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## Dietary supplements use by fish-eaters, vegetarians and vegans compared to meat eaters:, relationships with inadequate nutrient intake and sociodemographic characteristics

Benjamin Allès, Philippine Fassier, Emmanuelle Kesse-Guyot, Julia Baudry, Sandrine Péneau, Serge Hercberg and Mathilde Touvier

*Équipe de Recherche en Épidémiologie Nutritionnelle (EREN) Inserm U1153 /Inra 1125/Cnam/Université Paris 13, Centre de Recherche en Épidémiologie et Biostatistique Sorbonne Paris Cité (CRESS), Bobigny, France*

### Abstract

**Introduction:** Dietary supplements (DS) containing nutrients found mainly in animal products might be useful for individuals following specific type of vegetarian diet. However, the nutritional quality of the overall diet has been reported better in vegetarians compared to meat eaters, nuancing this potential interest. Little information is available about DS use according to the different types of vegetarian diets. This cross-sectional study aimed to describe DS use among fish eaters, vegetarians, vegans and meat eaters and to investigate its impact on nutritional inadequacy and its association with sociodemographic characteristics. Potentially at-risk DS use which include DS-drugs contraindicated associations; use of DS pointed out by safety authorities; and excess of tolerable upper intake levels were also described.

**Material and methods:** 76,925 participants to the NutriNet-Santé cohort who completed a quantitative DS questionnaire and three 24 h dietary records were classified into 4 diet groups: 74,558 meat eaters, 1,126 fish eaters, 793 strict vegetarians and 448 vegans. A composition database including > 8000 DS was used. The prevalence of nutritional inadequacy was determined based on usual dietary intakes corrected by variance reduction, and analyses were weighted according to the French census data. Multivariable logistic regression models were performed to estimate the associations between sociodemographic characteristics and DS use.

**Results:** The proportion of DS users (at least one DS during the last 12 months) was 42.4% in meat eaters, 65.7% in fish eaters, 61.7% in strict vegetarians and 76.7% in vegans. As compared to food intake alone, DS use lead to low decrease in nutritional inadequacy (< 5%), except in vegan for whom substantial decrease in inadequacy was observed for zinc (-5%), riboflavin (-11%) and vitamin B12 (-28%). Compared to meat eaters, fish eaters and vegetarians DS users showed highest proportions of DS-drugs contraindicated associations, use of DS pointed out by safety authorities, and subjects exceeding tolerable upper intake. Vegan DS users showed the lowest proportions of DS-drugs contraindicated associations and use of DS pointed out by safety authorities. DS use was associated with higher education in fish eaters, higher education and being non-smoker in vegetarians, and higher income in vegans (all  $p < 0.001$ ).

**Discussion:** Our results suggest that DS contribute to reducing the risk of inadequate intake for specific animal product-related nutrients mostly in vegans. DS use was associated with different sociodemographic characteristics depending on the vegetarian diet type. Potential benefits or risks associated with DS use in vegetarians should be assessed in further longitudinal studies.

### Conflict of Interest

There is no conflict of interest.