BETA-CAROTENE IN GOLDEN RICE: A PRIMER

Research shows that Golden Rice is the same as ordinary rice plus the added benefit of beta-carotene, a precursor of vitamin A, in its grain. To understand its potential impact on human health, let’s compare the beta-carotene in Golden Rice with the beta-carotene in other vitamin A rich food sources.

There are two types of vitamin A that are found in the diet. Preformed vitamin A is found in animal products such as meat, fish, poultry, and dairy foods. Provitamin A is found in plant-based foods such as fruits and vegetables. The most common type of provitamin A is beta-carotene.

MEASURING BETA-CAROTENE FROM FARM TO PLATE

The beta-carotene content of any vitamin A rich food—whether it’s yellow fruits, leafy green vegetables, or Golden Rice—changes depending on storage time and processing. To ensure more accurate projections of its nutritional potential, the beta-carotene content of Golden Rice is monitored at different stages.

1. Beta-carotene content is highest upon harvest, but gradually reduces until it reaches a stable level two months after harvest.

2. Beta-carotene content largely stabilizes after two months of storage and is measured.

3. Exposure to heat affects beta-carotene content to some extent. Measurements on reductions caused by parboiling and cooking are also recorded.

4. Remaining beta-carotene content at this stage can provide 30-50% of the estimated average requirement (EAR) for vitamin A of young children and pregnant and lactating women.
BETA-CAROTENE AND THE BODY

Beta-carotene is an ideal source of vitamin A because the human body only converts as much as it needs. Rice has a simple and easily digestible food matrix, which allows for a high bioavailability and bioconversion of beta-carotene to vitamin A.

3.6 UNITS OF BETA-CAROTENE = 1 UNIT OF RETINOL (VIT A)

28 UNITS OF BETA-CAROTENE = 1 UNIT OF RETINOL (VIT A)

12 UNITS OF BETA-CAROTENE = 1 UNIT OF RETINOL (VIT A)

THE SMALL AMOUNTS OF BETA-CAROTENE IN GOLDEN RICE ARE MORE EFFICIENTLY CONVERTED BY THE HUMAN BODY INTO VITAMIN A.

BETA-CAROTENE

VITAMIN A

Despite the success of existing nutrition interventions, vitamin A deficiency continues to be the leading cause of preventable childhood blindness and increased risk of infection for over 190 million children worldwide.

Golden Rice and other rice biofortification initiatives can serve as a complementary pathway to improved nutritional status.