



# VITAGORA®

Quarterly Newsletter of the Food Industry Cluster

Vitagora® Taste-Nutrition-Health

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Welcome to the first edition of Vitagora® Quarterly, the newsletter of Vitagora®, the Taste-Nutrition-Health food industry cluster.

Vitagora® was born out of a concerted movement by the French government to foster competitive growth by creating closer links between industry, public and private research and training organizations, with the result of launching collaborative R&D projects in strategic areas. This competitive cluster (*pole de compétitivité* in French) was created around Burgundy and Franche-Comté's numerous world-class research units in the areas of taste-sensory and nutrition, and these two regions' considerable fabric of companies in the food and health industries.

Therein lies the strength of what Vitagora® has to offer its industrial partners : a solid network of scientific and technological know-how and industry experience in the areas of Taste-Nutrition Health able to respond to industry needs in terms of innovation in food products. After only 3 years of existence, the positive results of the momentum created by the cluster are already on display: 54 accredited R&D projects involving more than 90 companies and laboratories, 58 million Euros in investment and a predicted turnover of 301 million Euros for the industrial project partners that collaborate with the cluster. Not to mention the 11 companies that have been attracted to or have been created the region in the wake of the cluster, of which the latest, Exichol France, was announced on March 3<sup>rd</sup>.

With the addition of 3 more industrial projects selected for national funding and the organization of the 3<sup>rd</sup> International Taste-Nutrition-Health Congress in Dijon, Vitagora® is well on the way to achieving national and international recognition as a center of excellence for research and development into food products and nutritional supplements conforming to consumer demands in terms of taste and nutrition.

With our eye firmly fixed on the international stage, we are now taking Vitagora® to the rest of the world with our delegations that will visit South-East Asia and the United States in May, June and July of this year. We hope this will be the chance for us to introduce you to Vitagora®'s unique approach combining the best of the food and health industries, with the result of mutually beneficial scientific and technological collaborations in the areas of taste, the sensory and nutrition-health.

We hope you enjoy reading Vitagora® Quarterly.

Pierre Guez  
President  
Vitagora® Taste-Nutrition-Health

## 3<sup>rd</sup> INTERNATIONAL TASTE-NUTRITION-HEALTH CONGRESS

& 2<sup>ND</sup> EUROPEAN PARTNERSHIP MEETINGS ON TASTE

April 23<sup>rd</sup> to 25<sup>th</sup>, 2008 in Dijon

**400 participants of 15 nationalities : in its 3<sup>rd</sup> year, Vitagora<sup>®</sup>'s International Taste-Nutrition-Health Congress continues to pave the way for open dialogue between industry and research representatives from European countries and beyond. New in 2008, a day dedicated to food industry professionals and an optional technical training session on the taste of low-fat products.**

Remain at the cutting edge of research into nutrition and food technologies integrating the notion of taste, while keeping a firm eye on R&D and practical research applications: the objectives of the Vitagora<sup>®</sup> cluster and those of the Taste-Nutrition-Health International Congress that it organizes are one and the same.

This Congress, now in its 3<sup>rd</sup> year, focused on creating “productive encounters between scientists and food industry representatives, as well as between local and global manufacturers of food products”, explains Pr. Michel Narce, chair of the Congress’ scientific committee. “Our ambition was to continue the trend towards the pooling of knowledge and expertise that is embodied by our Taste-Nutrition-Health cluster. Our ambition was also to give a new momentum to research in nutrition and food technologies based on a pragmatic view of market trends and the current and future interests of the food and health industries.”

This year, the Congress chose three key themes, one



An exhibitor at the 2008 Taste-Nutrition-Health Congress

for each day of the event:

- Lipids, taste and nutrition (Wednesday, April 23<sup>rd</sup>)
- Vitamins, biofactors and nutrition (Thursday, April 24<sup>th</sup>)
- Nutrition and bone metabolism (Friday, April 25<sup>th</sup>)

Each of these days featured scientific conferences, with workshops on related topics, for industry, R&D and health professionals. The conferences covered such topics as the perception of lipids in humans and animals, folates in relation to reproduction and cardiovascular risk, and the impact of probiotics and Vitamin K on bone metabolism. In 2008, the Congress paid special attention to developing its international status with the presence of a number of European and world experts in their fields. In total 15 nationalities were represented among the more than 400 participants and speakers.

