

## Teff Cereal: A Nutrient Powerhouse

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In recent years, teff cereal has gained significant popularity as a nutritious and versatile grain. Originating from Ethiopia, teff has become a global sensation due to its exceptional nutritional profile and numerous health benefits. Teff is a warm-season, annual, low-risk cereal crop that belongs to the family Poaceae, subfamily Chloridoideae (Eragrostoideae), tribe Eragrostidae, subtribe Eragrostae, and genus Eragrostis (2). Teff is the sole domesticated cereal in the genus Eragrostis, which has over 350 different kinds. It was first cultivated in Ethiopia, an area of eastern Africa, where it has long been a staple meal and continues to play a significant role in the local cuisine and culture. Each year, teff is thought to feed 50 million Ethiopians. It is, nevertheless, underutilised in many nations (5). Teff is derived from the Ethiopian word 'teffa,' which means 'lost' due to its small, insignificant grain size, nutty flavour, and naked or hull-free status, which has the benefit of avoiding the expense of dehulling. The grain is oval-shaped and measures 0.7 to 1.0 mm in diameter and 0.9 to 1.7 mm in length.



**Macronutrient Profile of Teff Cereal:** It boasts an impressive array of essential nutrients that contribute to its reputation as a super food. Teff grains have 357 kcal/100g, about the same as wheat and rice. Rich in complex carbohydrates, teff provides sustained energy release and helps maintain stable blood sugar levels. It is an excellent source of dietary fiber, which aids in digestion, promotes satiety, and supports a healthy gut microbiome. Furthermore, teff stands out as a significant source of protein, containing all the essential amino acids required for proper body functioning. This makes it a valuable option for individuals following vegetarian or vegan diets. The limiting amino acid lysine, which is frequently lacking in wheat and rice, is a great supply of essential amino acids in teff, which has 9.4 to 13.3% of protein. Ash content ranges from 2.6 to 3.0% while fat ranges from 2.0 to 3.1%. The starch level is 73% on a dry basis, with a high percentage of resistant starches, while the fibre content ranges from 3 to 7%. Teff grains had a high content of unsaturated fatty acids (72.46%), of which 20.06% were saturated and 39.91% were polyunsaturated. It was found that linoleic and oleic acids made up 50% and 29%, respectively, of the lipids in teff, and that the bulk of these lipids were unsaturated.

**Micronutrient Profile of Teff Cereal:** In addition to macronutrients, teff cereal is packed with essential vitamins and minerals. Teff also contains notable amounts of essential minerals

such as iron, calcium, magnesium, and phosphorus, which play crucial roles in various physiological processes. It is particularly abundant in iron, making it an ideal choice for individuals prone to iron deficiency or anemia. Teff also provides substantial amounts of calcium, supporting bone health and preventing conditions like osteoporosis. It has a very high mineral content, especially calcium, iron, magnesium, phosphorus, potassium, sodium and zinc of 180, 7.63, 184, 429, 427, 12 and 3.63 mg/100g, respectively. Red teff contains a large amount of iron, and in regions of the country where red teff-based foods are widely consumed, people tend to have higher haemoglobin levels and, as a result, a lower risk of anaemia brought on by parasite infections (8). The grain is rich in vitamin C, an antioxidant that aids in collagen synthesis, boosts immune function, and promotes iron absorption. Teff's vitamin B complex content, including thiamine, riboflavin, and niacin, contributes to energy production, neurological health, and overall vitality.

**Phytochemicals in Teff:** Teff cereal is not only a nutritional powerhouse but also contains a range of phytochemicals, which are bioactive compounds found in plant-based foods. One such compound present in teff is called polyphenols, which have been linked to various health benefits, including antioxidant and anti-inflammatory properties (7). Ferulic acid (285.9 g/g), the most abundant phenolic compound in teff, is the main regulating phytochemical present. These phytochemicals may contribute to reducing the risk of chronic diseases such as cardiovascular disease and certain types of cancer (7). Assyringic (14.9 g/g), gentisic (15 g/g), protocatechuic (25.5 g/g), vanillic (54.8 g/g), coumaric (36.9 g/g), and cinnamic (46 g/g) acids, among others, are also found in teff.

