Customer stories:

Brazil, Netherlands, New Caledonia, Romania,...
R&D, Protein, Ingredients, Pet Food, Cereals,...
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  http://www.youtube.com/ClextralLines

Meet our teams at the first quarter
(refer to last page for complete list of fairs)
Editorial

Approaching 65 million Euros’ worth of orders in 2011, Clextral beat its previous historic record dating from 2008. Thanks to your confidence, as illustrated in the various testimonials in this 20th issue of Clextrusion, Clextral has advanced its technological offer and has furthered its commercial presence on the five continents. We are pursuing a single objective: your satisfaction as a customer, relying on the innovation that we foster, our concern for sustainable development, the expertise provided in our services, and our international network, which has been strengthened further with the opening of our subsidiary in Brazil and our office in Vietnam.

Along with all of the Clextral team, I offer you my best wishes for 2012. Let’s broaden our ideas so we can build the future together.

Georges Jobard
President of Clextral
The day-to-day technical response.
Service+ is fully dedicated to technical and process support for customers.

The Service+ team is at the disposal of customers in order to address their questions and propose appropriate solutions. Technical and process support has always been a priority for Clextral, which continues to reinforce its teams in France and abroad in order to provide a personalized local service.

From France, Service+ provides a new telephone number and a new e-mail address to take into account the requests upon receipt and direct them to the best specialists in Clextral.

"Knowing how to listen, and placing skilled people in touch: right from the get-go, that guarantees the success of our interventions."

Your French Service+ contacts
Email: customerservice@cletral.com
Tel: +33 4 77 40 38 88

Sandrine Barral, the voice of Service+ from France

The Service+ after-sales technicians: experts in mechanical engineering, automatic controls and process support.
We give the floor to...

Gérard Mounier,
Service+ Manager since 2010.

What was your career path within Clextral before Service+?
During the first part of my career, I completed numerous startups and managed worksites pretty much all over the world. Bolstered by this field experience acquired in twin-screw extrusion lines, I was then placed in charge of coordinating training modules for customers. I also specialized in the sale of services across the Eastern European and Russian zone for over five years. One of my most outstanding experiences in this field was the sale and supervision of the transfer of a whole factory from Hungary to Ukraine.

So Service+ is a new stage in your career. Why did you make this choice?
My current objective is to give the Service+ team the benefit of my experience and to ensure that our customers receive a top-level service throughout the lifespan of their installations.

Some of our equipment has been in operation for over 40 years and we are always able to offer spare parts, upgrades, technical improvements, etc.

"Our everyday work involves supporting our partner customers on an ongoing basis."

Thierry Ramousse,
Manager of the Service+ Intervention Teams.

After 15 years of interventions on 5 continents, Thierry currently fulfills the role of being a technical expert concerning questions relating to mechanical engineering as well as management of the schedule for after-sales interventions. According to Thierry, the quality of Service+ exchanges with customers, regardless of the means of communication used (telephone, e-mail, remote support, maintenance inspections, etc.) is essential for ensuring that the customer receives good support. While the first contact is often of a corrective nature, as discussions progress, the Service+ technician quickly manages to advise customers about preventive aspects in order to rapidly eliminate risks of shutdowns and unforeseen additional costs.

"Service+ provides responses at technical level as well as advice on the use of equipment, maintenance, and process optimization."

Denis Montmartin,
Service+ Automatic Controls Manager.

Since Service+ was established, Denis has been the priority contact for customers for questions relating to automatic controls and electrical components subject to after-sales service. His experience enables him to respond to customers’ immediate needs. He is also a priority correspondent in terms of the management of remote support contracts so that troubleshooting alternatives can be offered, to minimize production downtime. (See the next page.)
Remote support
a new offer for even greater responsiveness.