### Uniting the food industry and health professions

The 3<sup>rd</sup> edition of the Congress developed a new formula for bringing together the various players of the food and health sectors – private and publicly-funded research units, health professionals, representatives of food manufacturing and the pharmaceutical industry, R&D engineers, and so on.

For example, the Round Table debates held on Wednesday April 23<sup>rd</sup> involved a lively discussion of the topics of “Functional ingredients” and “Lipids in food” from the angle of both the food industry and scientific research. The round table debates featured



One of the 40 international speakers who gave conferences during the Congress

representatives of such companies as Senoble, Barry Callebaut, Frutarom, Diana Naturals and Lactalis as well as local and international scientific and technological experts.

Another new offer in 2008 was the chance for the Congress participants to take part in one-to-one business meetings. By posting a summary of their offers or requests for technology in the on-line catalogue, Congress participants could both request and be requested for meetings with representatives of publicly-funded research units, laboratories, technical centers or indeed manufacturers of food products and health supplements. Around 150 meetings were programmed for the first two days of the Congress.

*“Originally, when the Congress was launched in 2006, it only concerned the Health & Nutrition sector of Vitagora®,”* explains Michel Narce. *“By merging the Congress with the industry-focused European Partnership Meetings, also organized by Vitagora® in 2007, we have created an event that is truly representative of the Taste-Nutrition-Health cluster. Not only did all of Vitagora®’s industry sectors participate in this event but also all three of the Industry-Research-Training triptych that makes up the cluster.”*

The ‘Training’ aspect of the Congress in particular received a boost thanks to the one day technical training session offered by the CRITT 2ABI on the topic of taste problems in low-fat food products. 12 representatives of the food manufacturers took part in the training course.

### Open evening – “Wine and Nutrition”

The evening of April 23<sup>rd</sup>, the organizers of the Congress invited members of the public to an ‘Open Evening’ on the subject of “Wine and Nutrition”. A preview was presented of the results of a study on the protective role of moderate wine consumption during a meal regarding cardiovascular disease. The visitors were also able to take part in a sensory experience organized by the Burgundy Wine Bureau (BIVB – Bureau Interprofessionnel des Vins de Bourgogne) presenting a range of aromas to be found in wines.

[www.vitagora-sante.com](http://www.vitagora-sante.com)

## Does the ‘taste’ of fat exist?

The 3<sup>rd</sup> International Taste-Nutrition-Health Congress was the opportunity for two scientific experts from either side of the Atlantic to present their findings from two complementary studies into the oral perception of lipids. Pr. Richard Mattes of the University of Purdue in the US has carried out a study on human subjects. The second study concerns Pr. Philippe Besnard’s research on the dietary behavior of mice, in particular concerning the Fatty Acid Transporter CD36 which has been identified as a fat-taste receptor.

So does this mean that a 6<sup>th</sup> taste exists (the recently discovered ‘umami’ being the 5<sup>th</sup>), that of fat? The research carried out by members of the Laboratory of Physiology and Nutrition at the University of Burgundy in Dijon, directed by Philippe Besnard, is proving promising. Their research is the scientific basis for SENSOFAT, a nationally funded research project accredited by Vitagora®, which was officially being launched this year and whose progress is being followed with much interest by the food industry. *“The goal of this project is to understand how CD36 works, whether at the level of the tongue, the intestine or even the brain”*, says Philippe Besnard.

The aim of SENSOFAT is indeed to find out if this protein is a fat-taste receptor in humans. As CD36 is also present in the intestine, researchers are trying to discover what role it plays. *“Is it a fatty-acid transporter increasing the absorption of lipids, or a fat-receptor that allows the intestine to pick up on the presence of fats in the digestive tract”*, explains the research team. But CD36 is also found in the brain, in particular in the hypothalamus, an area of the brain involved in eating, hence the question of the role of CD36 in dietary behavior, suggesting a wide range of applications in the field of nutrition and metabolic disorders.

