

Nutritional Manipulation to Reduce the Animal Feeding

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Description

A high-temperature environment can be a typical extreme working environment for many individuals. When the ambient temperature exceeds the body's ability to regulate itself, a series of immune responses are triggered, which we call heat stress. When exposed to heat stress for a long time, the body's immunity decreases, which leads to the release of inflammatory mediators, causing acute inflammation and inducing the secretion of reactive oxygen species by leukocytes, followed by various pathophysiological responses, such as thermoregulation dysfunction and water and electrolyte balance disorders. The most significant impact is on brain functions, including cognition, memory, judgment, emotion, and consciousness.

Essential Role of Nutrition

The Chinese Nutrition Association report pointed out that high-temperature nutrition research should focus on functional foods such as vitamins, amino acids and phytochemicals, and medicinal and homologous food substances to prevent thermal environment-related diseases. Functional foods are a part of the daily diet. They are natural and have little or no toxic effects, so they have broad application prospects. Ingested functional foods play an essential role in preventing and treating some diseases due to the natural phytochemicals (functional factors) that play a crucial role. Therefore, some food compounds can be used as medicines and are under investigation for these beneficial effects.

Many phytochemicals have been demonstrated to have beneficial effects for disease prevention and treatment of high-temperature environments. Functional factors such as tyrosine, glutamic acid and arginine can significantly reduce the body's nitrogen loss under heat stress and improve the body's thermal adaptability. Mineral elements (mainly sodium, potassium, chromium, and selenium) can generally enhance the body heat stress ability. Likewise, natural phytochemicals can improve the body's resistance to heat stress, especially some Chinese herbal medicines, such as ephedra, vitex, citrus, American ginseng, nanshan vine. Therefore, we investigated whether we could use novel bioinformatics methods to screen potential functional food components that can improve mental performance under heat stress conditions. After verifying efficacy in animal models,

we can further screen and select the identified high-efficiency functional food components to guide our formulations.

Nutritional Profile of Cowpea

It has a reasonable amount of soluble and insoluble dietary fiber, phytochemicals, minerals, and vitamins. For millions of individuals in less developed nations, cowpea seeds have a significant amount of dietary protein, supplementing the nutritional value of less-protein cereals and tuber staples. Cowpeas are available in diverse forms and extents, including mature seeds (dry grain), green seeds, and green pods, all of which are nutritious. The cowpea's leaves can also be eaten. They contain anti-nutritional elements that may be detrimental to the diets of humans and non-ruminant animals. However, several processing procedures are utilized to lessen or eliminate the negative effects of anti-nutritional components. The cowpea's whole grains, decoctions, hulls, and leaves are treated and used for human consumption. The dietary constituent of cowpea is influenced by genomic specifics, environmental circumstances, biotic stressors, and postharvest control. The cowpea is an extremely nutritive foodstuff with potential medicinal benefits due to its great protein, fiber, and lower glycemic index.

Bioinformatics is widely used in the field of Chinese medicine to determine the relationship between certain components of Chinese medicine and potential benefits for disease. Based on these methods and investigations, we applied this method to the field of functional foods. Compared with the typical application of isolated studies involving a specific gene and signal pathway, this method can further investigate the functions of complex biological systems, making our goal orientation more comprehensive and precise. 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* 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.

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.