Clextral is upgrading its remote support service in order to better respond to its customers’ needs. This service is not a new offer by Clextral as this remote diagnostics technology has already been used for several years in order to provide troubleshooting for certain customers. Thierry Jarousse, the Process Information Technology (PIT) Product Manager at Clextral, points out: “Our role was often limited to providing diagnostics for a breakdown, and guiding the customer’s technical teams so that equipment could be restarted. We did not yet have access to all of the line’s single equipment. That’s why we decided to develop a new system.

All the equipment items capable of communicating with each other can be accessed remotely by our specialists, whenever our customers grant authorization for us to connect”. This new remote support service offers numerous technical advantages. In particular, it enables remote access to automatic controls, intervention on peripheral equipment (feeders, pumps, etc.), real-time viewing of the interface for the operators terminals or supervision stations and therefore, generally speaking, makes it possible to improve diagnostics capabilities on the one hand, and interventions on the other hand. This reworking of remote support thus makes it possible to:

- Respond even more quickly and efficiently to customers’ needs.
- Reduce the environmental impact by limiting travelling.

A new Service+ remote support offer guaranteeing intervention times has been set up. This offer integrates regular preventive maintenance actions in order to improve the long-term reliability of equipment, reduce breakdowns and unexpected events, reduce reconditioning costs, and maintain the performance levels of the equipment items.

To find out more, please do not hesitate to talk to your sales contact about it, who will be sure to provide you with all the requisite details.

Cut your croutons

Croutons can multitask! Whether in soups, salads, or snacks, they fit in everywhere. When it comes to cutting them, you can trust Clextral.

“There’s not just one crouton, there are several of them”…and they need an efficient, flexible cutting system. Clextral offers a new flexible cutting system for extruded croutons that is easy to use. This cutter was developed with a partner supplier. Extruded croutons come in four different shapes with cutting angles that are at a right angle or a 45 degree angle. It only takes a few minutes to change the cutting shapes thanks to this crouton cutter with a hygienic design.

The croutons cutter is controlled via a PLC with a smart touch interface, and currently there are different models for two different throughput rates: 300 kg/h and 600 kg/h. A clip-on upgrade kit can also be supplied by Clextral to snack manufacturers who want to improve their offer with this very trendy new product, which is both tasty and healthy. This system can be installed very quickly on existing equipment and Clextral can also assist industrials with choosing raw materials and recipes (including post-extrusion coating).

"Changing the tooling is as easy as changing a printer cartridge at home."
Extruded Cereal Products BV

A Dutch success story in the field of extruded products.

The company ECP is equipped with three extrusion lines and a Rotante rotary dryer by Clextral. Ms Carry Reichgelt founded ECP BV in 1999. She started by buying a twin-screw extruder, then a second one, followed by a third one three years later when ECP shifted to a new building in Helmond.

Clextrusion: Ms Reichgelt, you are the President and founder of ECP BV. Could you tell us a few words about your company?
Ms Carry Reichgelt: I started this business eleven years ago with a BC 45 twin-screw extruder. After two years, I installed a second production line in the factory. Three years later, we shifted to a new building and purchased a new machine. Production now takes place on our three production lines, all using Clextral brand equipment. We currently have 15 employees, working in four shifts. Everything is automated and consequently the three extrusion lines only require two operators in the factory.

Clextrusion: What range of products do you extrude in your factory, and in your opinion, what are the advantages of twin-screw extrusion?
Ms Carry Reichgelt: We manufacture semi-finished products which are ingredients for the food industry: breakfast cereals, ingredients for bakeries, the chocolate industry, the snacks industry, baby food, and we also have a production line dedicated to gluten-free products. The products that we manufacture can either be shaped or milled for their functionality in other products. We use twin-screw extrusion because this technology makes it possible to obtain a product of consistent quality and to use a wide range of raw materials.

Clextrusion: What would you like to tell us about this technology?
Ms Carry Reichgelt: We started with the BC 45 twin-screw extruder which may seem like a small machine but it does currently enable us to produce approximately 400 kg per hour. We produce 24 hours a day, thanks to the fact that once the extruder has been started up and adjusted, it can operate continuously non-stop. We change the shafts when we have to change the screw configuration in order to change products. I like having a Clextral extruder because the barrels are electrically-heated, which makes it possible to work at very high temperatures. Often, the other machines use steam or oil.

