



Nutrición Hospitalaria

ISSN: 0212-1611

nutricion@grupoaran.com

Sociedad Española de Nutrición

Parenteral y Enteral

España

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Nutrición Hospitalaria, vol. 33, núm. 3, 2016, pp. 52-59

Sociedad Española de Nutrición Parenteral y Enteral

Madrid, España

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Macronutrients contribution from beverages according to sex and age: findings from the ANIBES Study in Spain

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Abstract

Methodologies and procedures used in dietary surveys have been widely developed with the aim of evaluating the nutritional status of a population. However, beverages are often either disregarded at national and international assessment of nutrients intake or poorly mentioned. Moreover, there is no standardized questionnaire developed as a research tool for the evaluation of beverages intake in the general population. Moreover, the contribution of different beverages to macronutrients intake is rarely provided. The latter in the context of a continuous expansion and innovation of the beverages market in Spain. Therefore, the main goal of the present study was to evaluate non-alcoholic and alcoholic beverages macronutrients contribution in the ANIBES study in Spain (9-75 years old).

As expected, those contributed to dietary macronutrient intake mainly as total carbohydrates and sugar. The contribution to other macronutrients (proteins and lipids) by the beverage groups was of much less importance. For non-alcoholic beverages, contribution to carbohydrates was much higher in younger populations (children: $10.91 \pm 9.49\%$, mean \pm SD for boys and $9.46 \pm 8.83\%$ for girls; adolescents: $11.97 \pm 11.26\%$ for men and $13.77 \pm 10.55\%$ in women) than in adults: $9.01 \pm 9.84\%$ for men and $7.77 \pm 8.73\%$ in women. Finally, a much lower contribution was observed in the elderly: $4.22 \pm 6.10\%$ for men and $4.46 \pm 6.56\%$ for women. No sex differences, however, across all age groups were found. Results for sugar contribution showed a similar trend: children ($23.14 \pm 19.00\%$ for boys and $19.77 \pm 17.35\%$ for girls); adolescents ($28.13 \pm 24.17\%$ for men and $29.83 \pm 21.82\%$ in women); adults $20.42 \pm 20.35\%$ for men and $16.95 \pm 17.76\%$ in women, $p \leq 0.01$; and elderly: $14.63\% \pm 9.97$ for men and $9.33 \pm 12.86\%$ in women. The main contribution corresponded to sugared soft drinks, juices and nectars, more relevant and significant in the younger populations.

As for alcoholic beverages, the contribution of macronutrients to the total diet is low for carbohydrates and sugar. The main contribution of this group, as expected, is alcohol, being higher from low alcohol content beverages, and in men vs women ($p \leq 0.001$).

Key words: ANIBES study. Nutrition surveys. Macronutrients intake. Beverages intake. Spain.

INTRODUCTION

The beverages groups are characterized by their great heterogeneity and innovation. In Spain, the non-alcoholic beverages segment has traditionally been composed of mineral water, soda, soft drinks, juices and nectars. At the same time, within the alcoholic

beverages category, beer has consolidated as one of the most demanded drinks by Spanish consumers (1). However, the most significant increase is the availability of non-alcoholic beverages: in 1964 roughly a drink was consumed per week (46 g/person per day), but in 2010 consumption increased tenfold (444 g/person per day). On the other hand, consumption of dairy products has also increased considerably from 1964 to nowadays, even though a marked decrease in the last years has occurred, mainly by replacing milk by other non-alcoholic drinks (the latter being the group with a higher growth in the recent years), which may lead to a poorer nutritional density, mainly of concern for children and young population (2). Moreover, the World Health Organization (WHO) acknowledges the high burden of disease caused by unhealthy dietary and lifestyle patterns in many countries of the Region; in particular, they are concerned about the rapid rise of overweight and obesity, especially in children. In their declarations, they support research of the population's nutritional status and behaviours, and accessibility of data to promote new research and better returns on investments (3).

In this regard, the methodologies and procedures used in dietary surveys have been widely developed with the aim of evaluating the nutritional status of a population (4-6). However, beverage is often either disregarded at national and international assessment of nutrients intake or poorly mentioned. Moreover, at present there is no standardized questionnaire developed as a research tool for the evaluation of beverage intake in the general population (7).

