



**The ANIBES study
on energy balance in Spain:
Design, protocol and methodology**

With the participation of:



NUMBER 1

The ANIBES study on energy balance in Spain: design, protocol and methodology

The ANIBES scientific study involves a representative sample of the resident population in Spain (excluding the autonomous cities of Ceuta and Melilla) between the ages of 9 and 75.

To be specific, the sample is comprised of 2,009 people from a total population of 37 million people. The gender distribution (50.4 % men and 49.6 % women) reflects the distribution of the men and women in our country. Furthermore, its size was bolstered for the younger age groups (from 9 to 12 and 13 to 17 years of age) in order to correctly represent these age groups (error +/- 6.9 %). Therefore, the most enhanced random sample was 2,285 participants.

The study, in data

- **Age groups:** from 9 to 12 (children), 13 to 17 (adolescents), 18 to 64 (adults) and 65 to 75 (elderly)
- **Gender:** male and female
- **Geographical distribution:** (north-east, east, south, west, north-central, Balearic and Canary Islands, and metropolitan areas of Madrid and Barcelona)
- **Population size:**
 - 2,000 to 30,000 inhabitants ("rural" population)
 - 30,000 to 200,000 inhabitants ("semi-urban" population)
 - more than 200,000 inhabitants ("city" / "town" population)

The study was performed using stratified sampling and was carried out in several stages, with 128 sample points, 90 interviewers divided into 11 different areas and 12 coordinators, who had been previously trained by the Spanish Nutrition Foundation technicians.

Other factors considered in the sample selection:

- Unemployment rate
- Percentage of foreigners (immigrant population)
- Physical activity level
- Educational level/socio-economic level

Data collection

The fieldwork for the ANIBES scientific study was conducted for a period of three months, between September and November 2013, after two pilot studies had been previously performed (June – September 2013). It was divided into 15 cycles, each comprised of two parts:

● 1st visit:

Made by an interviewer and conducted in person with the participant for one hour. A few days before the visit, a letter and a leaflet explaining the survey were sent to potential participants, including a check to see whether they met the requirements to take part in the sample. This first visit was divided into the following stages:

- **Anthropometric data collection** on the participants (weight, size, waist circumference, % of body fat and % of body water).
- **24-hour dietary recall.** The participant told the interviewer his or her food and drink intake over the last 24 hours. The amounts of food and drinks were quantified using household measures, food models, pictures and brands.
In this regard, the participants had no information of any kind about when they were going to be interviewed about their food consumption.
- **Participant training on the use of the tablet and the software to be used.**
All the participants received a tablet, which was used exclusively for the study, and were trained to use it. Anyone who was not at ease handling the tablet was given the option of using a camera and paper and/or a telephone interview to log their data.
- **3-day food logs:** Food logs were filled out in the tablet by each participant, who had to record all the foods and drinks consumed over three consecutive days (2 working days and 1 weekend day) including, moreover, descriptions of the dishes and pictures taken of them, as well as of leftovers.
- **Physical activity:** Part of the total sample (206 people, approximately 10 % of the total sample) carried an accelerometer with them during the three days that they recorded their intake, which enabled their level of physical activity to be determined with a high level of reliability.

● 2nd visit:

Used to collect the tablet and the accelerometer, where appropriate. This last phase of the fieldwork also included filling out a questionnaire on physical activity habits and on the perception and comprehension of eating and health habits.



Data processing

Thanks to the technology used in the ANIBES scientific study, the information collected on each participant could be checked and coded almost in real time. Together with the information on food and drink, and the amount ingested in each case, information was also recorded with respect to the location of each participant, who they were eating with, as well as whether they were doing it watching television or sitting at a table.

At the end of the day and after completing their food and drink logs, the participants reported whether their intake corresponded to their regular consumption pattern (and if not, the reason why it was different). The food logs were sent in real time so they could be coded by specialised personnel for which software and a specific database were developed, designed by IPSOS, which served to check and code the data in tandem (for example, each food or drink recorded in the tablet corresponded to a food/serving code).

When all the information on food and drink intake was transformed into energy and nutrients, via the FEN's specific dietary assessment program, the data were processed using different statistical tools and analysis. The data obtained were divided into 16 food groups, 29 subgroups and 761 ingredients, for their subsequent analysis.

Quality Control

- a) The dieticians-nutritionists who took part in the study monitored the food and drink logs included by each participant over the course of three days.
- b) The initial quality control was based on the photographs and descriptions sent by the participants and on the descriptions made before/after each intake, with special attention being paid to the validation of variables such as ingredients, processed and ready-to-eat food brands, serving size and cooking technique used, in order to obtain accurate information for better coding.
- c) Final approval of the information received from each participant was carried out by a dietician-nutritionist and a supervisor, always under the FEN's direct supervision.

Based on the food and drink consumption logs, energy and nutrient intake was calculated using software specifically devised for the ANIBES scientific study, based mainly on an extended and revised version of the Food Composition Table by Moreiras et al. (2013).

Daily food quality was analysed using the nutrition targets for the Spanish population as criteria (SENC, 2011). Likewise, data provided by manufacturers, nutrition information on labels and the photographic atlas of foods, to assign a weight according to serving sizes, were also taken into account.

References

Ruiz E, Ávila JM, Castillo A, Valero T, del Pozo S, Rodríguez P, Aranceta-Bartrina J, Gil A, González-Gross M, Ortega RM, Serra-Majem LI, Varela-Moreiras G. The ANIBES Study on Energy Balance in Spain: Design, Protocol and Methodology. *Nutrients*, 2015;7:970-998; doi:10.3390/nu7020970

Scientific Committee

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The final protocol of the ANIBES scientific study was previously approved by the Clinical Research Ethics Committee of the Community of Madrid (Spain).