Clextrusion: You purchased a Rotante rotary dryer in 2005 – what can you tell us about this drying technology?
Ms Carry Reichgelt: We selected a Clextral Rotante rotary dryer because we needed to dry certain products easily. We have to process products with a moisture content below 1% and the Rotante rotary dryer enables a very regular moisture content to be obtained.

Clextrusion: Thanks very much Ms Reichgelt for the trust you have shown in Clextral over many years.
Breakfast cereals in Romania

The company Rommac manufactures 23 different products on its extrusion line.

Mr Aurel Beldiman, Rommac’s founder, chose Clextral twin-screw extrusion technology for equipping his cereals factory. This ultra-flexible line makes it possible to manufacture a highly varied range of products with a quality level that has won over Romanian consumers.

Rommac was founded in 1994 by Aurel Beldiman who, from the outset, opted for an orientation towards the production of breakfast cereals for the Romanian market. Initially, Mr Beldiman developed expertise in the field of expanded products and cereals extrusion. This expertise was extended to derivative products, particularly cereal bars and muesli. Today, Rommac supplies the main national and international networks of supermarkets in Romania.

Clextrusion: How did you come to decide to launch yourself on this market in Romania?
Mr Beldiman: In 1994, when I founded Rommac, the breakfast cereals market in Romania was in its early stage. At the time, the consumption level for this type of products was extremely low. We had the intuition that this market segment had development potential and it can be said that we were pioneers for offering these products locally to Romanian consumers.

Clextrusion: You purchased a multi-products extrusion line from Clextral in summer 2009 and I noted that it was your first experience in terms of twin-screw extrusion. What made you decide to choose Clextral?
Mr Beldiman: In 2004, we ourselves designed a single-screw extruder with a capacity of 70kg/h, with which we made a whole range of extruded products. Once the worthwhile nature of the market had been proven, it became necessary to equip ourselves with real industrial equipment with a much larger production capacity, using modern technology. So naturally we chose to invest in a twin-screw extrusion line. After a market study, we opted for Clextral, which is recognized as being the leader on the twin-screw extrusion equipment market.

Clextrusion: What is the range of products that you manufacture on the extrusion line and what are the advantages of Clextral technology?
M. Beldiman: On the line purchased from Clextral, to this day we manufacture breakfast cereals, corn and multigrain flakes as well as co-extruded products and flat crispy bread. In my opinion, the main benefit provided by this extrusion line is the reliability of the extruder and its ease of maintenance, enabling us to obtain quality products which are greatly appreciated by consumers.

Clextrusion: Are there other projects in the pipeline?
A very comprehensive project

From the initial contacts through to acceptance of the line: Manuel Delgado has followed this multiproduct line project from A to Z.

Manuel Delgado managed commercial relations with Mr. Aurel Beldiman of Rommac from the initial contact through until finalization of the contract. He was then in charge of successfully completing the project with the engineering team.

The firm Rommac wanted to equip itself with a very flexible, fully-automated extrusion line. Indeed, initially it was difficult for them to know how the market was going to react and evolve; hence the request for a very flexible line capable of manufacturing products from different families such as expanded breakfast cereals, cornflakes and multigrain flakes, flatbreads and filled flatbreads, coextruded cereals, products comprising cereal bars, etc.

