HORIZON 2020

Sweeteners and sweetness enhancers: Impact on health, obesity, safety and sustainability

Reporting

Project Information

SWEET

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Project closed

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Coordinated by
THE UNIVERSITY OF LIVERPOOL
United Kingdom

Periodic Reporting for period 3 - SWEET (Sweeteners and sweetness enhancers: Impact on health, obesity, safety and sustainability)

Reporting period: 2021-10-01 to 2022-09-30

Summary of the context and overall objectives of the project

The SWEET project has been designed to i) identify and address the barriers and facilitators to the use of sweeteners and sweetness enhancers (S&SEs) and ii) examine the risks and benefits of using S&SEs to replace sugar in the diet in the contexts of health, obesity, safety and sustainability. Our commercial partners have started to develop resources which will help industry select S&SEs for new foods. The effect of various S&SEs on the body's biological systems and behaviour will also be examined across a wide range of consumers. A large trial will examine the benefits (and potential problems) with using S&SEs to replace sugar in the diet. In all studies safety and overall health risks will be considered. Further to this, existing data will be combined and examined to determine the benefits and risks of consumption of S&SEs verses sugar. The environmental impact of using these new S&SEs will also be assessed to ensure they are a sustainable approach. Consumer needs, preferences and opinions will determine which and how S&SEs might be used in the future. This will help policy makers, manufacturers and health experts determine if and how S&SEs can be used to improve health among various consumer groups with differing requirements. This should support the reduction of calories from sugar in the European diet, a critical step in dealing with the challenge of obesity and diet related diseases across Europe.

Work performed from the beginning of the project to the end of the period covered by the report and main results achieved so far

Innovation and production - Technological & health impact databases have been produced for a panel of S&SEs. Toxicological assessment has evaluated the safety of individual S&SEs. Candidates & innovative blends have been selected to be assessed in clinical trials. Three sugar-reduced beverages have been developed for Phase 1 (acute) trials and two S&SE blends have been included in foods (cakes, biscuits chocolates, yoghurt and cereal) for Phase 2 (medium term) trials. Sweet taste receptor studies have screened S&SEs and blends in cellular assays to determine binding and activation potential for sweet and bitter taste receptors and to examine the impact of mutations on receptor affinity. Exploration of the regulatory framework for the approval of new S&SEs in foods has been completed.

Short term effects on feeding behaviour - Phase 1 trials have assessed the acute impact of S&SE blends in beverages. Analysis of biological samples is ongoing. Ethical approval has been secured and trials commenced at all sites involved in the Phase 2 trials.

Prolonged effects on health diet and safety - The long term dietary intervention has been revised to a 1-year intervention without follow-up. The recruitment goal for adults was achieved but a reduced number of children were recruited. The intervention has been completed and final data entry and cleansing is ongoing.

Epidemiological studies - Data has been harmonised to produce a common virtual database to merge analysis. Longitudinal associations between S&SE intake and markers of metabolic syndrome and NAFLD has been analysed. Work to develop and validate an S&SE biomarker method to compare self-reported S&SE intake with real-world has been completed. Work is ongoing to assess biomarker

levels in cohort studies. Dietary coding required to establish the relative importance of genetic and environmental influences on S&SE intake in childhood has been completed.

Sustainability modelling - Scoping work has identified and selected S&SEs and food products for in-depth case-study by LCA approaches. Attributional and Consequential LCAs and Life Cycle costings have been complete for Thaumatin, Steviol glycosides, Aspartame, Neotame and Sucralose. Social LCAs have been completed for Thaumatin, Steviol Glycosides and Sucralose.

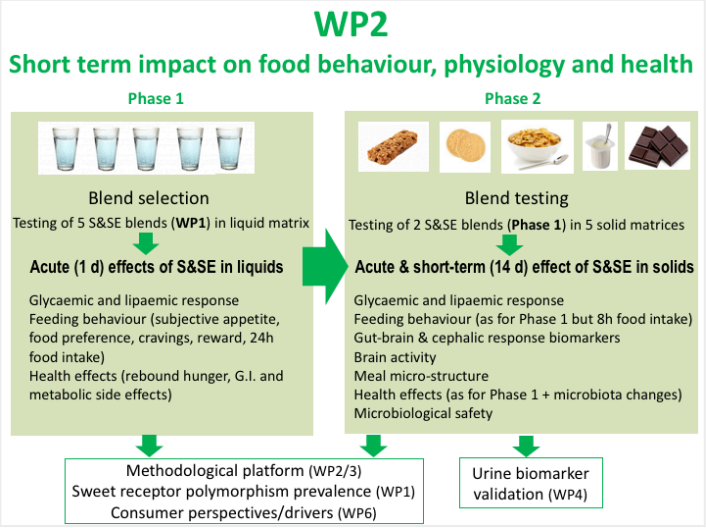
Innovation, exploitation and dissemination - An impact plan has been developed & the initial gender action plan completed. A second phase of monitoring gender equality is ongoing. Mass media analysis & social media analysis have been completed. Consumer derived typology of S&SEs has been completed in both UK and Spain. An online survey examining cross-European stakeholder attitudes towards S&SEs is being prepared for distribution.