The Consensus Meeting on the Methodology of Dietary Surveys, Classification of Physical Activity and Healthy Lifestyles (8) in 2015 highlighted the aims of assessment of beverages as an area of scientific interest that is still in development and seems to be very promising for improving health research (9) and to extrapolate the results to practical recommendations at population level.

Many valuable dietary surveys have been previously conducted in Spain (10-13), although, to the best of our knowledge,

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no one has approached energy and nutrients intake and its determinants using new, more accurate technologies. To fill this gap, the ANIBES study (*Antropometría, Ingesta y Balance Energético en España*, that is, Anthropometry, Dietary Intake and Energy Balance in Spain) was specifically designed to focus on accurate and update collection on macronutrient intake in the Spanish diet, by analysing more detailed and accurate information of food and beverage sources that currently contribute dietary intake.

We have previously shown that beverages contribution to energy intake in the ANIBES study in Spain was 2.9% for non-alcoholic beverages and 2.3% for alcoholic beverages, showing a lower contribution to total energy intake. Sugared soft drinks contributed 2.0% (36 kcal/day out of 1,810 kcal/day) to total energy intake. A lower consumption compared with mean contribution was seen in children (1.9% of energy, 34 kcal/day) and the lowest corresponded to the elderly population (0.7% of energy, 13 kcal/day). Juices and nectars contributed 1.3%, more in children and adolescent than in adults and the elderly. Alcoholic beverages of lower/moderate alcohol content (beer, wine, cider) represented over 90% of energy contribution within this group (14).

OBJECTIVES

The main objective of the present study was to evaluate macronutrients contribution of non-alcoholic and alcoholic beverages in the ANIBES study in Spain.

METHODS

The design, protocol, and methodology of the ANIBES study have been already described in detail (15,16).

SAMPLE

The design of the ANIBES study aimed to define a sample size that is representative of all individuals living in Spain, aged 9 to 75 years. The initial potential sample consisted of 2,634 individuals, and the final sample comprised 2,009 individuals (1,013 men, 50.4%; 996 women, 49.6%). In addition, for the youngest age groups (9-12, 13-17, and 18-24 years), a boost sample was included to have at least $n = 200$ per age group (error $\pm 6.9\%$). Therefore, the random sample plus booster comprised 2,285 participants.

The fieldwork for the ANIBES study was conducted from mid-September 2013 to mid-November 2013, and two previous pilot studies were performed. To equally represent all days of the week, subjects participated during two weekdays and one weekend day, always consecutive days. The final protocol was approved by the Ethical Committee for Clinical Research of the Region of Madrid (Spain).

FOOD AND BEVERAGE RECORD

Study participants were provided with a tablet device (Samsung Galaxy Tab 2 7.0) and trained in how to record information by taking photos of all food and drinks consumed during the three days of the study, both at home and outside. Photos had to be taken before beginning to eat and drink, and again after finishing, so as to record the actual intake. Additionally, a brief description of meals, recipes, brands, and other data was also recorded using the device.

Food and beverages records were returned from the field at almost "real" time, to be coded by trained coders who were supervised by dietitians-nutritionists. The dietitians-nutritionists assigned appropriate codes for all flagged food and portion codes and checked any other queries raised by the coders.

Beverages and their contribution to energy and nutrient intakes were calculated from food consumption records using this software (VD-FEN 2.1), which was newly developed for the ANIBES study by the Spanish Nutrition Foundation and is based mainly on Spanish Food Composition Tables (17), with several expansions and updates. Data obtained from food manufacturers and nutritional information provided on food labels were also included. A food photographic atlas was used to assist in assigning gram weights to portion sizes.

STATISTICAL ANALYSIS

The intake data were grouped into 16 food groups, 38 subgroups and 754 ingredients for in-depth analysis. For beverages, data were grouped into 2 food groups, 10 subgroups and 64 ingredients. Once all dietary intake information had been transformed into energy and nutrient data, these data were processed using different statistical analysis tools and packages.

