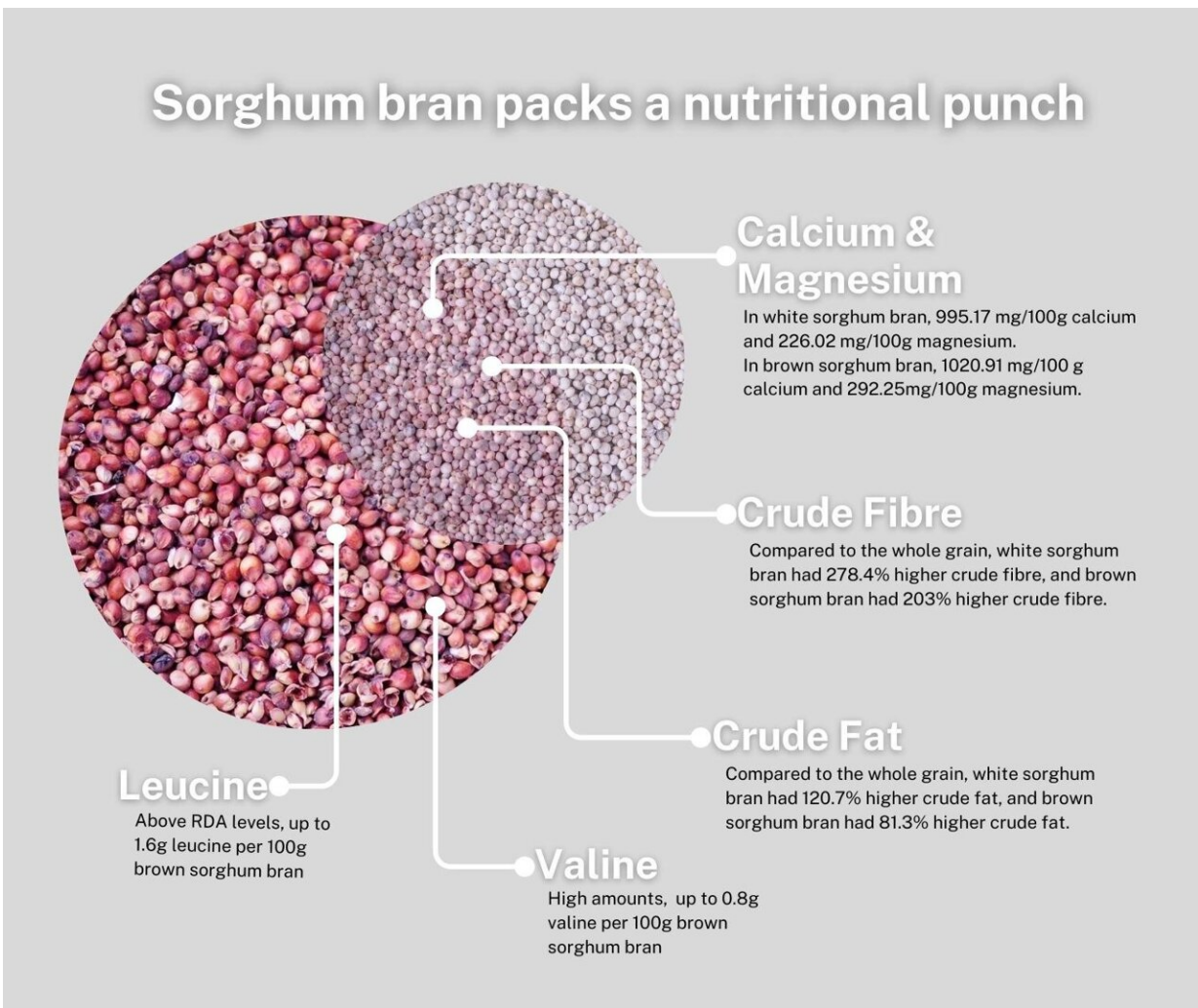


# Sorghum bran packs bigger punch than whole grain, nutritional study shows

September 11 2023



Sorghum bran packs a mineral and essential amino acid punch much higher than the whole grain flour, UJ researchers find, for calcium and magnesium in particular. The climate-resilient crop is produced in many developing countries, and is suitable for disaster relief food supply. Credit: Therese van Wyk,

University of Johannesburg.

Sorghum bran has much higher levels of some essential amino acids and minerals needed for human health and development than a whole grain or dehulled sorghum flour, researchers from the University of Johannesburg have found.

Sorghum [bran](#) packs a calcium, magnesium, leucine and valine punch much higher than the [whole grain](#) flour. The climate-resilient gluten-free grain also holds its own on macro—and micronutrients compared to the biggest grains produced worldwide.

Dr. Janet Adebo and Dr. Hema Kesa investigated and compared the nutritional quality and functional properties of the different anatomical parts of two locally available sorghum varieties—white and brown sorghum.

The study is published in [Heliyon](#).

Dr. Adebo is a researcher and Dr. Kesa the Director of the Food Evolution Research Laboratory (FERL) within the School of Tourism and Hospitality at the university.