## FLOUR+: Realizing the nutritional and sensory potential of bread

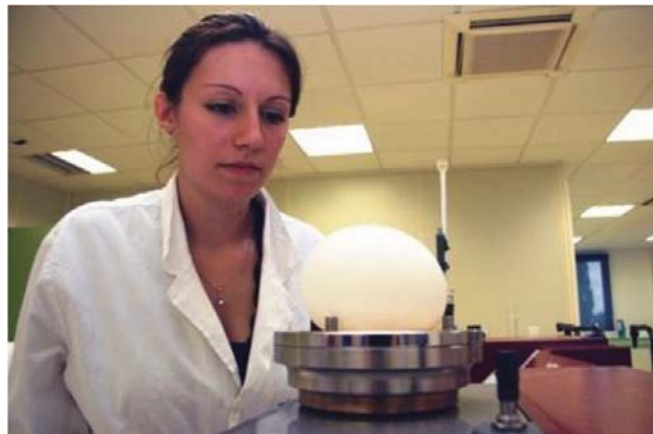
Last October, 350 varieties of wheat were planted for the project FLOUR+. These varieties will be studied closely once harvested next July and for three successive harvests, until 2010. *“Of course, we have already carried out a number of tests as 250 varieties have already been planted since the autumn of 2006. The next stage is a meticulous analysis of these harvests”*, explains Jean-Philippe Fasquel, scientific manager of Eurogerm and project coordinator.

The project FLOUR+, a flagship project of Vitagora®, is the outcome of a strategy deployed by three companies – the Dijon Céréales Group, Eurogerm and the Elancia Group – which are partnered in a joint venture called Bourgogne Terre de Culture (BTC). The project FLOUR+ is working to develop a method for characterizing wheat varieties according to their nutritional and sensory potential and determining how the potential of each bread-making product evolves and is preserved throughout the wheat-flour and bread industrial chain. According to the findings of the project, new bread varieties will be developed for the tastes and nutritional needs of specific consumer groups, for example the elderly or diabetics.

Its originality resides in the fact that it covers the whole of the production chain, from seed production right through to the final consumer. *“We are trying to optimize each stage, all the while ensuring a permanent transfer of new technology towards food manufacturers, as well as getting feedback regarding wheat selections,”* says Jean-Philippe Fasquel.



FERME d'EXCELLENCE® research platform



CEREALISABLE® R&D center

In order to carry out the research program, this project has developed three specific and complementary tools: FERME d'EXCELLENCE®, a varietal and quality research platform, CEREALISABLE®, a cereals R&D center, and CONSOLAB®, which helps to analyze consumer preferences. In the case of the successive experimental plantings, these are grown at the FERME d'EXCELLENCE®, analysed at CEREALISABLE®, using expertise in different fields (agricultural engineering, technology, processing, health, nutrition and the sensory palette), and finally tested on consumers in finished products by CONSOLAB®. A team of 25 people are currently working on this project.

Since the beginning of 2008, a doctoral thesis funded by the company BTC, the project leader, has begun which is co-directed by the European Centre for the Sciences of Taste and the FLAVIC research unit, both based in Dijon. A second thesis will be launched during 2008. BTC has also created two staff positions to run the various structures needed to carry out the activities of FLOUR+. *“For this project, we are now really moving into a higher gear”*, explains Jean-Philippe Fasquel.

FLOUR+ received accreditation and funding from the French government funding agency (FUI, Fonds Unique Interministériel) in July 2007. The FUI provides funding for the accredited projects of French competitive clusters which present innovative aspects that are of particular interest on a national level.

## Vitagora®'s International Development Visits to South-East Asia and the United States

As part of a strategy of international development, Vitagora® will be leading two delegations on overseas visits to South-East Asia from May 11<sup>th</sup> to 24<sup>th</sup>, and the United States from June 27<sup>th</sup> to July 3<sup>rd</sup>. Organized with the support of the French economic bureaus, these delegations will be composed of representatives of Vitagora®'s member organizations: companies, public and private research laboratories and training establishments.

*“International development has been an ambition for our cluster since its creation,”* explains Christophe Breuillet, Cluster Manager. *“A number of actions have already been put in place over the last two years – the International Taste-Nutrition-Health Congress is a good example – with the aim of widening our network and increasing the visibility of the skills and know-how of our member companies and organizations. In 2008, this aspect has been made a priority and, with the two overseas trips we are organizing, the international visibility of Vitagora® will receive a real boost.”*

As well as being the chance to discover new technologies and scientific research programs, these trips will be the opportunity for Vitagora® and its members to set up commercial, industrial or technological partnerships around the areas of taste and dietary behaviors having an impact in nutrition and health.