For those variables normally distributed, comparison between groups was performed by a Student's t-test for two independent samples and ANOVA test for more than two independent samples with a 95% confidence interval. Non parametric tests were performed to solve the lack of normality: a Mann-Whitney test for two independent samples and a Kruskal Wallis test for more than two independent samples with a 95% confidence interval. Bonferroni or Games Howell tests were used for non-equal variances to adjust multiple comparisons between groups. The Levene's test was used to check the equality of variances and the Kolmogorov-Smirnoff normality test was used to test the normality of the distribution: random sample (2,009 participants) and random + booster sample (2,285). The random sample is used to show total sample data and to compare between sexes. To compare age groups and sex in age groups, a booster sample was included in order to expand those age groups less represented in the random sample. The following statistics were calculated to qualify each variable in the analysis: mean, standard deviation, and variance to measure dispersion in the values, minimum and maximum values, median, quartiles (as well as interquartile range), and deciles to describe the shape of the distribution.

RESULTS

Tables I-V show the dietary sources of macronutrients from the different beverages groups and subgroups by sex by age groups. Data are expressed as means.

Beverages groups mainly contributed to dietary macronutrients intake as total carbohydrates and sugar. The contribution of other macronutrients (proteins and lipids) by the beverages groups was almost irrelevant. Fiber was mostly provided by juices and nectars.

In relation to total carbohydrates and sugars, relevant differences with age were observed. For non-alcoholic beverages, in terms of age, the differences were of importance: a much higher contribution from the non-alcoholic beverage to carbohydrates in children (9-12 years): boys $10.91 \pm 9.49\%$ (mean \pm standard deviation) and girls $9.46 \pm 8.83\%$, and adolescents (13-17 years): men $11.97 \pm 11.26\%$ and women $13.77 \pm 10.55\%$, compared

to adults (men $9.01 \pm 9.84\%$ and women $7.77 \pm 8.73\%$) and the elderly (65-75 years): men $4.22 \pm 6.10\%$, and women $4.46 \pm 6.56\%$. No differences between sexes were found, however, for all age groups.

A similar trend was observed for sugar: children (boys $23.14 \pm 19.00\%$ and girls $19.77 \pm 17.35\%$); adolescents (men $28.13 \pm 24.17\%$ and women $29.83 \pm 21.82\%$); adults (men $20.42 \pm 20.35\%$ and women $16.95 \pm 17.76\%$, $p \leq 0.01$) and elders: (men $14.63\% \pm 9.97$ and women $9.33 \pm 12.86\%$).

Within the non-alcoholic beverages subgroups, for total population, sugared soft drinks contributed $5.07 \pm 8.19\%$ and $4.17 \pm 7.30\%$ ($p \leq 0.01$) of total carbohydrates intake, for men and women, respectively ($4.82 \pm 7.17\%$ - $3.19 \pm 5.06\%$ in children, $7.05 \pm 9.93\%$ - $7.68 \pm 7.97\%$ in adolescents, $5.13 \pm 8.16\%$ - $4.33 \pm 7.46\%$ [$p \leq 0.05$] in adults and $1.51 \pm 3.64\%$ - $1.60 \pm 4.5\%$ in elderly adults, also for men and women). Juices and

Table I. Macronutrients intake (%) from beverages food groups and subgroups in the ANIBES Spanish population by sex (total: 9-75 years)