The technical requirements were as follows:
- Completing an economical multi-products line.
- Supplying all of the equipment and services for startup and products development.
- Taking full responsibility for this turnkey “products” project.
- Supplying a maximum of equipment items that operate using electrical power rather than gas as the latter is more expensive and less available in Romania. In order to respond to this demand, Clextral supplied the usual services and equipment as well as the electric steam generator and the electrical heating on the coating and drying machine. Installing an air recycling system on the latter made it possible to reduce the installed capacity and reduce the carbon footprint of the apparatus by lowering energy consumption.
- The line operating system was very quickly adopted and appreciated by the Rommac line managers, who were trained at Clextral’s premises at Firminy while the equipment was being manufactured. The Rommac line, installed in southwest Bucharest, completed its acceptance procedure in October 2010 after the development of products and recipes by Clextral process engineers, who carried out work on the 23 products manufactured on the line. Today, we continue to assist our customer to improve its mastery of the technology and processes on a daily basis in order to develop new products. Indeed, the remote support system enables a very quick response (within a few hours, and often within half a day) to the customer’s requirements. Rommac’s success is visible; all you have to do to witness it is to go and visit a Romanian supermarket – Rommac products are on all the breakfast cereal shelves.

"The improvements made to the coating system made it possible to reduce the carbon footprint."
Customers stories

Pet food in New Caledonia

Clextral has installed a pet food production line using twin-screw extrusion technology at "Les Moulins de Saint Vincent" animal feed factory in New Caledonia. The 500 kg/h production line manufactures dog food under the Deliss’ and Wolpy brand names.

Clextral: For your dog and cat food manufacturing project, you chose Clextral twin-screw extrusion technology. Could you outline for us what motivated your choice of initiating this project in New Caledonia and why you chose Clextral?

Jean Louis Chotan: It was in 2010 that the Group decided to launch itself on the dry foods market for dogs and cats. New Caledonians are particularly fond of their pets and so the market was a promising one. Nearly 3,000 tonnes of dry foods are imported every year, with approximately ten brands being represented. When we did research on extruders, Clextral very quickly appeared to be the leading choice. This choice was confirmed by the mainland French consultancy TGC, which we assigned to carry out the project. The closeness of Clextral’s Australian subsidiary also constituted a substantial argument in favor of our final decision, particularly due to the technical and process support that on-site personnel are able to ensure. It is only a 3½ hour flight from Sydney to Noumea.

Clextrusion: What type of products do you manufacture on this line? Do you envisage other types of production?

Jean Louis Chotan: We currently manufacture two products on the line: Wolpy and Deliss’ dry foods. We opted to aim for quality while relying on our expertise in terms of animal feed and on the partnership we have with the agricultural cooperative group InVivo, a European leader that is a pioneer in animal feeds and health. Wolpy dry foods were thus developed with this group whereas the concept for Deliss, which is more of a top-end product, belongs to us. This range is offered in the form of three products for puppies and adults, while the Wolpy offers choices: “tonic” or “crunchy”. We envisage manufacturing dry foods for cats and dry foods based on rice in the future. We have also just installed the two-color option to have two colors on the same biscuit.

Clextrusion: Could you summarize the benefits of twin-screw extrusion in your experience?

Jean Louis Chotan: This project of launching ourselves in terms of a new type of product that requires cooking and therefore demanding an extruder was a real challenge because we were starting from nothing. From the purchase of the production line through to startup, we can say that everything went smoothly. We had a very easy line handover thanks to the flexibility of the equipment and its ease of operation.

Clextrusion: I learned that your group was committed to a quality approach involving double certification. Could you tell us more about that?

Jean Louis Chotan: In May 2008, the management of the Saint-Vincent Group did in fact decide to adopt double certification: ISO 9001 (the company quality management system) for GIE Saint-Vincent, and ISO 22000 (the food safety management system) for the rice factory. The project was undertaken in early 2009 and from the month of March of the following year, we obtained these two forms of certification thanks to the involvement of
of all of the staff. The quality guarantee is essential in our business. We aim for quality in order to provide us with a place on this market with a locally manufactured product. It is not always obvious because the “local product” is not always perceived positively by consumers, who also hesitate to change brands. Currently, feedback is good, even though we have not yet launched the communication campaign.

"The closeness of Clextral’s Australian subsidiary constituted a substantial argument in favor of our final decision."