The two trips are being structured around prestigious local food industry expos with an emphasis on health and nutrition. The Asia delegation will thus be visiting the IFIA Health Foods Expo in Tokyo, May 21<sup>st</sup> and 22<sup>nd</sup> 2008. Prior to this expo, the delegation will also be organizing meetings with local scientific and industry leaders in Singapore, Thailand and Vietnam.

The Best of Food Thinking 2008

**IFT08**

ANNUAL MEETING + FOOD EXPO

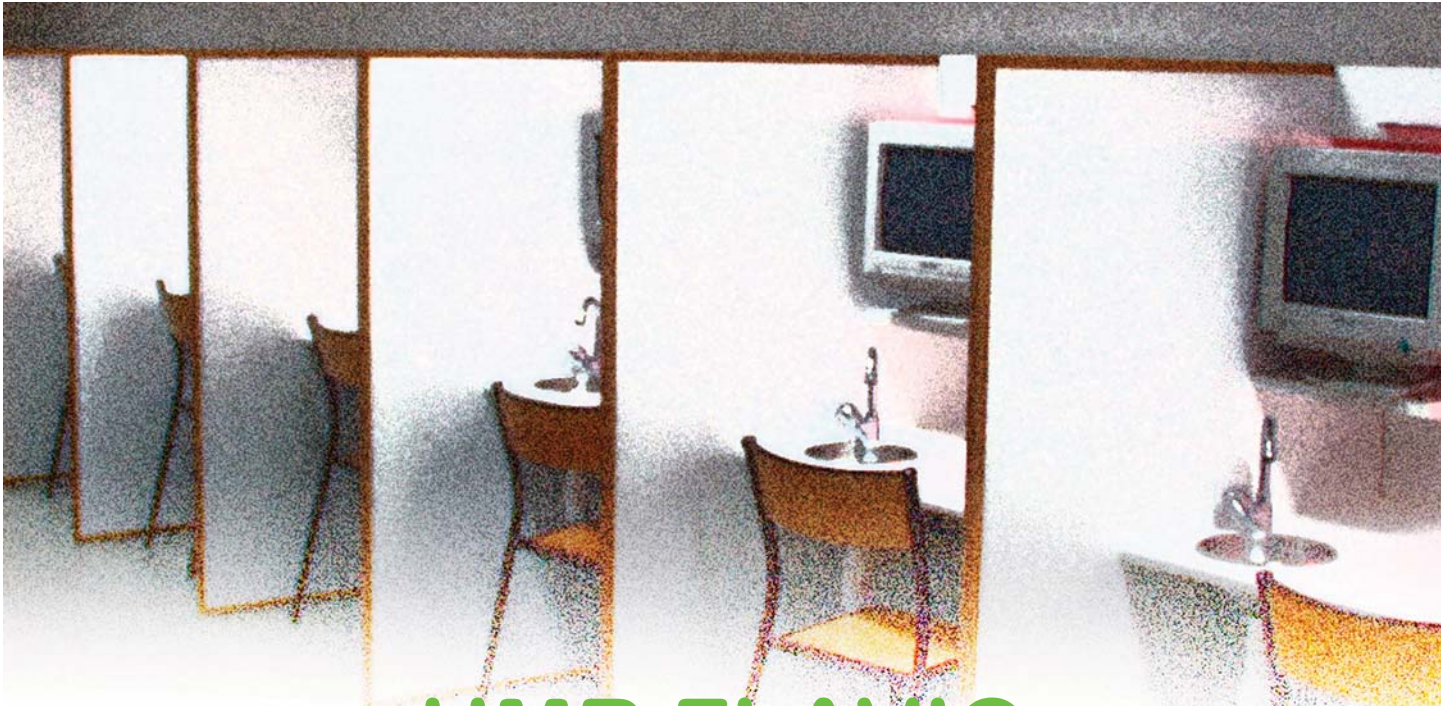


For the delegation visiting the United States, the trip is organized around the IFT (Institute of Food Technologists) Food Expo in New Orleans, from June 28<sup>th</sup> to July 1<sup>st</sup>, which brings together more than 22,000 food industry professionals.