	Proteins %	Lipids %	Carbohydrates %	Sugar %	Fiber %	Alcohol %
<i>Men (aged 9-75 years) (n = 1,013)</i>						
<i>Non-alcoholic beverages</i>	0.93	0.20	8.96	20.35	0.57	-
Water	-	-	-	-	-	-
Coffee and infusions	0.39	0.00	0.30	0.82	-	-
Sugar soft drinks	-	-	5.07	11.24	-	-
Non-sweetened soft drinks	0.00	0.04	0.01	0.06	-	-
Sports drinks	-	-	0.22	0.45	-	-
Energy drinks	0.23	0.16	0.21	0.46	0.04	-
Juices and nectars	0.31	0.01	3.06	7.10	0.53	-
Other drinks	-	-	0.10	0.22	-	-
<i>Alcoholic beverages</i>	0.49	-	1.78	4.96	-	100.00
Low alcohol content beverages	0.49	-	1.72	4.83	-	93.58
High alcohol content beverages	-	-	0.06	0.14	-	6.42
<i>Women (aged 9-75 years) (n = 996)</i>						
<i>Non-alcoholic beverages</i>	1.42	0.48	7.76	16.77	0.49	-
Water	-	-	-	-	-	-
Coffee and infusions	0.53	0.01	0.40	1.05	-	-
Sugar soft drinks	-	-	4.17	8.76	-	-
Non-sweetened soft drinks	0.01	0.06	0.03	0.10	-	-
Sports drinks	-	-	0.11	0.25	-	-
Energy drinks	0.59	0.40	0.23	0.52	0.05	-
Juices and nectars	0.30	0.01	2.76	6.00	0.44	-
Other drinks	-	-	0.05	0.09	-	-
<i>Alcoholic beverages</i>	0.23	-	0.89	2.21	-	100.00
Low alcohol content beverages	0.23	-	0.86	2.16	-	93.26
High alcohol content beverages	-	-	0.03	0.05	-	6.74

Table II. Macronutrients intake (%) from beverages food groups and subgroups in the ANIBES Spanish population by sex (children: 9-12 years)

	Proteins %	Lipids %	Carbohydrates %	Sugar %	Fiber %	Alcohol %
<i>Boys (aged 9-12 years) (n = 126)</i>						
<i>Non-alcoholic beverages</i>	0.56	0.06	10.91	23.14	0.65	-
Water	-	-	-	-	-	-
Coffee and infusions	0.02	-	0.01	0.02	-	-
Sugar soft drinks	-	-	4.82	10.05	-	-
Non-sweetened soft drinks	0.00	0.01	0.01	0.02	-	-
Sports drinks	-	-	0.41	0.87	-	-
Energy drinks	0.08	0.03	0.01	0.02	-	-
Juices and nectars	0.46	0.01	5.65	12.16	0.65	-
Other drinks	-	-	-	-	-	-
<i>Alcoholic beverages</i>	-	-	0.00	0.00	-	-
Low alcohol content beverages	-	-	-	-	-	-
High alcohol content beverages	-	-	0.00	0.00	-	-
<i>Girls (aged 9-12 years) (n = 87)</i>						
<i>Non-alcoholic beverages</i>	0.60	0.02	9.46	19.77	1.10	-
Water	-	-	-	-	-	-
Coffee and infusions	0.01	-	0.00	0.00	-	-
Sugar soft drinks	-	-	3.19	6.67	-	-
Non-sweetened soft drinks	0.00	0.01	0.00	0.01	-	-
Sports drinks	-	-	0.16	0.32	-	-
Energy drinks	-	-	-	-	-	-
Juices and nectars	0.59	0.01	6.11	12.77	1.10	-
Other drinks	-	-	-	-	-	-
<i>Alcoholic beverages</i>	-	-	0.00	0.00	-	-
Low alcohol content beverages	-	-	-	-	-	-
High alcohol content beverages	-	-	0.00	0.00	-	-

nectars were ranked second, contributing $3.06 \pm 5.71\%$ for men and $2.76 \pm 5.02\%$ in women, but differences were also observed according to age: $5.65 \pm 6.81\%/6.11 \pm 6.80\%$ in children; $4.49 \pm 6.27\%/5.83 \pm 8.66\%$ in adolescents; $2.93 \pm 5.63\%/2.55 \pm 4.53\%$ in adults and $2.01 \pm 4.91\%/1.98 \pm 4.50\%$ in the elderly, for men/women. A similar trend for sugar was shown. Lately, other types of drinks represented a much smaller contribution to carbohydrates and sugar intake. As for alcoholic beverages, the contribution of macronutrients to the total diet is low for carbohydrates and sugar. The main contribution of this group, as expected, is alcohol.

Fiber is basically contributed by juices and nectars (men $0.53 \pm 2.02\%$ and women $0.44 \pm 1.58\%$) and in a lower proportion by energy drinks (men $0.04 \pm 0.59\%$ and women $0.05 \pm 0.72\%$).

