



Project no.
036302

Project acronym
EU-FRESH BAKE

Project title
Freshly Baked Breads with Improvement of Nutritional Quality and Low Energy Demanding for the Benefit Of the Consumer and of the Environment

Instrument: **Specific Targeted Research Projects**

Thematic Priority: **5, Food Quality and Safety**

Title of report:
Publishable Executive Summary

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Project coordinator name:
Project coordinator organisation name:

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Publishable Executive Summary

Description of Project Objectives

EU-FRESHBAKE PROJECT: “Freshly baked breads with improvement of nutritional quality and low energy demanding for the benefit of the consumer and of the environment”. This project aims at taking benefit of refrigeration to improve the availability for the consumer of fresh bread with enhanced nutritional and textural quality. It concerns the Bake Off Technology (BOT), which consists in producing bread from industrial refrigerated or frozen or non frozen bakery goods and to retail them in downtown baking shops OR to make them available in supermarket for domestic baking. So far, BOT has concentrated its efforts on production of plain white breads with low nutritional value. The nutritional and organoleptic qualities of bread can be improved by taking benefit of refrigeration if specific enzymes and ferments and specific process are used. In addition, most processes and technologies used in the BOT is energy demanding. This project is aiming at improving the industrial practice versus energy consumption and also in taking benefit of refrigeration to improve the availability for the consumer of fresh bread with enhanced nutritional and textural quality of bread; applications will concern “gluten” breads, “gluten free” breads and organic breads. At the same time, it will aim at promoting and helping the ongoing rise of the BOT, which needs to be adapted to the needs of the consumer for products with improved nutritional quality and health benefit.

Contractors Involved

The twelve contractors involved in EU-FRESHBAKE project are shown in the Table 1.

Table 1: Contractors list

No	Contractor	Country		Steering Committee
1	ENITIAA (project co-ordinator)	France	Academic	Pr. Dr. Alain LE BAIL
2	CEMAGREF	France	Research Centre	Dr. Tiphaine LUCAS
3	Krakow University KU	Poland	Academic	Pr. Dr. Marek SIKORA
4	CSIC-IATA	Spain	Research Centre	Pr. Dr. Cristina ROSELL
5	Zagreb University PBF	Croatia	Academic	Pr. Dr. Duska CURIC
6	TTZ-EIBT	Germany	Research Centre	Mr. Thomas PARK
7	Russian Academy of Science IBCP RAS	Russia	Academic	Pr. Dr. Vladimir YURYEV
8	MIWE	Germany	Industry	Mr. Martin PITTROFF
9	PURACOR	Belgium	Industry-INDUS	Dr. Ingrid VAN HAESENDONCK
10	BIOFOURNIL	France	Industry-SME	Mme. Maren BONNAND-DUCASSE
11	BLEZGLUTEN	Poland	Industry-SME	Mr. Mariusz KOCZWARA
12	SCHAER	Italy	Industry- SME	Dr. Virna CERNE

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Project Logo and Project Public Website



EU-FRESHBAKE

EU-FRESHBAKE Project: “Freshly baked breads with improvement of nutritional quality and low energy demanding for the benefit of the consumer and of the environment”.

<http://eu-freshbake.eu/eufreshbake/>

Expected End Results and Intentions for Use and Impact

The five key objectives of EU-FRESHBAKE project:

1. To take benefit of the refrigeration: At low temperature, enzymes are still active meanwhile yeast and ferments are not or minimally active. Refrigeration during fermentation may be used to improve nutrition quality.
2. Innovative process / energy saving: The frozen partially baked bread technology is growing because of its convenience. This process needs more than four times the energy needed for conventional baking. Research will focus on optimizing frozen part baked bread process and in developing innovative process pathways which are low energy demanding.
3. Innovative formulations / nutrition quality: Research will focus on designing specific recipes and ingredients adapted to the innovative processes. Gluten bread, gluten free breads and organic breads will be targeted. Specific nutritional parameters will be considered.
4. Equipments adapted to the innovative process: Innovative equipments adapted to the innovative process pathways will be designed and prototypes will be tested.
5. Tools to extend the findings to future applications: A guide of good practice will be delivered to help industry to take into account energy consumption in bread making. A label will be designed concerning energy consumption of the process and specific quality aspects. Information will be transferred to industry.