On July 5 and 6, 2011, Clextral held a Seminar on extruded flakes at the Firminy test centre in France. Thirty or so participants from five continents attended this event. During these two days demonstrations concerning the extrusion of cornflakes and multigrain flakes were organized. Moreover, an introduction to the twin-screw extrusion process was planned as well as a presentation of engineering and automatic controls for lines. All these alternating topics were tackled by Daniel Durand, Senior Process Engineer. We would like to thank Mr Pascal Tabouillot, the Processes & Methods R&D Director from the Extrusion Department at the firm Limagrain (France), and Ms Corinne Charré from Perten Instrumentations (Sweden), for their presentations. Mr Tabouillot introduced the latest trends on the world market for breakfast cereals, with a focus on raw materials, particularly corn varieties adapted to extruded flakes. Ms Charré, for her part, summarized the role of the Rapid Viscoelasticity Analyzer (RVA) in the ready-to-consume cereals process. Mr Gilles Maller, Clextral’s Vice-President of Technologies Development, concluded by providing a reminder that using the twin-screw extrusion process for manufacturing flakes constitutes a very worthwhile alternative to the traditional manufacturing system in terms of productivity and energy consumption. It was possible for the participants to assess the quality of the extruded flakes produced during the demonstrations and they provided excellent results.

In 2012 Clextral organizes seminars in English and Spanish. Contact us to keep up-to-date on the next dates: contact@clextral.com

The extruded flakes seminar attracts attendees from 5 continents

Mr Chotan and his team in front of the 500 kg/h pet food production line equipped with an Evolum EV 53 twin-screw extruder installed in New Caledonia by Clextral.
Twin-screw extrusion in Rio

Embrapa (Empresa Brasileira de Pesquisa Agropecuária), a Brazilian Agronomy Research Institute, is an official body of the Brazilian Ministry of Agriculture. With its 44 research centers, its mission is to provide solutions for sustainable agricultural development in Brazil thanks to technologies creation and transfers. A pilot Evolum EV25 extruder is in operation in Rio de Janeiro in the department run by Dr José Luis Ascheri.

**Clextrusion: Dr Jose Luis Ascheri, you are the leader of the team that is working with the Clextal EV25 twin-screw extruder. What is your personal background with extrusion technology, and can you tell us more about the type of research that you are conducting?**

**Dr Ascheri:** I have been working in the field of extrusion for over 20 years. After receiving my doctorate from the University of Campinas Unicamp, I joined Embrapa in 1990 to develop new products from non-conventional alternative raw materials. I chose to specialize in extrusion and cereal products. The products that we develop can relate both to food as well as to feed, in fact any products that enable twin-screw extrusion technology to be used. I first used single-screw extrusion technology and I quickly became convinced that twin-screw extrusion is the best solution to develop new products. Within Embrapa, we are endeavoring to profit from the possibilities and advantages offered by this technology as much as possible. The flexibility of the equipment enables us to invest in the technology in stages, starting with the extruder, and to add additional components during the second stage: it is quite appreciable for a research institute like ours. Recently for example, we equipped ourselves with a co-extrusion kit and new cutting devices.

"The twin-screw extruder is a positive pump that makes it possible to obtain better product regularity."

**Clextrusion: What type of products do you manufacture using Clextal extrusion equipment?**

**Dr Ascheri:** At Embrapa, we consider ourselves to be so lucky to have this piece of equipment that we try and use the twin-screw extruder on as many products as possible. We do of course work on traditional products such as ready-to-eat cereals or snacks, as well as instant flours and textured soy-based products. We also work on certain products which are not directly related to food consumption, such as biomaterials in the form of biodegradable films, for example. As indicated, we also work on animal feed such as pet food, fish feed, and livestock feed (for goats for instance). More recently, we have worked on the extrusion of foods for frogs. Of course, when we develop new formulations, our objective is to use alternative raw materials and to respond to nutritional concerns. We adapt to the end consumer for breakfast cereals. If the product is intended for schoolchildren, we work on fibers and nutritional factors like the proteins content. We are going to try to make use of available alternative sources of carbohydrates and, for example, we have developed a product that includes special potato flour. For special diets, we will be rather focus on the fibers rate, whilst at the same time seeking a good, pleasurable taste. As far as fish feed is concerned, for instance we are working on recipes for shrimp feed that have to be able to sink and to have a very small diameter.