## **Bran for nutrition**

Dr. Adebo said, "The reduction of nutrients in sorghum bran has become a matter of nutritional concern. Bran removal, or reduction in bran particle size due to milling or deliberate dehulling, affects the nutritional quality.

"There is strong scientific evidence linking regular consumption of

whole grain cereal foods to long-term health benefits. The studies mostly associate this with the bran component included as part of whole grains," she adds.

## **Climate resilient, versatile food resource**

Sorghum is widely grown both as a traditional and commercial crop for human and animal food in much of Africa and Asia. It is one of three gluten-free grains in the top seven produced grains world-wide—the others are corn (maize) and rice.

The grain has the added advantage of being produced locally in many developing countries. It is known for its high resilience during water scarcity. There are some varieties tolerant to waterlogged soil that is not suitable for farming corn (maize).

Whole grain sorghum is traditionally made into porridge, flatbreads, beer, and cakes. In industry, sorghum bran is also known as sorghum offal, sorghum milling waste or sorghum mill feed. Some online food vendors sell the bran as a human food.

In consumer foods, sorghum bran is already used as an additional ingredient in the development of high fiber snacks, baked products, chocolate, and pasta.

## **Fiber**

Crude fiber in the bran samples Dr. Adebo analyzed were much higher than from other parts of the whole grain, says Dr. Adebo. Compared to the whole grain, white sorghum bran had 278.4% higher crude fiber, and brown sorghum bran had 203% higher crude fiber.

## **Leucine**

Meanwhile, brown sorghum bran contained high levels of the essential acid leucine, above the Recommended Daily Allowance (RDA) level. The levels detected in the brown sorghum bran were up to 1.60g/100g, says Adebo.

The bran could help supply needed levels of this essential amino acid required for repairing and building muscle.

## **Valine**

High amounts of up to 0.80g/100g valine was detected in the brown sorghum bran.

The essential amino acid valine is vital for muscle tissue and repair as well as growth hormone production—much of these functions are needed in kids and teenagers who require these essential nutrients.

## **Calcium and magnesium**

Relatively high calcium and magnesium levels were detected in sorghum bran. The results show that sorghum bran is a cheap and readily available source of these minerals which can assist in bone growth and development.

The analysis found 1020.91mg/100g calcium and 292.25mg/100g magnesium in brown sorghum bran.

In white sorghum bran, the results show 995.17mg/100g calcium and 226.02mg/100g magnesium.

## **Crude fat**

Relatively high levels of fat in the bran could potentially open a market for sorghum bran oil—a 'plant'-based oil.

The crude fat was higher in both bran samples, as compared to other anatomical parts of the sorghum grain.

Compared to the whole grain, white sorghum bran had 120.7% higher crude fat, and brown sorghum bran flours had 81.3% higher crude fat.

## **Sorghum holds its own, with advantages**

When comparing sorghum with the top grains world-wide, it holds up well for macro-nutrients, says Dr. Kesa. Compared to corn (maize), wheat, rice, barley, and oats; sorghum contains similar ranges of protein, crude fiber, carbohydrates and minerals.

Generally speaking, there is need for changing dietary choices to locally available food sources, says Dr. Kesa. Sorghum will be a good choice in Southern Africa as it is available, says Dr. Kesa.

Sorghum is naturally gluten-free, which means it does not contain gluten, a protein complex found in wheat, barley, and rye. This makes sorghum a safe and suitable grain for individuals who need to follow a gluten-free diet due to conditions like celiac disease or non-celiac gluten sensitivity, she says.

"Also, sorghum has been found to contain resistant starch, which is a type of dietary fiber that resists digestion in the small intestine. Resistant starch can have positive effects on gut health by promoting the growth of beneficial gut bacteria and contributing to improved digestion.

"Sorghum has a relatively low glycemic index (GI) compared to some other grains. Foods with a lower GI can help regulate blood sugar levels, which is particularly important for people with diabetes."

## Disaster relief options

Because of these properties, sorghum can also be a versatile and local resource for disaster relief efforts, says Kesa.

"In [emergency situations](#) where communities are at risk of protein and micronutrient deficits, soy-fortified sorghum grits are a good alternative. The use of sorghum in such emergency response in disasters can create livelihoods, improve nutrition, and promote sustainable agriculture.

"Sorghum grain and bran can also be used as animal feed, providing a source of nutrition for livestock during and after disasters. Livestock are most times critical for the livelihoods of communities, so maintaining their health and productivity is essential for long term recovery," she says.

Consuming [sorghum](#) as a wholegrain, or using its bran in food preparation and formulation, translates to consumption of more fiber. This is beneficial to the gut, immune system and health generally.

**More information:** Janet Adeyinka Adebo et al, Evaluation of nutritional and functional properties of anatomical parts of two sorghum (*Sorghum bicolor*) varieties, *Heliyon* (2023). [DOI: 10.1016/j.heliyon.2023.e17296](#)

Provided by University of Johannesburg

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