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# Categorized Dietotype Emergence by Exploratory Factorial Analyses with Axial Nutrition–Health Precision Potential †

**Edwin Fernández-Cruz [1,*], Víctor de la O [1], Cristina Fernández [1], Alfonso L. Calle-Pascual [2,3], Angélica Larrad [4], José Luis Espadas [4] and Jose Alfredo Martínez [1]**

[1] IMDEA-Food Institute (Madrid Institute for Advanced Studies), 28049 Madrid, Spain; cristinamaria.fernandez@imdea.org (C.F.); jalfredo.martinez@imdea.org (J.A.M.)
[2] Centro de Investigación Biomédica en Red de Diabetes y Enfermedades Metabólicas Asociadas (CIBERDEM), 28029 Madrid, Spain; alfonsoluis.calle@salud.madrid.org
[3] Department of Medicine II, Faculty of Medicine of the Universidad Complutense of Madrid (UCM), 28040 Madrid, Spain
[4] Department of Endocrinology and Nutrition, University Hospital San Carlos (UHSC), 28040 Madrid, Spain; a.larrad47@gmail.com (A.L.); joseluis.espadas@salud.madrid.org (J.L.E.)
* Correspondence: edwin.fernandez@alimentacion.imdea.org
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**Abstract:** Introduction: Dietary habits and healthy lifestyles are crucial factors impacting cardiometabolic health and quality of life. Precision nutrition has emerged as a valuable tool to monitor the multiple factors participating in metabolic wellbeing and to examine the possible interactions between diet and health. One such approach involves the use of dimensional reduction methods, which aim to classify subjects into distinct nutritional subgroups or dietotypes based on differential dietary intakes and health outcomes. Methods and Results: A multidimensional exploratory analysis using carefully collected dietary data (Validated FFQ/72 h Recall questionnaires) as well as anthropometric and biochemical determinations from the DIETARY DEAL pilot-study was conducted to define specific dietary profiles. A factorial analysis design was performed, which allowed to identify four distinct clustering factors, characterized as factor 1, or a proto-omnivorous food profile (F1p-O); factor 2, or a pro-vegetarian plant-based diet (F2p-V); factor 3, or a pro-Mediterranean pattern (F3p-M); and factor 4, or a pro-health pescatarian dietary regime (F4p-P). Statistical differences concerning food group consumption (g/d) were found. Thus, F1p-O evidenced higher consumption of fruits, fatty fish, and white and red meat; F2p-V was richer in vegetables, fruits, pulses, and whole grains; F3p-M had olive oil as the most representative food/ingredient; and F4p-P elicited consumption of healthy foods such a vegetables and fatty fish and the avoidance of refined grains, red meats, whole dairy, and ultra-processed solids. After adjusting for potential confounders and energy using the residual method, F1p-O showed a direct relationship with fat-free mass ($\beta = +4.4$; $p < 0.001$), and skeletal muscle mass ($\beta = +2.6$; $p < 0.001$), while the association with F2p-V was the opposite in such somatic markers ($\beta = -2.3$; $p < 0.001$; $\beta = -3.1$; $p < 0.001$; respectively). F3p-M was inversely linked with IL-6 and zinc ($\beta = -0.9$; $p < 0.05$; $\beta = -5.3$; $p < 0.05$, respectively), and F4p-P was coupled with selenium intake in age- and sex-adjusted models ($\beta = +5.6$; $p < 0.05$). Conclusions: Our findings suggest that proto-omnivorous dietary patterns are positively associated with lean mass components, while plant-based diets showed opposite trends. Mediterranean dietary patterns prompted a possible association with anti-inflammatory profiles. These results highlight the potential utility of dimensional reduction methods in understanding the occurrence of qualitative clustered dietotypes relating diet with health outcomes for prescribing precision nutrition.

**Keywords:** dietotype; precision nutrition; factorial analysis



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