There were differences between the contribution of proteins and lipids by beverages as age and sex, but the amount contribut-

ed to the total diet for these groups is not very relevant. In relation to proteins, the group of non-alcoholic beverages, basically as low alcohol content beverage (beer, wine, etc.), was $0.93 \pm 1.96\%$ for men and $1.42 \pm 2.54\%$ for women ($p \leq 0.001$), and regarding high alcohol content beverages it was $0.49 \pm 1.06\%$ for men, and $0.23 \pm 0.62\%$ ($p \leq 0.001$) for women. As for lipids, the contribution of the group of non-alcoholic beverages to men intake was $0.20 \pm 1.38\%$ and $0.48 \pm 1.69\%$ to women intake ($p \leq 0.001$), whereas alcoholic beverages did not contribute to lipids intake.

DISCUSSION

The ANIBES study was designed to obtain accurate and updated information on the anthropometric data, macronutrients and micronutrients intake and expenditure, as well as the practice of physical

Table III. Macronutrients intake (%) from beverages food groups and subgroups in the ANIBES Spanish population by sex (adolescent 13-17 years)

	Proteins %	Lipids %	Carbohydrates %	Sugar %	Fiber %	Alcohol %
<i>Men (aged 13-17 years) (n = 137)</i>						
<i>Non-alcoholic beverages</i>	0.52	0.08	11.97	28.13	1.02	-
Water	-	-	-	-	-	-
Coffee and infusions	0.05	-	0.06	0.19	-	-
Sugar soft drinks	-	-	7.05	16.30	-	-
Non-sweetened soft drinks	0.00	0.02	0.01	0.03	-	-
Sports drinks	-	-	0.08	0.14	-	-
Energy drinks	0.06	0.04	0.04	0.09	0.03	-
Juices and nectars	0.41	0.01	4.49	10.81	0.99	-
Other drinks	-	-	0.24	0.57	-	-
<i>Alcoholic beverages</i>	0.00	-	0.01	0.04	-	-
Low alcohol content beverages	0.00	-	0.01	0.04	-	-
High alcohol content beverages	-	-	-	-	-	-
<i>Women (aged 13-17 years) (n = 74)</i>						
<i>Non-alcoholic beverages</i>	0.78	0.28	13.77	29.83	0.71	-
Water	-	-	-	-	-	-
Coffee and infusions	0.04	0.00	0.02	0.06	-	-
Sugar soft drinks	-	-	7.68	16.63	-	-
Non-sweetened soft drinks	0.00	0.02	0.01	0.02	-	-
Sports drinks	-	-	0.12	0.23	-	-
Energy drinks	0.28	0.22	0.12	0.25	0.13	-
Juices and nectars	0.46	0.03	5.83	12.65	0.59	-
Other drinks	-	-	-	-	-	-
<i>Alcoholic beverages</i>	0.02	-	0.02	0.09	-	-
Low alcohol content beverages	0.02	-	0.02	0.09	-	-
High alcohol content beverages	-	-	-	-	-	-

activity, socioeconomic data and lifestyles of the population for the first time in a study in Spain. For that purpose, a country representative survey has been approached, and new technologies for dietary food and beverage records and physical activity levels have been used.

An important goal within the ANIBES study was also to estimate beverages consumption accurately. Therefore, ANIBES represented the first population survey of the consumption and variety of beverages in Spain that used photography. Also it is important to stress that leftovers were also taken into account, a key factor for beverages where traditionally whole portions (glass, wineglass, can, etc.) are approached. Seasonality in the consumption of beverages is very important, thus, the fieldwork was performed from September to November as a period in which beverage consumption is usually more stable (18). Total energy intake (14) and macronutrients distribution for the other foods groups (19) was already shown in previous publications.

Beverage consumption certainly varies greatly according to age, sex, temperature, etc., and is also very different between countries (20). From the limited data available, the results show that the studies on beverage intake in European countries had very different design and methodology (7,12,21). Sometimes, studies from European countries had roughly similar beverage intakes, however, when taking into account different categories of beverages, the situation changes, and the composition of the subgroups of food is different (7).

In the ANIBES study, non-alcoholic beverages and alcoholic beverages showed a contribution to the total diet for proteins, lipids and fibre not very relevant in contrast to total carbohydrates and sugars, for which differences according to age were observed. Others recent studies have also reported differences between the age groups (22) and no differences in consumption patterns between genders in youngest groups (23), as well as in our case.