**Clextrusion: What is the composition of the Embrapa extrusion team?**

**Dr Ascheri:** I manage a team consisting of engineering doctors devoted to food research. Sensorial analysis forms an integral part of our process as no product can be approved without first having passed sensorial analysis tests.

The Embrapa extrusion team in front of the EV 25 extruder from Clextal
"We also work on certain products which are not directly related to food consumption, such as biomaterials in the form of biodegradable films for example."

Clextrusion: An extrusion seminar was held from November 16 to 18 at Embrapa. How long have you been organizing such events?

Dr Ascheri: This year, we organized the 18th of these seminars and we welcomed 75 participants. Ludovic Lacau, from Clextral’s subsidiary in Latin America, spoke about twin-screw extrusion relating to the themes of “Innovations and applications of thermoplastic extrusion for the food industry” and “Aquaculture and animal feed extrusion”. This seminar aimed to present the basics of extrusion technology and the extruder, from the characteristics of the raw materials required through to the processing and final manufacturing stages for the various products. What was involved of course was showing the trends and innovations in the fields concerned by extrusion technology.

Clextrusion: Thank you for your time

Dr Ascheri: what’s the next step for you?

Dr Ascheri: I will be in San Francisco until March 2012 as part of a year-long collaboration with the Agricultural Research Service of the United States Department of Agriculture which is also equipped with a Clextral twin-screw extruder.

Embrapa held its 18th seminar on the theme of twin-screw extrusion in Rio de Janeiro from November 16 to 18, 2011. Ludovic Lacau from Clextral spoke at that event, which brought together 75 participants.

Sustainable development

Clextral is reducing its environmental impact at its sites

Integration of all of the components of “Sustainable Development” into the Management Policy has been a strategic goal for Clextral for many years. Considering ISO 14001 to be a real performance tool, Clextral has relied on this standard to manage, organize and partly formalize its Sustainable Development approach for over 5 years. The work undertaken has made it possible to considerably reduce the environmental impacts of the production sites, generating:

- 50% reduction in water consumption, amounting to a saving of approximately 4,500 m³ of water annually thanks to eliminating certain equipment items,
- 66% reduction in paint consumption (and therefore a 66% reduction in VOCs – Volatile Organic Compounds),
- 50% reduction in VOC discharges relating to grease removal solvents by changing solvents, and elimination of grease removal stations and their replacement with “organic” fountains.

These results were highlighted by the greenhouse gas emissions (carbon balance) diagnostics carried out in 2011 at the two Clextral French sites by Bureau Veritas. The methodology applied was the one featured in the Ademe Carbon footprint.

E-learning module for raising awareness of sustainable development launched in late 2011 within Clextral.

Employees are receiving training in sustainable development:

In late 2011, a “Cap Planet” e-learning module was set up within Clextral. This two-part module, which can be accessed via the Internet, is intended for all employees in order to raise their awareness about sustainable development and the company contribution.

This action is integrated into the “sustainability” project which expresses the ability of the Group’s enterprises to develop their practices and integrate sustainable development stakes into their lines of business and their organizational structures. The Legris Industries Group has been a member of the UN Global Pact since 2004, providing proof of a commitment to making annual progress in terms of its 10 principles (the environmental sector, labor rights, human rights, etc.).
Fibrous proteins for well-being

Clextral High Moisture Extrusion Cooking (HMEC) twin-screw extrusion technology enables food processors to manufacture unique products which have the appearance and consistency of meat as well as its taste. These products respond to a growing trend: flexitarianism, which applies to people who are reducing their meat consumption whilst at the same time continuing to eat it.