Progress beyond the state of the art and expected potential impact (including the socio-economic impact and the wider societal implications of the project so far)

SWEET will take existing and new S&SEs and incorporate these in foods typically high in sugar. Data bases will be developed to inform the selection and examine safety issues. The project also seeks to understand the effects of S&SEs on sensory and biological processes in the body and how they may influence behaviour. Looking at individual food preferences and taste responses the project will examine how S&SEs interact to increase pleasure without stimulating over consumption. A large-scale study will examine the long-term impact of consuming a diet containing S&SEs on human appetite, food choice and body weight and particularly whether and how they help consumers maintain a healthy weight. The project will also measure real word use of S&SEs via biomarkers in urine samples to validate against self-report mechanisms. With this understanding the project will examine the relationship between self-report S&SE use and health outcomes from a number of sizable studies to better inform evidence-based guidelines and policy. Beyond health there may be wider economic, social and environmental impact of adopting S&SEs to replace sugar. The project will anticipate these through life cycle analysis of specific S&SEs chosen to be developed. Throughout the project the concerns of consumers and other barriers to innovation will inform our approach. This will assure the products that consumers need and want are developed and that these meet all regulatory requirements. This will make it easier for industry to commit to sugar replacement. Ultimately, the data yielded will be used to develop tools to help manufactures select the best ingredients and get products that consumers need and want to market.

In terms of impact, SWEET builds partnerships between public and private sector partners which will generate evidence on the potential use of S&SEs in combating obesity while improving the sustainability of food in the EU. It will also empower the consumer by allowing a greater number of potential, and better-informed food choices to improve their diet. Regulators will also be better informed on the safety of new products and S&SE blends including the long-term impact of their use in the diet. Individual differences in needs, responses and preferences will allow the tailoring of

products to specific consumer needs. The project will help industry responsibly development S&SEs acceptable to consumers to replace sugar in foods. This will be done by understanding the economic, social and environment consequences of these changes. Stakeholder workshops will be used to feed in concerns, barriers, and potential solutions, as well as disseminate outcomes. The resulting stakeholder plan will ensure the above impacts will be delivered via communication between consumers, patient representatives and advocates, non-governmental organisations, ingredients makers, food producers and retailers, health experts, regulators and media.



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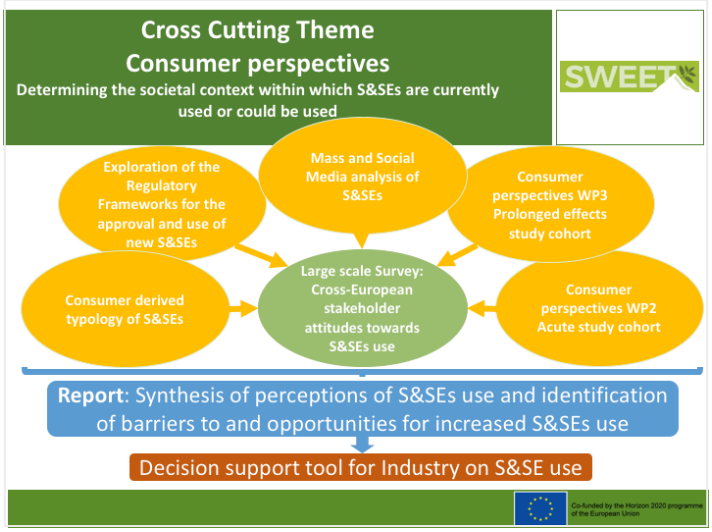

