

# Acceptance and adoption of biofortified crops in low- and middle-income countries

Elise F Talsma<sup>1</sup>, Alida Melse-Boonstra<sup>2</sup>, Inge D Brouwer<sup>2</sup>

<sup>1</sup>International Center for Tropical Agriculture (CIAT), Cali, Colombia; Contact: e.talsma@cgiar.org

<sup>2</sup>Division of Human Nutrition, Wageningen University & Research, the Netherlands

## Introduction

Biofortification of staple crops through conventional plant breeding, genetic engineering or agronomic approaches, is a promising strategy for increasing dietary nutrient density to improve human health. Successful implementation depends, amongst others, on willingness of consumers and farmers to accept the newly bred crop varieties.

## Objective

In this systematic review, we summarize studies assessing the sensory acceptance and adoption of biofortified crops and the determining factors among consumers and farmers in low- and middle-income countries.

## Results

Most studies were found on sensory acceptability (n=40), followed by consumer adoption (n=26) and lastly by determinants of acceptance (n=20) and focused on cassava, orange flesh sweet potato, maize, rice, beans and pearl millet. Sweet potato and maize are crops most studied, with rice and pearl-millet least investigated. Overall sensory acceptance was good, and availability and information on health benefits are the most important determinants of acceptance and adoption.

## Conclusion

From a sensory perspective, biofortified crops are well accepted by rural and urban populations. Even a visible trait such as (yellow) color does not seem to be a major obstacle in itself. Availability of the crop and information on health benefits are among the most important determinants of acceptance and adoption of biofortified crops. Most studies do indicate that there is need for segmented targeted communication strategies due to the preference heterogeneity of respondents studied. However, in many of the studies reviewed here, biofortified crops were not yet available and acceptance remained hypothetical. Data on actual adoption are only available for sweet potato and to a lesser extent for yellow maize based on large effectiveness studies. Future studies should look into the actual determinants of adoption during and after wide scale introduction of biofortified beans, cassava, rice and pearl millet.

## Methods

We used the electronic databases of Pubmed, Scopus and Web of Science for the systematic review with two key topics combinations of 1) Biofortification, and 2) Acceptance OR Adoption, combined with the identification of unpublished or ongoing studies through contacting key organizations and biofortification experts yielded 1669 records (December 2015). Applying exclusion criteria resulted in a final selection of 72 papers and the exclusion criteria comprised:

- not about biofortification with micronutrients
- not a human study
- not a low- and middle-income country
- not a staple crop (as defined in the search strategy: maize, cassava, sweet potato, potato, pearl millet, bean, sorghum, rice)
- a language other than English or Spanish
- no mention of acceptability
- no original research

