based human and animal diets for less developed countries' livelihoods.

Vascular Annual Pulse

Cowpea is a centuries-old human crop, having originated in Africa and spread throughout Latin America and Southeast Asia. It's a warm-season, vascular annual pulse crop with a wide range of uses. It is a member of the Fabaceae family, subtribe Phaseolinae, *Vigna* genus, and *Catjang* section. The *V.*

unguiculata subspecies *unguiculata* is responsible for all cultivated cowpeas. The black-eyed pea, black-eyed bean, Crowder pea, Southern pea, frijol caup, and feijo-caup are all names for this legume crop. Africans have been domesticating and farming cowpeas for decades to get protein for themselves and their livestock feed. It's currently grown throughout the world, with a particular emphasis on the tropics. The cowpea grows best in plains foliage, with temperatures ranging from 25 to 35° Celsius and annual rainfall ranging from 750 to 1100 mm. It is more resistant to sandy soils and drought than soybeans. It may grow in a variety of soil types, as long as they are well-drained. Its output has increased 2.7 times since 2000, reaching 8.9 million metric tons in 2019. Nigeria, Niger, and Burkina Faso accounted for 74.3% of all African cowpea production. For almost 6000 years, the cowpea has been widely used as a primary and less-priced protein source throughout Africa. It has gradually made its way into people's diets all over the world.

Alternatively, cowpea is a vital pulse crop for food security and population health around the globe with major nutritional and nutraceutical qualities. In less developed regions, it is primarily planted for grain and leaves, and occasionally for green pods. It is the most important source of macro and micronutrients in the human diet. It can be found in a variety of cuisines and snacks. It can also be eaten whole, tinned, or frozen, as well as mashed into flour for baking purposes. Cowpea seeds have been shown to be a better substitute for soybeans in diets with comparable protein content for those who are allergic to them. Cowpea whole grains and decorticated grains are high in protein, carbs, and fiber, and leaves and green pods have substantial vitamins and minerals. By providing ground cover, fixing nitrogen up to 80%, controlling weeds, and reducing the need for and cost of nitrogen fertilizer, the cowpea plant contributes significantly to the long-term viability of agricultural systems and the development of soil fertility in marginal lands. It is an essential buddy crop for cereal-pulse cropping as it provides residual nitrogen acquired from the decomposition of its foliage litter, roots, and nodes.

Cowpea whole grains have comparable dietary components to other legumes, with a little fat content and enormous protein value. It contains 23–32% protein, 50–60% carbohydrates, and 1% fat. It has 2 to 4 times more protein than cereal and root crops, and it is high in lysine. It has a reasonable amount of dietary fiber, phytochemicals, minerals, and vitamins. While

cowpea whole grain protein content is low in methionine and cysteine as compared to livestock-origin proteins, it is high in amino acids as compared to cereals. According to several researchers, cowpea seeds, leaves or aerial parts, hay, and haulms are also suitable fodder species that are necessary for livestock feed. Low animal production is typically connected to less palatability and nitrogen content of accessible feeds in several tropical and subtropical locations. As a result, several high-yielding tropical grain legumes, such as cowpea, could be used as animal feed. The seed's mean protein content is 25.47%, which is comparable to soybeans, winged beans, and gram. As compared to *Cajanus cajan* (Arhar) and gram pulse, cowpea seeds have a higher lysine concentration. Cowpea plant components (for example, leaves, green pods) are used to prevent or treat several human ailments such as measles, smallpox, adenitis, burns, and ulcers, in addition to their nutritional value. Similarly, the seeds of cowpea are used to cure several ailments, such as astringent, antipyretic, and diuretic. For liver and spleen problems, intestinal cramp, leucorrhoea, menstrual abnormalities, and urine expulsions, decoction or soup is employed.

Meanwhile, demand for animal-derived proteins, vitamins, and a critical mineral has risen, and their cost has also increased from time to time. To overcome such a problem, legumes like cowpea could enhance human and animal feed accessibility and protein absorption. For example, cowpea seeds and leaves are a

valuable source of protein, vitamins, and minerals in less developed places, and they are less expensive than beef, dairy products, seafood, fish, meat, or poultry, helping low-income farmers by combating protein malnutrition. Many sections of Africa ingest ripe or immature pods, especially during the "hungry period". Furthermore, despite the fact that cowpea seeds, leaves, and other its plant parts have significant value for population health, food, and feed for underdeveloped nations, as mentioned earlier, it is the least used pulse crop in comparison to others, such as soybeans, and it has received less attention from international researchers. In this regard, research has been undertaken in various regions of the world to study the nutritional composition of cowpea seeds and leaves. However, the nutritional benefit of cowpea seeds and leaves in human and animal diets has not been thoroughly researched or mixed. Therefore, the goal of this comprehensive analysis was to provide insight and synthesis into the nutritional uses of cowpea for human consumption and livestock feed, with the specific objectives: a) to describe the nutritional value of cowpea as a food source. b) To determine the nutritional value of cowpea as a feed source. c) To identify the health benefits of cowpea. This review's information was gathered from secondary sources such as relevant books, scientific publications, and internet sources. After gathering all the available information, it was presented in accordance with the objectives of this paper.