



Tropentag, September 9-11, 2020, virtual conference

“Food and nutrition security and its resilience  
to global crises”

## Nutritional Quality and Food Safety of Processed Small Indigenous Fish Species from Ghana

LAURA WESSELS<sup>1</sup>, ASTRID ELISE HASSELBERG<sup>2</sup>, INGER AAKRE<sup>1</sup>, FELIX REICH<sup>2</sup>, AMY ATTER<sup>3</sup>,  
MATILDA STEINER-ASIEDU<sup>4</sup>, SAMUEL AMPONSAH<sup>5,3</sup>, MARIAN KJELLEVVOLD<sup>1</sup>, JOHANNES PUCHER<sup>2</sup>

<sup>1</sup>German Federal Institute for Risk Assessment, Germany

<sup>2</sup>Institute of Marine Research, Norway

<sup>3</sup>Council for Scientific and Industrial Research, Food Research Institute, Ghana

<sup>4</sup>University of Ghana, Ghana

<sup>5</sup>University of Energy and Natural Resources, Ghana

### Abstract

Malnutrition is a severe issue in low-and middle-income countries, although fish has the potential to mitigate this burden. In Ghana, fish is a central part of the diet, but data on nutritional value and food safety parameters in processed indigenous fish species are scarce. On markets in five different regions of Ghana, samples of smoked, dried or salted small fish species were collected including *Engraulis encrasicolus* (European anchovy), *Brachydeuterus auritus* (Bigeye grunt), *Sardinella aurita* (Round sardinella), *Selene dorsalis* (African moonfish), *Sierrathrissa leonensis* (West African (WA) pygmy herring) and *Tilapia* spp. (tilapia). The samples were analysed for the content of nutrients (crude protein, fat, fatty acids, several vitamins, minerals, trace elements), microbiological contamination (total colony counts, *E. coli*, coliforms, and *Salmonella*), and levels of contaminants (PAH4, heavy metals). All sampled processed fish species (except for tilapia) showed the potential to significantly contribute to the recommended nutrient intakes of vitamins, minerals, and essential fatty acids. However, high levels of iron, mercury and lead were found in certain fish samples, which necessitates further identification of the sources along the food value chains. In all samples, the total colony counts were in an acceptable range while *E. coli* was found only in one sample. In addition, high numbers of coliform bacteria were found in the samples which calls for improving the hygiene conditions along the value chains. *Salmonella* was not detected in any of the samples. PAH4 in smoked samples reached high concentrations and necessitate the improvement of smoking practices and smoking equipment. This study provides valuable data with respect to nutritional value and potential food safety hazards of small processed fish as food in Ghana. Future research should seek to identify potential sources of contamination and critical points along the value chains, and develop applicable mitigation strategies to improve the quality and safety of small processed fish in Ghana.

**Keywords:** Fishery products, food quality, food safety, processed fish, nutrition