The delegations will be made up of a number of representatives of organizations and companies from various sectors of the food industry. The international groups SEB (home cooking appliances), Diana (food ingredients made from natural extracts) will be accompanied by the SMEs Eurogerm (ingredients for the flour and bread-making sectors) and Foulon Soplably (fruit juice). The delegations will also include representatives of the agri-food engineering school ENSBANA, and the R&D laboratories Aromalyse (sensory analysis), Vect'oeur (scientific laboratory dedicated to wine and its environment) and Nexidia (laboratory specialized in the adaptation of microorganisms to their industrial environment).

Any representatives of companies, research or training organizations wishing to meet with the Vitagora® delegations can contact the local French government economic bureaus. To find your local branch, please visit this website <http://www.missioneco.org>.





## UMR FLAVIC

# Exploring Taste and the Sensory

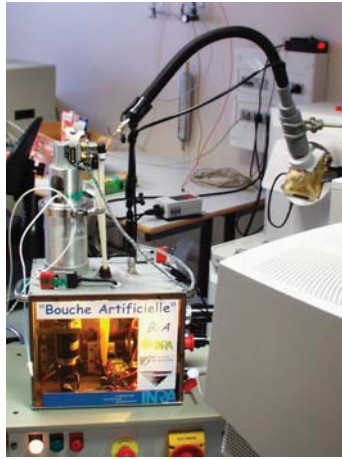
Involvement in nearly a dozen projects, FLAVIC is one of Vitagora®'s most active research units. Dedicated to the study of taste and the sensory, FLAVIC has developed important research programs with Vitagora® such as SENSINMOUTH (the study of flavor release mechanisms within the mouth) and OPALINE (an observatory of taste preferences of newborns and children under the age of two). The research teams of this unit did not wait for the creation of a cluster to start collaborative programs with multinationals of the food industry. But without Vitagora®, it is doubtful that so many companies would have FLAVIC on their radar.

FLAVIC (FLAVOR, Vision and Consumer behaviour) was jointly created by the University of Burgundy, Dijon's agricultural engineering school (ENESAD) and INRA, France's national agronomic research institute. This publicly funded research unit employs a staff of 130, including 90 permanent staff members working on highly specialized research programs. Some of these programs are attempting to demystify the sensory properties of food products according to their composition or structure. Others aim to understand the formation of a 'sensory image', the basis of food and dietary preferences. Other projects seek to evaluate the role of food components in pathologies of the eye. These research programs are very often developed in partnership with, in particular, major food industry players such as Danone, Nestlé or Unilever. Considering

Vitagora®'s vocation of creating closer links between industry and research, it is unsurprising that FLAVIC, under the direction of Elisabeth Guichard, was quick to involve itself in the newly created food industry cluster.

Today, the research teams of this unit are working on a number of projects accredited by Vitagora®. Two of these projects, SENSINMOUTH (the study of the mouth mechanisms responsible for the liberation of sensory stimuli) and OPALINE (an observatory of the dietary preferences of newborns and toddlers) are particularly representative of the activities of the cluster. More recently 4 more projects accredited by Vitagora® have been launched including a study of how food macromolecules, especially proteins, interact with small flavor molecules.

Another of these projects run by FLAVIC is being carried out by a team specifically interested in the effect of nutrition on vision. This project aims to understand how lipid nutrition can affect the eye, in particular concerning ocular pathologies, and is being developed in collaboration with optometrists at Dijon's University Hospital.



The artificial mouth created by a FLAVIC team for studying flavour release mechanisms

### A momentum created by Vitagora®

Jean-Luc Le Quééré is the coordinator of the considerable combined research support services of UMR FLAVIC, as well as being the vice-president of INRA's Dijon research facility. As such, he is the INRA representative on Vitagora®'s board of directors.



Jean-Luc le Quééré

He has firm opinions on the role of the cluster in relation to public research units such as FLAVIC. "Without Vitagora®, many companies in the food manufacturing sector of the region and beyond would never have made contact with us. This is the momentum that Vitagora® has set in motion — and which is gaining pace — that has allowed us to launch a number of projects in the last few months," he explains. Beyond the basic research activities of the unit, a number of industrial applications are indeed taking form. "The aim of some of the research carried out by scientists of FLAVIC within Vitagora® accredited projects is to find objective elements that could allow us in time to formulate food products with better-appreciated sensory properties, without losing sight of the nutritional needs of various segments of the population."

