Project no.
262418
Project acronym
GlutenFree

Project title
Tasty and healthy gluten-free bakery products and pasta - improved products for wide consumer acceptance

FP7-SME-2010-1 Research for SMEs

GLUTENFREE – Final Report (01/10/2010 – 31/12/2012)

Publishable Summary

Executive summary

Common problems of currently available gluten-free products include high starch and low fibre contents, reduced shelf life, strong off-flavours as well as dense, crumbly and dry texture (bread) and untypical colouring, low protein and fibre contents, texture issues such as reduced elasticity and increased cooking losses (pasta). The scientific and technological development activities carried out in the Gluten-Free project tackled these issues from different angles and delivered a number of valuable results for the involved SMEs. A baseline sensory study on gluten-free bread and pasta with consumers in Germany, Italy and Ireland at project start revealed information on consumer preferences, acceptance and needs, which provided the basis for target-oriented product development and optimization in the project. An in depth characterisation of gluten-free flours showed that some of these flours represent an interesting alternative to the commonly used wheat flour with regard to their nutritional properties. However, their potential for the production of bread is certainly limited due to the lack of the structure-forming proteins. Therefore, the use of complex formulations combining different gluten-free flours and ingredients such as hydrocolloids and proteins are necessary to get products of similar quality to wheat containing counterparts (i.e. bread or pasta). With regard to structure forming proteins, processes for the production of new lupin and broad bean protein isolates were optimized regarding the product yield and viscoelastic properties as well as subsequent scale-up and testing on a technical scale. Fundamental research then has generated new knowledge and insights on the effects of a range of proteins, hydrocolloids and fibres on the technological properties of breads and pasta. A number of beneficial ingredients such as HPMC, xanthan and proteins (from lupin, pea and potato) were found to improve quality of bread and pasta. However, no general rules or guidelines regarding their application could be made since their effect strongly depended on the formulation, the dosage level and, especially for hydrocolloids, on the hydrocolloid grade. Consequently product developments, e.g. baking trials, have to be carried out target-oriented. In addition, it was found that shelf-life and texture properties of gluten-free breads can be improved to a certain degree by using sourdoughs fermented with selected lactic acid bacteria producing either exopolysaccharides or antifungal substances. Fermentation and baking were also elucidated as important factors influencing bread aroma by changing the specific odorants present in gluten-free flours. Based on these results a wide range of recipes for new gluten-free prototypes of bread and recipes for gluten-free spaghetti enriched with protein and fibre were generated in collaboration between the RTD and the industry partners. Finally, the outcomes of the above mentioned research were used for the implementation of new gluten-free food prototypes into the production lines of the involved SMEs and the production of high-quality gluten-free bakery products and pasta for a final consumer acceptance study in the end of the project. The results of this study showed that some breads (oat bread, linseed bread) achieved high consumer acceptance, whereas some other breads and especially the pizza bases need some final improvements prior to their market launch. With regard to pasta, most of the new spaghetti prototypes were well accepted by consumers and one product was comparable to the gluten-free market leader. This prototype was considered as being ready for market launch and was commercialized by the respective pasta producer by the end of the project. As a conclusion, these results allow the participating food producers to place new or improved products on the market and thus have the potential to generate additional turnover and employment after the end of the project. Celiac as well as healthy consumers will also benefit by having access to a wider range of tasty gluten-free foods.