

Rice bran may help curb malnutrition, diarrhea for infants

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CSU Associate Professor Elizabeth Ryan said there is a great deal of rice bran produced around the world, yet it is often either wasted or used as animal feed. Credit: William A. Cotton/CSU Photography

Malnutrition is prevalent on a global scale and has numerous negative consequences for children during the first five years of life. For some children, it can mean struggling with health issues for life or a higher

risk of death among those under five years of age.

A new study led by Colorado State University found that adding a [rice bran](#) supplement for infants who were being weaned from their mother's milk resulted in them receiving more nutrients that enhanced growth and reduced diarrhea, among other findings.

Researchers said the study showed that rice bran, a nutrient-dense, phytochemical-rich food that has shown chronic disease-fighting properties, is a practical dietary intervention strategy in rice-growing regions that have a high prevalence of impaired growth and development in children.

The study, "Rice bran supplementation modulates growth, microbiota and metabolome in weaning infants: a clinical trial in Nicaragua and Mali," was published Sept. 26 in *Scientific Reports*, a journal from the publishers of Nature.

Elizabeth Ryan, associate professor in the Department of Environmental and Radiological Health Sciences at CSU, said there is a great deal of rice bran produced around the world, yet it is often either wasted or used as animal feed.

"Our hope is that, given the findings from our study, we can make rice bran more available and affordable for human consumption, particularly in low-resource rural settings," she said.

Rice bran supplementation effects

To study the effects of daily rice bran supplementation, the research team collected monthly stool samples from nearly 100 infants in Nicaragua and Mali over the course of six months. Scientists also collected demographic information and made note of household

characteristics.

Ryan said one of the most important findings from the study involved a common data point used to monitor growth in infants—length for age. In Nicaraguan infants, this data point significantly changed over time, as well as weight for age scores in Mali infants when compared with the control group.

"In Mali, we also saw a lower incidence of diarrheal episodes for infants 6 to 12 months of age when consuming the rice bran supplement," she added.

Diarrheal disease is the second leading cause of death in children under five years old, according to the World Health Organization. It is both preventable and treatable, yet it remains a leading cause of malnutrition in children under five years old. Each year diarrhea kills around 525,000 children under five.

In Nicaragua, researchers also found a significant reduction in a marker of gut permeability, also known as "leaky gut," which can result in partially digested food or toxins passing from inside the gastrointestinal tract into the rest of the body.

Ryan said that longer clinical trials with more follow up—tracking children from 2 to 5 years old—are needed to verify the long-term impacts of these findings for growth outcomes, including prevention of malnutrition and reduction of diarrheal episodes.

Even so, the scientist said that it is amazing to see the outcomes from these early stage [clinical trials](#) that can influence a change in rural and urban food systems.

"We've worked hard to identify practical, sustainable interventions with

the potential for an impact globally," said Ryan.

Next steps

Ousmane Koita, a pharmacist specializing in medical biology at the University of Bamako in Mali, and Samuel Vilchez, chair of the Department of Microbiology at the National Autonomous University of Nicaragua, served as the study site principal investigators. Ryan also acknowledged the international team of students and staff, who were instrumental in the design and successful completion of the research.

Ryan is now working with rice agriculturalists, milling industries, [food safety](#) and toxicology experts and public health scientists in West Africa to build out the human food supply chain for rice bran so that it can become a sustainable ingredient in infant diets.

She is also developing dietary biomarkers of rice bran intake in children and adults with funding from the National Institute of Food and Agriculture. Ryan and her research team are examining the impact of host and gut microbial metabolism of rice bran, which differ not just by age and country, but also involves consideration of a diverse suite of environmental exposures.

"Our major next steps are to develop a safe, heat-stable rice [bran](#) product for human food consumption in [rice](#)-growing regions of the world where child malnutrition and diarrheal diseases persist and merit innovative efforts for prevention," she said.

More information: Luis E. Zambrana et al, Rice bran supplementation modulates growth, microbiota and metabolome in weaning infants: a clinical trial in Nicaragua and Mali, *Scientific Reports* (2019). [DOI: 10.1038/s41598-019-50344-4](https://doi.org/10.1038/s41598-019-50344-4)

Provided by Colorado State University

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