Introduction

The Total Diet Study (TDS) approach provides a snapshot of the dietary exposure of populations. In the framework of a 3-year Standard and Trade Development Facility funded project (STDF) implemented by the Food and Agriculture Organization of the United Nations (FAO) and the technical support of the World Health Organization (WHO) a TDS is currently taking place in Benin, Cameroon, Mali and Nigeria.

The study aims to assess human dietary exposure to toxic chemicals of the populations of eight locations, by processing food expenditure data from official household budget surveys. These data were processed from an extraction of 4 databases including a total exceeding 70,000 households to assess the i) average and ii) high consumers dietary patterns in four countries of Sub-Saharan Africa.

Experimental

Conversion of food purchase value into food quantity as consumed

Figure 1: Data processing via the SPSS software.

The process stages are: A: food value (currency), B: food as bought (g), C: edible food (g), D: food as consumed (g)

Conversion of household members into a standard unit

Figure 2: Adult male equivalence table provided by the National Bureau of Statistics (Nigeria).

Columns 2 an 3 define the fraction of adult male equivalent (AMF) of any household member depending on the age and gender of the subject.

Purge from over/under reporting households

Figure 3: Selection of normally reporting households on the basis of energy intake by adult male equivalent. Households reporting less than 1200 or more than 5100 kcal/adult male equivalent/day were removed from datasets prior to calculating the average and percentile 95 intakes.

Definition of the food classification

Figure 4: Food classification represented as a 3-strata pyramid hierarchy. Each stratum equals 100% of the diet.

The average and percentile 95 consumptions were assessed at each level of the hierarchy. Each level can be characterized by the purpose it serves in the TDS approach, thus defining:

1. Consumption patterns (level 2)
2. Pooled samples (level 2)
3. Subsamples (level 3)

Results and discussion

Inter-country food consumption patterns

Figure 5: Average daily consumption by food groups (unit: g/adult male equivalent/day) of populations of the 4 countries of the study.

Intra-country food consumption patterns

Figure 6: Average daily consumption by food groups (unit: g/adult male equivalent/day) of populations of the 8 study centers of the study

Interpretation

Dietary patterns of the study populations show the largest variations for cereals and tubers food groups, in absolute terms. Intra-country variations of dietary patterns may be more extensive than inter-country variations, partly depending on whether the study centers are located by the ocean or closer to the Sahel. High consumption of cereals in particular seems to be a determinant factor for exposure assessment associated with populations dwelling in northern, semi-arid and arid locations of Sub-Saharan Africa.

Conclusion

Dietary patterns of populations of Benin, Cameroon, Mali and Nigeria were assessed thanks to a replicable and cost-effective method based on national household budget surveys, which are mandatorily updated every five years in African countries.

Cereals and tubers consumption levels turn out to be the most significant differences among the 8 study centers, most probably resulting in differential dietary exposure patterns with regard to contaminants and residues such as mycotoxins and pesticides, which will be subsequently assessed.

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