Socio-Economic Significance

EU-FRESH BAKE will have the following long-term socio-economic impact:

- Optimisation and reduction of the energy presently used in fermenting, baking, freezing and reheating BOT products
- Better quality convenience foods (breads, sandwich, ...) for Europe's consumers
- Improved health benefits for citizens
- New processes and equipment for the baking industry

Scientific Significance

The project will contribute to the following scientific areas:

- A consumer survey in four countries to canvass expectations of consumers toward bread and innovation
- Modelling of the processes involved in the BOT (partial baking, chilling, freezing, second baking, ...) chilling, and evaluation of the impact of these processes on energy demand and quality
- Thermomechanical models to examine the behaviour of fermented products and baked products
- Investigation of new ferments
- Development of numerical index to assess the nutritional quality of bread
- Development of numerical index to assess the energy efficiency of a process
- Development of a numerical index to assess the quality of a bread (texture, staling, ...)
- Development of the three innovative process pathways and formulations that are targeted for gluten, gluten free and organic type of products
- The development of new equipment if required for the optimised processes

Project Outcomes

- Optimisation of formulations and process pathways to produce high-quality partially baked breads using less energy
- New formulations and processes to produce gluten, gluten free and organic products with a low energy demand, a preserved quality and an improved nutrition quality
- A guide of good practice (brochure) for the BOT industry
- A conference, with published proceedings, to inform the industry on the results of the project

- A conference, with published proceedings to inform the European consumers on the results of the project

Work Performed and Results Achieved in the First Reporting Period

Table 2: Main achievements during the first 12 months of the project

SWP	Contractors Involved	Main Achievements
SWP1.1: Protocols for process	ENITIAA, CEMAGREF PBF, TTZ-EIBT, MIWE PURACOR, BIOFOURNIL BLEZGLUTEN, SCHAER	Reference protocols established: -bread making -Protocols validated
SWP1.2: Protocols for quality	ENITIAA, KU, CSIC-IATA PBF, RAS, PURACOR	Reference protocols established: -Protocols to measure bread quality (texture, crust flaking, staling rate ...) -Protocols validated
SWP1.3: Protocols for nutrition	KU, CSIC-IATA, PBF	Reference protocols established: -Protocols to measure nutrition parameters, glycaemic index, nutrition bread quality (texture, crust flaking, staling rate ...) -Protocols validated
SWP1.4: To do initial consumer survey	ENITIAA, KU, CSIC-IATA PURACOR, BEZGLUTEN	A consumer survey has been designed and has been done in France, Poland, Croatia, Spain and Belgium. An article gathering the results has been prepared.
SWP2.1: To model mixing	ENITIAA, TTZ-EIBT	The impact of mixing on dough rheology – reference has been evaluated. The impact of mixing on protein aggregation has been evaluated.
SWP2.2: To model fermentation	ENITIAA, CEMAGREF, CSIC-IATA, PBF, MIWE	Models to predict volume expansion during fermentation of selected conditions & recipes have been developed. MRI has been used as well as simple methods.
SWP2.3: To model refrigeration	ENITIAA	Values of thermal conductivity and enthalpy of dough and of bread have been measured. These values will be used to determine the energy demand of a given process.
SWP2.4: To model baking	CEMAGREF, PBF RAS, MIWE	Different models have been developed to predict the evolution of the rheology of the dough during baking. Preliminary tests on innovative solutions have been investigated. The aroma of bread has been evaluated as a function of processes.
SWP3.1: Glycaemic Index	RAS	The impact of amylose – amylopectine ratio on GI is an important point. A review paper is under preparation.
SWP3.2: Micronutrients	KU, CSIC-IATA	Phytates in bread has been evaluated in reference formulation. BV-TD-NPU-PER-LP-AS-CS-EAA has been established for the reference formulation of selected breads.
SWP3.3: Strains & ferments	PBF, TTZ-EIBT	Effect of <i>S. cerevisiae</i> on GI gluten reference formulation. The impact of fermentation conditions on crumb structure has been evaluated.
SWP4.1: Conventional formulation	ENITIAA, KU, CSIC-IATA PBF, TTZ-EIBT, RAS	GI of direct/UFD/PBUF/PBF/FBF of reference gluten formulation has been evaluated. FBF has not been evaluated. The GI of PBF was lower than the GI of direct. The impact of structural ingredients and the impact of refrigeration (dough ripening) have been studied.
SWP5.1: Conventional process	ENITIAA, CEMAGREF PBF, TTZ-EIBT, MIWE	QI of direct Reference gluten formulation has been evaluated. EEI has been evaluated for the different unit operation of the baking process.
SWP8.1: Management	ENITIAA	3 meeting have been organized at month 0-Nantes, month 6-Zagreb and month 12-Brussels.
SWP8.2: Exchange with other projects	TTZ-EIBT	A report has been done. An exchange with Healthgrain Integrated project occurred during the meeting of month 12 at Brussels.

