

Rice milling and parboiling trade-offs for economic and nutritional gains in West Africa

Sali A. NDINDENG¹, Erasmus TANG², Edgar TWINE³, Victor TALEON⁴

¹Africa Rice Center (AfricaRice), Agri-food Systems, Crop based system, Farming systems and Postharvest, Côte d'Ivoire, ²Institute of Agricultural Research for Development, Food Science, ³Africa Rice Center, Systems Transformation, ⁴HarvestPlus, International Food Policy Research Institute (IFPRI), USA

BACKGROUND

- Rice is a major source of nutrients, largely contributing to the food and nutrition security of millions of people in Africa
- Rice can be processed and consumed as non parboiled unpolished (brown), non parboiled polished (white), parboiled unpolished or parboiled polished.
- Africa faces triple burden of malnutrition – undernutrition, micronutrient deficiencies, growing rates of overweight and obesity
- White rice is mostly produced and consumed in Africa except in Nigeria and Guinea where parboiled rice is dominant.
- Most processors and consumers are not aware of the economic and nutritional benefits of parboiled rice vis-à-vis white rice

OBJECTIVE

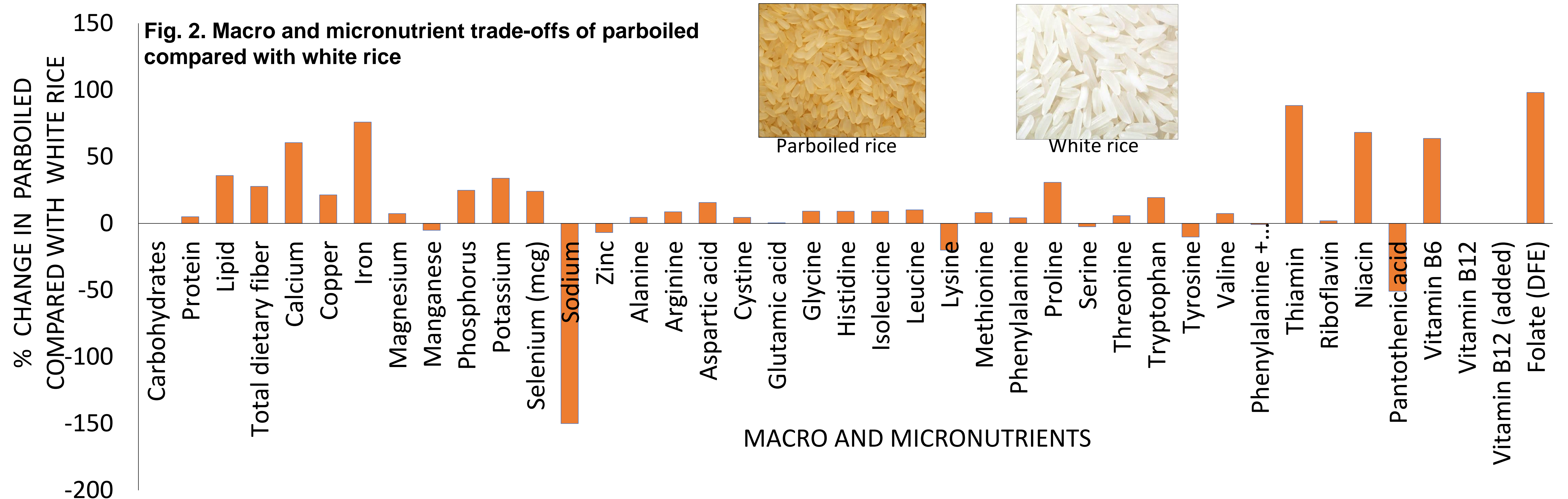
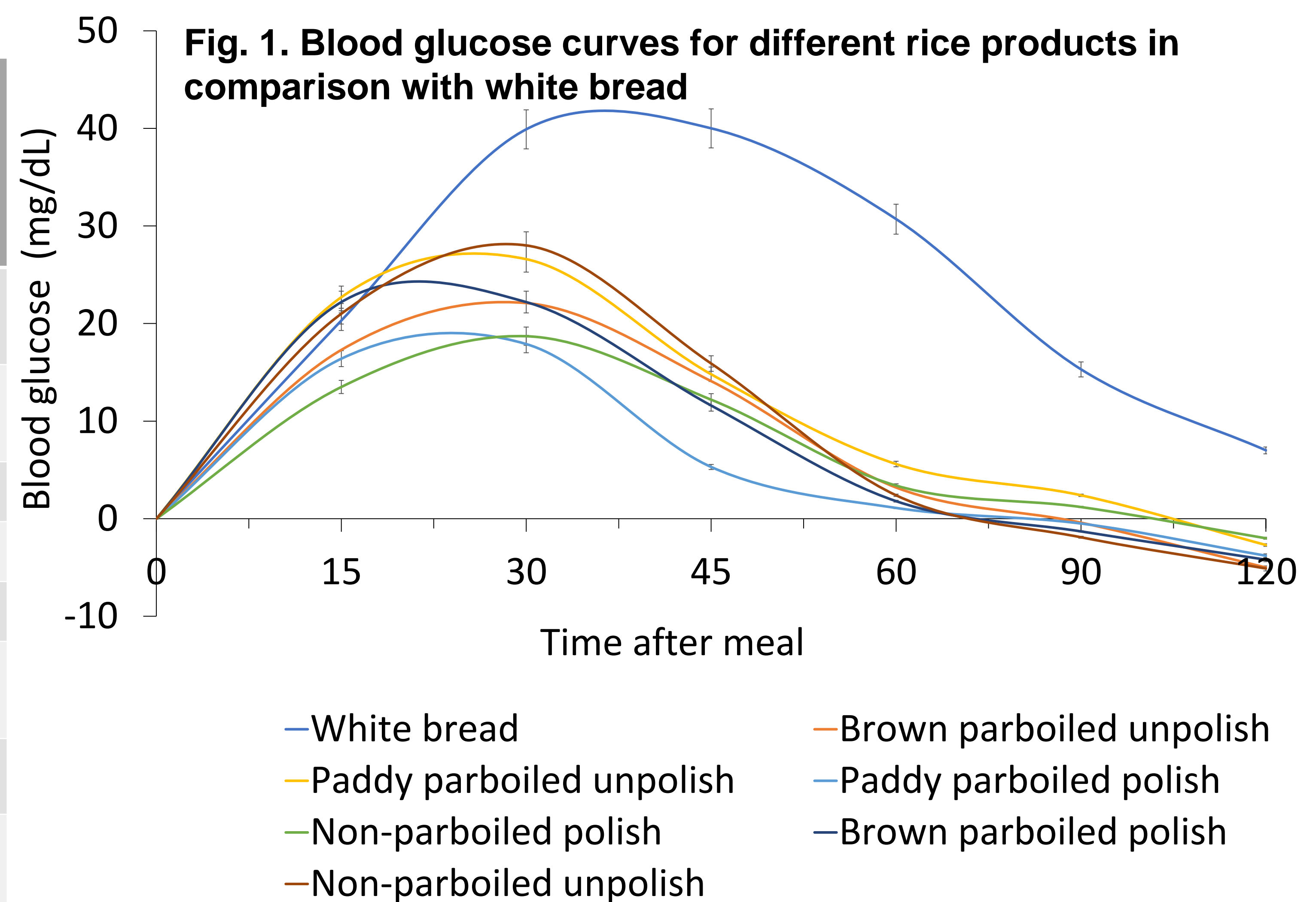
This paper seeks to present this information in a simple way with the goal of influencing both technological and policy changes that promote economically viable and healthy rice production and consumption habits.