The ancient grain teff has a rich history deeply intertwined with the culture, cuisine, and traditions of Ethiopia and Eritrea. Its journey from being a local staple to a globally recognized and valued grain is a testament to its exceptional qualities and the growing appreciation for diverse and nutritious food sources. Traditionally, teff was primarily used for making injera, a sourdough flatbread that is a staple in Ethiopian and Eritrean cuisine. Injera is a versatile and nutritious food that is often served with various stews and dishes. Teff's small grains are ground into flour, which is then fermented and cooked to create the spongy and tangy injera bread. Over time, the popularity of teff has spread beyond Ethiopia's borders. In recent years, teff has gained attention as a nutrient-dense grain with exceptional health benefits. Its unique nutritional properties, gluten-free nature, and versatility in cooking have contributed to its recognition as a "superfood" in the global market. Teff is now cultivated and consumed in various parts of the world, including North America, Europe, and Australia. Today, teff is not only used for making injera but also as a versatile ingredient in various culinary creations. Additionally, teff flour has gained popularity as a gluten-free flour substitute in the production of pasta, tortillas, and other gluten-free products. Teff is currently farmed in India, but it is seldom ever consumed by people. Teff straw is a fodder crop and a nutrient-dense feed for cattle. Teff is divided into three categories for marketing purposes: white, red/brown, and mixed. Teff can be ground without having to go through the dehulling process, and the resulting whole grain flour is used to make traditional flatbreads, porridge, soups, stews, and puddings. It can also be used to make other bakery items like biscuits, pancakes, cookies, cakes, and bread, as well as a number of traditional alcoholic and non-alcoholic beverages (1).

Teff has begun to become more and more popular in food markets all over the world because of its appealing agronomical advantages, nutritional qualities, and outstanding health benefits. Teff cultivation is also becoming more popular in other regions of the world. Australia, Cameroon, Canada, China, India, Netherlands, South Africa, UK, Uganda, and the USA are among these nations. Across the world, cereal grains represent a significant source of dietary nutrients. Although other grains including sorghum, maize, barley, wheat, and finger millet are occasionally used to make injera, which is a fermented soft flatbread similar

to dosa and appam that forms the traditional basic meal in East African countries, teff is the most popular cereal grain to make injera. Less than 1% of the phytic acid and other inositol phosphates found in teff grain, which are major inhibitors of Fe and Zn absorption. Because of the reduced interactions of iron with phytates and tannins, the most significant effect of teff fermentation is an increase in nutritional value.

Over the past 20 years, there has been a sharp increase in the prevalence of celiac disease worldwide, which now affects 1% of the world's population. The need for more gluten-free options grows as more people are being diagnosed with this condition. Foods free of gluten are hard to find and expensive to buy. Teff-based goods have a chance to be produced due to the rising global demand for gluten-free foods. Numerous gluten-free products might not meet daily fibre, mineral, and vitamin needs. To satisfy the daily intake requirements, they must therefore be fortified. Teff is inherently more nutritious than many other types of grain and does not need to be fortified (4). Teff is beneficial for people with celiac disease or gluten intolerance (3). Teff is therefore advantageous for celiac disease patients. Teff grains have a low glycemic index, making them ideal for patients with type 2 diabetes. Teff may improve insulin sensitivity and glucose metabolism (6). Teff's rising popularity can also be attributed to its gluten-free status, making it an attractive alternative for individuals with gluten sensitivities or celiac disease.

### Conclusion

Teff cereal is an exceptional grain that offers a multitude of nutritional benefits. Its rich content of complex carbohydrates, dietary fiber, protein, essential vitamins, minerals, and phytochemicals make it a valuable addition to a balanced diet. Whether consumed as porridge, in baked goods, or as a flour alternative, teff cereal provides a nourishing and flavorful option for those seeking to enhance their overall well-being.

### References

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