## OPALINE: Observatory of Food Preferences in Infants and Children

Opaline is a program aiming to improve the understanding of the factors explaining the variability of two year-old children's food preferences. Some twenty specialists in different fields (sensory science, biology, medicine, psychology, sociology, ethology and statistics) from seven research teams, are involved in the program. Program Coordinator Sophie Nicklaus, an INRA Research Fellow at FLAVIC clearly states that the program is, "an original breakthrough because it focuses on the enjoyable and sensory aspects of a child's diet."

Opaline, a program that has been accredited by the Vitagora® competitive cluster, will be monitoring 300 children from birth to the age of two, in the Dijon region. "We will be recording data on their food intake, attempting to assess their sensory reactivity to smells and flavors, and focussing on the psychosocial environment they live in," explained the INRA researcher. This set of data has been collected with a first group of 120 mother-infant pairs, progressively recruited since January 2005 as from the seventh month of pregnancy. These women have recorded the composition of their meals in 7-day diaries, the analysis of which enables to define the flavour profile of their diet along pregnancy and lactation.

Sophie Nicklaus also recalled the results from an earlier study that her team conducted which showed that as early as 2 or 3 years old, food preferences are already partly established, and are variable from one child to the next. They also showed that early chemical-sensory experience — in other words what is experienced at the end of fetal life, during nursing and diet diversification — partly contribute to the variability of observed preferences in young children.

Researchers would like to take this approach further and to use Opaline to answer several questions. "For instance, as early as six months, babies show a very strong variability in their appreciation of sweet tastes. With this program, we're trying to understand this variability. Is it already there at birth or at three months? Is the variability of infant behavior due to exposure to several sweet tastes at birth?" Sophie Nicklaus is determined to find the answers to these questions.



### 3 more Vitagora® projects with state accreditation, funding

Three more Vitagora® industrial projects have been given state funding and accreditation by the French government agency, Fonds Unique Interministeriel (FUI). The FUI provides funding to major projects accredited by French competitive clusters that are considered to be of strategic interest on a national level.

Vitagora® was the only food industry cluster to have 3 projects accepted in the latest round of project proposals.

The three projects accepted were:

- **EXICHOL** : the development and production of a new generation of nutritional active ingredients
- **QUALIVIVANT** : the optimization of the sensory and nutritional qualities of agricultural products using an approach based on the optimization of the natural defenses of plants (reduction of the use of agricultural chemicals)
- **VITALIM'SENIORS** : the development of a range of functional food products for preventing and treating weight gain in the elderly

The 3 joint projects involve the following partners:

Companies : Senoble, Canéo, Exichom France, Comité Nord de Plants de Pomme de Terre, Lara Spiral...

Public research laboratories of the University of Burgundy, INSERM (French national institute of medical and health research) and INRA (French national agronomic research institute).

With public funding of 4 million Euros and a total investment of 9.5 million Euros, the three projects aim to create 70 to 100 million Euros in additional turnover for their partner companies.

Vitagora® has one other industrial project with FUI accreditation, Flour+ which received 2 million Euros in state funding in July 2007.

Find out more about the projects Exichol, Qualivivant and Vitalim'Senior, in the next edition of Vitagora® Quarterly.

### Exichol joins Vitagora® in Dijon

The Swiss company Exichol, specialized in nutritional ingredients, has announced that it will set up its newly created French subsidiary in Dijon. The company's founders said their choice of Dijon was due to the presence of the Taste-Nutrition-Health cluster, Vitagora®, with its "dynamic creating collaborative, innovative and competitive projects". They also cited the presence of "a pool of high level research in the areas of taste and nutrition in relation to health, in particular concerning lipids and glucides" and "the exceptional support of the local political and economic structures."

The production unit that Exichol France will set up in Dijon will eventually employ 60 people and require an investment of 30 million Euros.

Exichol's main activity is the development of a new generation of nutritional ingredients contributing to restoring lipid and sugar metabolism. These active ingredients are designed in particular to have an effect on metabolic syndrome, cardiovascular risk and the consequences of atherosclerosis

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