KEY RESULTS AND CONCLUSIONS

- Five physicochemical traits of parboiled rice are strong and positively associated with economic gain and preference while four are weak and negatively associated with preference.
- Among the 39 macro and micronutrients analyzed, parboiled rice recorded higher quantities in 30 compared with white rice
- Parboiled polished rice also recorded lower human glycemic index and load which was lower than for normal brown rice or parboiled brown rice, which was in turn lower than for white rice (Ndindeng et al., 2022).
- Extracts of parboiled rice alleviate steatosis and reduce fat deposition in Lipid Induced HepG2 cells compared to those from white rice (Wu et al, In press).
- High degree of milling and some parboiling regimes have detrimental effects on micronutrients (zinc) content (Taleon et al. 2022).

Table 1. Economic trade-offs of rice physicochemical traits and preference

	Parboiled	White	% Change in Parboiled compared to White rice	Preference/ Price effect
Milling return (%)	70	63	10.00	++++
Head rice yield (%)	59	39.6	32.88	++++
Chalkiness	1.2	42	-3400.00	+++
Lightness	52.4	65	-24.05	--
Cooking time	20.5	19.9	2.93	-
Length to Width Ratio	3	2.8	6.67	+++
Swelling Capacity	3.3	4	-21.21	-
Amylose content (%)	24.5	25.1	-2.45	+++
Hardness (N)	37	32.4	12.43	-



PERSPECTIVE

Optimization of parboiling and milling regimes will have a significant effect on reducing micronutrient loss in rice especially for rice that has been biofortified



Funded by the European Union

Acknowledgements:

Grant agreement No. GA. No.101083388