Table IV. Macronutrients intake (%) from beverages food groups and subgroups in the ANIBES Spanish population by sex (adult 18-64 years)

	Proteins %	Lipids %	Carbohydrates %	Sugar %	Fiber %	Alcohol %
<i>Men (aged 18-64 years) (n = 798)</i>						
<i>Non-alcoholic beverages</i>	0.99	0.24	9.01	20.42	0.54	-
Water	-	-	-	-	-	-
Coffee and infusions	0.42	0.00	0.34	0.94	-	-
Sugar soft drinks	-	-	5.13	11.36	-	-
Non-sweetened soft drinks	0.00	0.04	0.01	0.07	-	-
Sports drinks	-	-	0.26	0.55	-	-
Energy drinks	0.25	0.18	0.25	0.54	0.05	-
Juices and nectars	0.31	0.01	2.93	6.76	0.49	-
Other drinks	-	-	0.09	0.21	-	-
<i>Alcoholic beverages</i>	0.59	-	2.11	5.81	-	100.00
Low alcohol content beverages	0.59	-	2.04	5.66	-	93.52
High alcohol content beverages	-	-	0.07	0.15	-	6.48
<i>Women (aged 18-64 years) (n = 857)</i>						
<i>Non-alcoholic beverages</i>	1.51	0.55	7.77	16.95	0.44	-
Water	-	-	-	-	-	-
Coffee and infusions	0.53	0.01	0.40	1.08	-	-
Sugar soft drinks	-	-	4.33	9.15	-	-
Non-sweetened soft drinks	0.01	0.07	0.03	0.11	-	-
Sports drinks	-	-	0.14	0.30	-	-
Energy drinks	0.69	0.47	0.24	0.59	0.03	-
Juices and nectars	0.28	0.01	2.55	5.62	0.41	-
Other drinks	-	-	0.06	0.11	-	-
<i>Alcoholic beverages</i>	0.26	-	1.01	2.50	-	100.00
Low alcohol content beverages	0.26	-	0.97	2.43	-	92.13
High alcohol content beverages	-	-	0.04	0.07	-	7.87

The present results are lower to those obtained from the latest Spanish Food Consumption Survey (FCS), the latter performed in households (non-alcoholic beverages contributed 5.9% to carbohydrates, and 13.2% to sugar, whereas alcoholic beverages provided a 0.9% and 2.1%, of total carbohydrates and sugar, respectively) (24). Other studies in Spain such as ENUCAM (Nutrition Survey of Madrid) (25) also showed somewhat lower results for carbohydrates and sugar contribution from non-alcoholic beverages (5.6%-12.5%) and from alcoholic beverages (0.5%-1.4). For additional comparison, in the ENIDE dietary survey (*Encuesta Nacional de Ingesta Dietética*), non-dairy beverages (excluding alcoholic drinks) contributed roughly 6% of total carbohydrates in the Spanish population (26). All these mentioned surveys in Spain have been performed in the last five years.

The impact of sugared soft drink consumption on obesity and metabolic disorders has come under intense scrutiny and debate

worldwide in recent years (27-30), but large differences between countries have been observed. The present study showed that sugared soft drinks contributed $11.24 \pm 17.31\%$ - $8.76 \pm 14.81\%$ to total sugar intake, for men and women, respectively. A higher consumption compared with mean contribution was seen in adolescents ($16.30 \pm 20.71\%$ - $16.63 \pm 17.64\%$) whereas the lowest contribution was obtained for the elderly population ($3.43 \pm 8.59\%$ - $3.30 \pm 9.37\%$). Higher consumptions were found, however, for children ($10.05 \pm 14.91\%$ - $6.67 \pm 10.57\%$) and adults ($11.36 \pm 17.29\%$ - $9.15 \pm 15.07\%$; $p \leq 0.05$). More efforts are needed in order to improve the diet quality of the youngest, but also to inform about the increasing variety of non-caloric drinks that are offered at present in the Spanish food market.