Main Elements of the Publishable Results in the First Reporting Period

The following table summarises the main elements of the publishable results of the plan for using and disseminating the knowledge during the first 12 months.

Table 3: Main elements of the publishable results during the first 12 months of the project

Planned Actual Dates	Type	Type of Audience	Countries Addressed	Size of Audience	Partner Responsible /involved
Month 1 and open until 3 years after end of project	Project web-site	Open to public world	World	-	ENITIAA
Month 1	Flyers	All	World	2000 pieces	All
Month 3	Press release: Back Business	Industry	Germany	-	ENITIAA
Month 3	Press release: Process alimentaire	Industry	France	-	ENITIAA
Month 8	Conference: Cereals & Europe and AACC International	Research	World	200 or more	ENITIAA
Month 9	Conference: BACK2007	Industry	Germany	100 or more	ENITIAA
Month 9	Posters: IXV International Starch Convention in Moscow	Research	World	100 or more	RAS
Month 10	Publications in International Research Journals	Research	World	-	ENITIAA KU, IATA PBF, RAS
Month 12	First International Symposium of Gluten Free Cereal products and Beverages in Ireland	Research	World	100 or more	ENITIAA
Month 12	1 st ICC Latin-American conference In Argentina	Research	World	100 or more	CSIC-IATA

Diagram Illustrating Work Package Structure

The EU-FRESHBAKE project has been organized in eight Work Packages, the picture below shows how the Work Packages depend on each other.

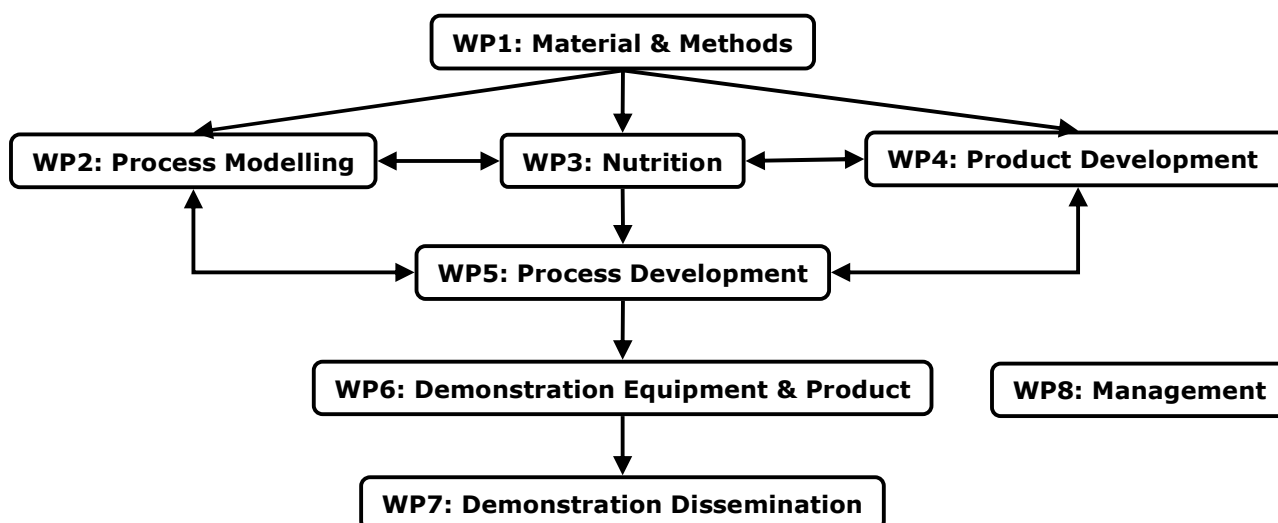


Figure 1: EU-FRESHBAKE workpackage structure