Role of Optimized Plant Protein Combinations as a Low-Cost Alternative to Dairy Ingredients in Foods for the Prevention and Treatment of MAM and SAM

Mark Manary and Meghan Callaghan-Gillespie

Protein is an important component of specialized foods to treat moderate acute malnutrition (MAM) and severe acute malnutrition (SAM). This is because wasting, the physiologic process that leads to acute malnutrition, is in large part reduction in the lean and functioning tissues of the body. It is generalized wasting of all organ systems that makes the wasted child more vulnerable. Protein is a category that represents all amino acids, the building blocks of almost all of the functional features of human cells. There are 11 essential amino acids, which cannot be synthesized endogenously, but must be absorbed from the gut. The term protein quality refers to the essential amino acid content of dietary protein. Aggregating the results from clinical trials with different foods with differing protein qualities used to treat MAM and SAM, correlations are seen between protein quality and rates of weight gain/recovery rates. Animal source proteins, in particular milk protein, are favored and prescribed as ingredients in foods to treat MAM and SAM. This is because the protein quality of milk is higher than that of plant proteins. Among plants, cowpea, common bean, and soybean have the most protein, the highest quality protein, and thus are candidates for foods for acute malnutrition. Clinical trials in SAM patients show that incorporation of milk protein causes greater weight gain and recovery. An interesting preliminary trial using crystallized amino acids to replace milk has shown some promise for the treatment of wasting but needs to be used in home-based therapy among young children before it can be recommended. MAM children, although less likely to die than SAM children, are deficient in essential amino acids and also require high protein quality to recover. Whenever specialized foods for wasting are considered, protein quality must be a key consideration.