Finally, we found a low to moderate contribution from alcoholic beverages (carbohydrates $1.78 \pm 3.41\%$ - $0.89 \pm 2.13\%$, $p \leq 0.001$, and sugar $4.96 \pm 9.51\%$ - $2.21 \pm 5.24\%$, $p \leq 0.001$, for

Table V. Macronutrients intake (%) from beverages food groups and subgroups in the ANIBES Spanish population by sex (seniors 65-75 years)

	Proteins %	Lipids %	Carbohydrates %	Sugar %	Fiber %	Alcohol %
<i>Men (aged 65-75 years) (n = 99)</i>						
<i>Non-alcoholic beverages</i>	1.65	0.41	4.22	9.97	0.39	-
Water	-	-	-	-	-	-
Coffee and infusions	0.64	0.01	0.39	0.92	-	-
Sugar soft drinks	-	-	1.51	3.43	-	-
Non-sweetened soft drinks	0.00	0.02	0.00	0.01	-	-
Sports drinks	-	-	0.07	0.15	-	-
Energy drinks	0.75	0.38	0.24	0.72	-	-
Juices and nectars	0.25	0.00	2.01	4.73	0.39	-
Other drinks	-	-	-	-	-	-
<i>Alcoholic beverages</i>	0.40	-	1.72	5.35	-	100.00
Low alcohol content beverages	0.40	-	1.63	5.11	-	93.65
High alcohol content beverages	-	-	0.09	0.24	-	6.35
<i>Women (aged 65-75 years) (n = 107)</i>						
<i>Non-alcoholic beverages</i>	1.39	0.28	4.46	9.33	0.34	-
Water	-	-	-	-	-	-
Coffee and infusions	0.83	0.03	0.62	1.47	-	-
Sugar soft drinks	-	-	1.60	3.30	-	-
Non-sweetened soft drinks	0.00	0.03	0.01	0.03	-	-
Sports drinks	-	-	0.02	0.11	-	-
Energy drinks	0.32	0.22	0.23	0.36	0.16	-
Juices and nectars	0.23	0.01	1.98	4.07	0.19	-
Other drinks	-	-	-	-	-	-
<i>Alcoholic beverages</i>	0.18	-	0.63	1.59	-	100.00
Low alcohol content beverages	0.18	-	0.63	1.59	-	98.72
High alcohol content beverages	-	-	0.00	0.00	-	1.28

men and women) in total population. Alcoholic beverages of lower alcohol content (beer, wine, cider) represented over 90% of alcohol contribution. In general, alcoholic beverage consumption has undergone a slow decline during recent years, according to FCS (259 g/person/day in year 2000 *versus* 208 g/person/day in year 2008) (31). Within this group, in the last few years, a gradual substitution of wine for beer has taken place, which represents almost 70% of the total alcoholic beverage consumption at present (31).

CONCLUSIONS

Current epidemiological studies in Europe focus on beverage intake and their contribution to nutrients intake are still scarce. From the limited data available and the diversity of the method-

ology used, the results showed that consumption of beverages is different between countries. Furthermore, it should be remembered that the contribution of different beverages on macronutrient intake is often not provided in the studies. Therefore, further research is needed to clarify the present role of the increasing beverages market on the dietary habits and subsequent nutritional status of the Spanish population. We, at the present study, have contributed by using the available ANIBES study innovative methodology.

Beverage groups mainly contributed to dietary macronutrients intake as total carbohydrates and sugar. For non-alcoholic beverages, in terms of age, the differences were very marked, showing a much higher contribution in younger populations than in seniors, and mainly as sugared soft drinks and juices and nectars. As for alcoholic beverages, the contribution of macronutrients is lower

for carbohydrates and sugar but is essentially by alcohol their contribution is higher as low alcohol content beverages in adult and elderly men.

ACKNOWLEDGEMENTS

The authors would like to thank Coca-Cola Iberia for its support and technical advice, particularly Rafael Urrialde and Isabel de Julián.

CONFLICTS OF INTEREST

The study was financially supported by Coca-Cola Iberia through an agreement with the Spanish Nutrition Foundation (FEN). The funding sponsors had no role in the design of the study, the collection, analysis, or interpretation of the data, writing of the manuscript, or in the decision to publish the results. The authors declare no conflicts of interest.

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