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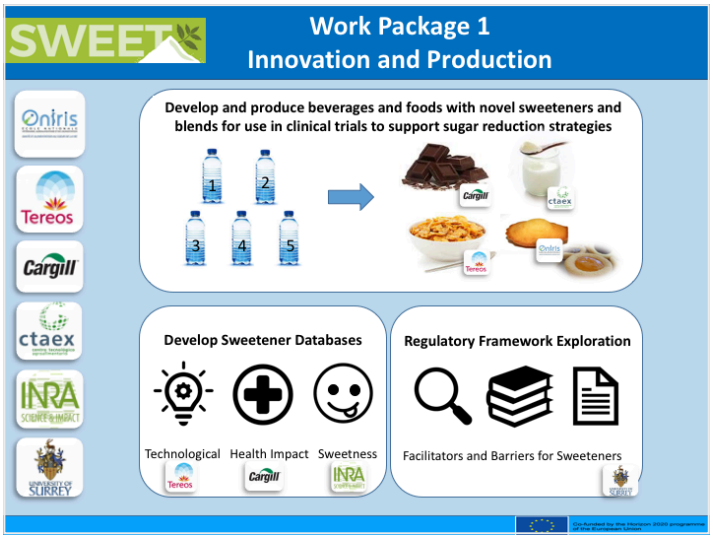

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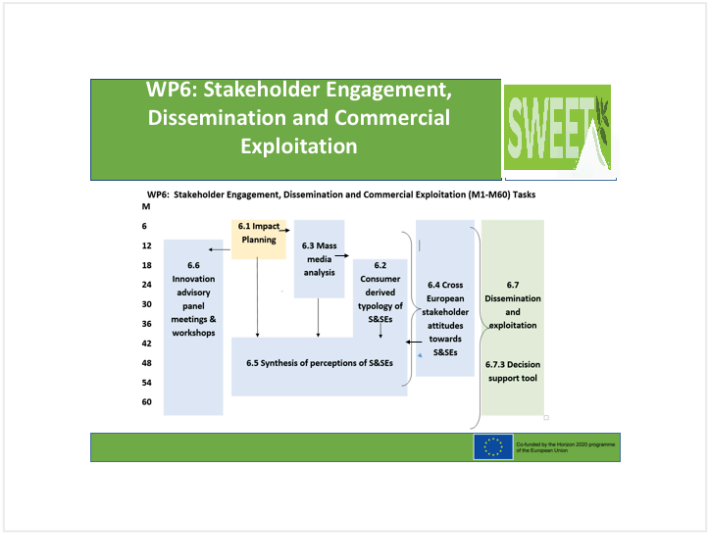

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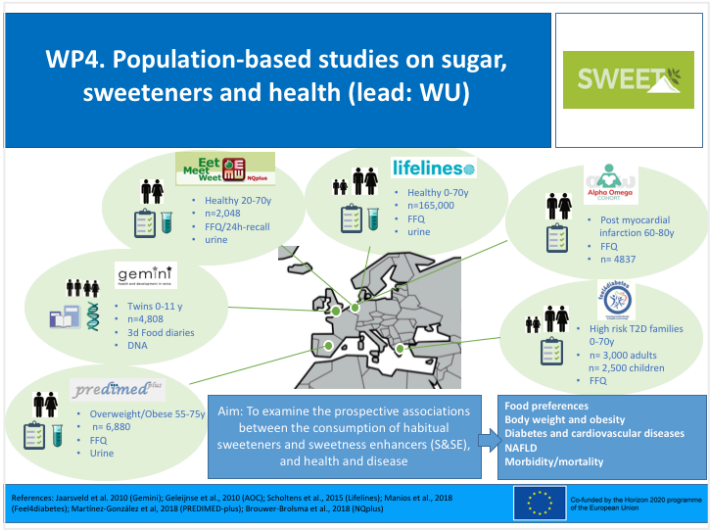

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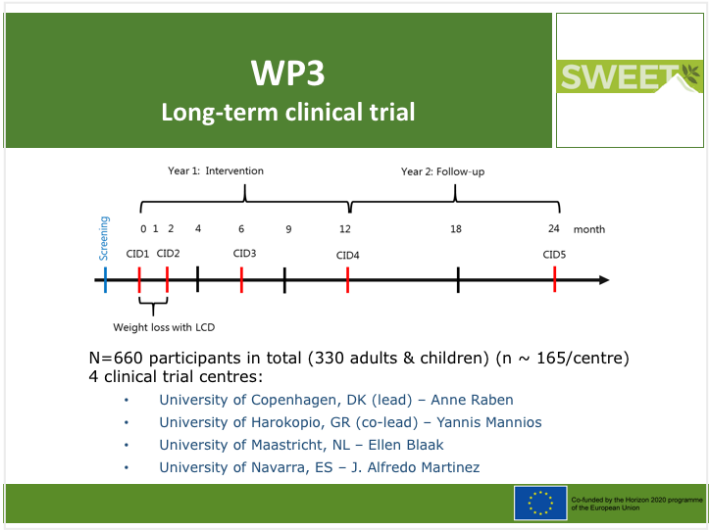

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European Union, 2025