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# LIFE Climate Smart Chefs; An Analysis of the Impact of Recipe Reformulation on Environment and Nutrition to Support Sustainable Menu Design (Editions 4 to 6)

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2023 was reported as the warmest year on record, and the global mean temperature reached 1.45°C above the 1850 to 1900 pre-industrial average[1]. Emissions from food production are estimated to push global warming over the 1.5°C target set by the Intergovernmental Panel on Climate Change (IPCC)[2]. The food industry contributes to one-third of greenhouse gas emissions (GHGe), and accounts for 70% of the world's fresh water use, through unsustainable practices within food production, packaging and transportation[3]. The LIFE Climate Smart Chef (CSC) project was developed to support EU Climate Policy in line with the objectives of the Farm to Fork Strategy[4]. This study aims to analyse the nutritional and environmental impact of recipe reformulation by chefs on the CSC project between January to May 2023.

Under the CSC project, 164 chefs were required to enter their recipes into Nutritics, complete a higher level training course on sustainable menu design, and then reformulate their recipes in an in-person workshop where the Nutritics "Foodprint" sustainability module was turned on. Foodprint profiles a recipe's carbon impact into a simple A to E grading system based on boundaries defined by the CSC project. 178 recipes from 27 chefs were entered into Nutritics software, and analysed for environmental impact (SuEatable LIFE database) and nutrition (energy, saturated fat, salt, sugar, and front of pack labels).

Environmental analysis showed a reduction in carbon (μ -40%; -20% to -75%) and water (μ -38%; 25% to -64%) following reformulation. While the number of A grade recipes remained the same, recipes with "Low" and "Medium" carbon grades B and C (B grades +7%, C grades +4%) and "High" carbon grade D recipes increased (+1%), "Very high" carbon E grade recipes (>1.2kg C02eq) decreased by 15%. For the nutrition analysis, there was a reduction in saturated fat content (μ -11%; 0 to +18g) and salt (μ -5%; 0 to +3.3g), whereas sugar increased after reformulation (μ + 16.3%; 0 to +32g). The Nutrition front of pack labels were impacted by reformulation; "red" labels decreased for salt and saturated fat, but increased for sugar (salt -17%; saturated fat -46%; sugar +50%), recipes labelled "amber" decreased for salt, but increased for saturated fat (salt -5%; saturated fat +6%; sugar 0%) and recipes labelled "green" increased for salt and saturated fat, but decreased for sugar (salt +7%; saturated fat +7%; sugar -1%).

Reformulation should consider multiple factors to ensure a net positive impact on environment and health. This analysis quantifies and provides insight into reformulation as a strategy in sustainable menu design. Quantifying impact may provide an evidence-based for food service reformulation strategies and targets. Future research should analyse additional factors such as cost and demographics, and in-depth statistical analysis.

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