TREASURE Report Summary

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Periodic Reporting for period 2 - TREASURE (DIVERSITY OF LOCAL PIG BREEDS AND PRODUCTION SYSTEMS FOR HIGH QUALITY TRADITIONAL PRODUCTS AND SUSTAINABLE PORK CHAINS)

Reporting period: 2016-10-01 to 2018-03-31

Summary of the context and overall objectives of the project

Research and development activities are carried out for the benefit of sustainable pork chains based on European local pig breeds and their production systems. Work program is planned to respond to consumer demands for quality and healthiness of pork products with regional identity and societal demands for environment preservation and development of local agro-economy. Description and evaluation of local pig breeds, with an emphasis on untapped ones is performed using novel genomic tools. Performance of local pig breeds is evaluated in contrasted agro-geo-climatic conditions and production systems (indoor, outdoor, organic). Focus is on pig feeding and management and on the use of locally available feeding resources. Intrinsic quality of traditional and new regional high quality pork products and attitudes of consumers from various market areas is assessed; in particular the motives for the choice and willingness to pay such products. Marketing strategies are addressed, esp. short chain distribution channels. All activities are driven from the perspective of sustainability (environmental impact, animal welfare, product quality, consumer acceptability and market potential). The activities engage innovative approaches to answer socio-economic demands of regional pork chains involving partners from different sectors. The ambition is to enhance existing and create new networks between academia and non-academia partners, within and between regions and to tackle the value chain for regional high quality pork products, focusing on so far untapped pig breeds, their production systems and pork products. Cross-fertilizing interactions between research, local agriculture, businesses and end-users are achieved with partners from these complementary sectors in all research and development activities.

Main objectives:

- analyse phenotypic and functional properties encompassed in local pig breeds, esp. untapped, and develop DNA tools for authentication, traceability, conservation and breeding programs;
- acquire knowledge on pig nutritional requirements, use of locally available feeding resources, innovative feeding and management strategies and environmental impacts of pig production systems as components of the sustainability of local pork chains;
- build up eating quality and healthiness attributes of regional pork products in line with consumer demands including innovations in traditional products to meet healthy/high quality requirements, and identify links between intrinsic qualities and production systems;
- perform a cost/benefit analysis at different levels of the chain and for the society, and research of market potential and strategies for regional high quality products;
- efficient transfer of knowledge and expertise among chain actors, general public and policy makers, creation of platform for functional networks within/between regions and sectors, creation of new umbrella collective trade mark for the products.
Work performed from the beginning of the project to the end of the period covered by the report and main results achieved so far

In WP1 the activities started with methodological setup and material collection, preparation of the datasets and tools for the use, preliminary exploitation and generation of genomic, transcriptomic and microbiota data. In particular, candidate gene SNP data, SNP chip data and whole genome resequencing data in DNA pools for all breeds were produced in addition to all RNAseq data and gut microbiota data from the planned experiments. Whole genome resequencing data were aligned to Sscrofa11.1 genome version and a total of about 30M of SNPs + indels were identified. Genome wide association studies in Casertana breeds identified genomic regions associated with several morphological traits (hairless, tail shape and ear size). Analysis of Runs of Homozygosity in Italian pig breeds was carried out and a machine learning pipeline for identification of breed informative marker was set up. All experiments that were set up in WP2 to evaluate innovative management practices or local feeding resources were finished as well as the big part of the associated analyses. To assess nutritional requirements two experiments were designed (in Iberian and Cinta Senese breeds) and modelling with INRAPORC used for several other breeds. First results on microbiota characterisation (co-activity with WP1) related to feeding and production system were obtained. Assessment of environmental impact of local breed production systems (Gascon, Krškopolje and Mora Romagnola breeds) was completed. In addition to planned work, the analytical review of production traits from all breeds was performed, and a book with the analysed information is in progress. In WP3, evaluation of intrinsic (sensory, technological, nutritional) qualities of traditional and innovative-traditional pork products have been undertaken using the quality toolbox in a variety of local breeds and production systems (connection with WP2). For all partners involved, laboratory analyses on tissue/meat/pork products are already or almost finished. Quality evaluation of meat/pork products using novel technologies (NIRS, biomarkers, CT) are in progress. A preliminary version of the database on carcass and meat quality traits for further implementation in breeding programs on local breeds has been developed. Consumer acceptability of traditional and innovative products for six local breeds in six countries was assessed and the final data analysed. This activity is closely related to WP4, in which the activities were focused on finishing data collection and carry out the scheduled analysis; in particular, WP4 partners have calculated the economic accounts of the different production systems as well as their social costs and benefits. Consumers’ preferences for traditional and innovative pork products have been also assessed. Finally, partners have outlined the protocol to be used in Focus groups with stakeholders to design the marketing strategies for the different production systems and, in particular, for the new umbrella trademark. In addition to trademark development, the focus of WP5 was on dissemination of results to scientific community and promotion of project to raise the general awareness among stakeholders.

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)

Research and development activities aim to improve knowledge, skills and competences necessary to develop existing and create new sustainable pork chains based on European pig genetic resources (local pig breeds). Activities focus on the genetic basis for their phenotypic singularity, adaptive traits, DNA markers that could be used in breeding programmes. Experiments are designed to improve knowledge about their nutritional requirements and to better exploit locally available feeding resources. The innovations to improve healthiness and quality attributes of products are tested with consumers and their motives to consume and purchase such products identified. Multicriteria evaluation of production systems, costs and benefit analyses at product, farm, and society levels and development of new umbrella trademark along with marketing strategies are important for the sustainability of local pig breeds. The key innovation potential of TREASURE resides in the idea that sustainable pig production systems can be built on local pig breeds, locally available feeding resources and traditional products which comply with societal demands for biodiversity, environmental protection, local food chains, animal welfare and consumer demand for high quality and health benefits of the products.

Related information