“Twin-screw extrusion is an excellent way of texturing proteins”: Anne-Sophie Le Corre, process engineer responsible for the development of new products at Clextral Inc., presented the advantages of twin-screw extrusion at the 5th conference on food vegetable proteins organized by Bridge2Food. This event was held in New Orleans in June 2011. Clextral’s American subsidiary, Clextral Inc., also organized a seminar in late 2010 devoted to extruded proteins which attracted approximately thirty attendees. In September 2011, Alain Brisset, Clextral food Engineering Process Manager, spoke at the conference about technological innovations in the field of proteins for Bridge2Food in Amsterdam. Food industry researchers have worked on alternatives to meat for over 20 years and twinscrew extrusion quickly appeared to be an excellent way of creating meat substitutes based on soy ingredients. Clextral participated in this research from the 1990s onwards and carried out the industrial implementation of the fibrous proteins treatment process in 2000, with the filing of a patent in 2001. As the meat-free protein products market continues to grow, research has continued and is expanding. Clextral signed cooperation agreements with Chinese and Canadian research centers in order to pursue their development efforts. (See Clextrusion Nos. 18 and 19.)

These partnerships have enabled the development of recipes for ready-to-consume products made using twin-screw extrusion technology. These finished products, based on extruded soy protein, come in a highly varied range of forms: chicken dips, squid, beef teriyaki, sausages, spring rolls and many others.

Three major varieties of foods rich in vegetable proteins are offered with numerous variations being possible within each segment:

1. Vegetarian with gluten: products that combine soy, rye and soy gluten, and other sources of vegetable proteins (lentils, chick peas, green peas, etc.)
2. Gluten-free vegetarian
3. Vegan: products that can combine all the various types of vegetable proteins but without any dairy constituents.

Reproducing the texture of meat is a complex process because you need to take into account both the visual aspect (visible fibers), chewability, elasticity and the tender and juicy aspects.

We call these products “fibrous proteins for well-being” because they enable consumers to experience the sensation of eating meat whilst at the same time making the right choice for their health” stated Anne Sophie Le Corre. The extruded vegetable proteins obtained using HMEC (High Moisture Extrusion-Cooking), are indeed rich in fibers, low-fat, and offer excellent nutritional value. Moreover, these vegetable proteins have a lower carbon footprint than meat (12% less than chicken, and 95% less than beef), or even than other meat substitutes.

The HMEC process involves a twin-screw extruder for mixing and cooking the ingredients according to perfectly controlled parameters, followed by

| FUNDAMENTAL RESEARCH on texturization and fibration of soy/gluten proteins: |
| - National Food Research Laboratory of Tsukuba (Japan) |
| - Laboratory of Biochemical and Food technology of University of Montpellier (France) |
| INDUSTRIALIZATION PHASE |
| 1994: Partnership between Clextral and France based food center to optimize and industrialize HMEC concept |
| COMMERCIALIZATION |
| 1999: first industrial application of HMEC to produce meat analogs (= CLEXTRAL platform) |
| TODAY: World market Value of vegetarian meat substitutes estimated at: 14 billion US$ |

This is not meat!
Flexitarianism or semi-vegetarianism is a recent neologism which is applied to people who reduce their meat consumption. The people referred to by this term can go without meat occasionally or regularly to a greater or lesser extent. Individuals who consume meat in less than half of their meals may be considered to be “flexitarians”. Research in this field indicates that “the flexitarian segment has a growth potential of one third of the adult population of the United States”. While this trend is mainly linked to health concerns, it is also guided by ethical and economic considerations.

1999: 95% of American consumers of meat substitutes are female vegetarians
2009: 95% of American consumers of meat substitutes are NOT vegetarians and 50% are men.
- 50% also consume meat.
- 40% are semi-vegetarians who are reducing their meat consumption.
- Less than 10% are vegetarians.

Clextral spoke at the Bridge2Food seminar on food proteins in the United States in June 2011 and then in Europe at the conference on technological innovations in the field of proteins in September. Partnerships like the ones that were developed with Bridge2Food are important for Clextral for everything relating to codevelopments and innovation in the field of proteins research. Participation by Anne Sophie Le Corre from Clextral Inc. and by myself made it possible to initiate worthwhile contacts at these events. We wish to continue this cooperation and hope to create a cluster with certain decision-makers in order to tackle the 2050 food market.

Bridge2Food was founded in 2002 in the Netherlands. This global networking company provides research and advisory services for global food industries concerning foodstuffs, ingredients, and processing technologies for products segments experiencing rapid growth. Gerard Klein Essink, the founder of Bridge2Food, stated: “We offer the possibility at the level of technology or general management and senior management to obtain a better knowledge of the field of proteins and to meet at the events that we organize. For R&D directors, we hold a biennial conference on food proteins that specifically focuses on raw materials, texture and health.”

To look up the schedule and information about this network: www.bridge2food.com.

The advantages of the Clextral solution using twin-screw extrusion (HMEC technology):
Safety: The characteristics of the process ensure strict microbiological control of the product (heat treatment).
Quality: The products’ parameters are standardized in terms of color, texture, fibration characteristics, and shape. Once these criteria have been defined, they remain constant during production and are fully reproducible.
Uniformity: The formulation and the process ensure excellent water retention, even during post-treatment operations.
Cost: The overall process makes it possible to achieve a very competitive cost for the finished product, depending on the recipe, with the cost of the raw materials only constituting 60% of the total cost.
News about our worldwide presence in 2011

Your local contacts:

**Clextral ViệtNam**

François Claudinon has been working in Clextral’s automatic controls department since 2002, particularly on the full production lines. He moved to Vietnam in order to establish Clextral’s office in Ho Chi Minh City.

“When I was offered this mission, I accepted immediately. The country did in fact totally win me over and convinced me. It is a dynamic zone full of promises and I will be happy to offer this local service to our customers.”

François Claudinon, 9 years of experience at Clextral

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**Clextral do Brazil**

Ludovic Lacau joined Clextral in 2001 in order to carry out Sales Manager duties for the South American subsidiary. He set up the Brazilian subsidiary of Clextral at Curitiba and will continue to fulfill Sales Manager duties for South America. Ludovic is multilingual, speaking French, English, Spanish, Italian and Portuguese as he has already lived in Brazil before. His wife is Brazilian.

“It is a gratifying challenge to cover this zone experiencing major development, with sustainable growth prospects.”

Ludovic Lacau, 10 years of experience at Clextral

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**New appointment for Clextral’s Scandinavian subsidiary**

The development of Clextral’s Scandinavian subsidiary has been assigned to Xavier Boivin, the sales manager for the zone over the last two years. Xavier joined Clextral ten years ago as the Technical Manager for Services and then took the global responsibility of the Business Unit. He will move to Denmark in April 2012. In addition to the promotion and development of Clextral’s full offering in Scandinavia, Xavier will also develop KAL business lines on its historic plastic extrusion and injection markets.

“It’s an amazing opportunity to implement Clextral’s development strategy across a geographic zone offering a whole host of real opportunities.”

Xavier Boivin, 10 years of experience at Clextral

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**Meet our teams:**

- **GULFOOD** - Dubai, United Arab Emirates, February 19 to 22 - stand S-A81
- **IPACK IMA** - Milan, Italy, February 28 to March 3 - Hall 13 stand B47 - C42
- **EUROPAIN** - Paris, France, March 3 to 7 - stand K 108
- **SNAXPO** - Phoenix, AZ, USA, March 16 to 19
- **ANUGA FOODTEC** - Cologne, Germany, March 27 to 30
- **ESA SNACKS PRODUCTION COURSE- CHIPS & SNACKS** - London, April 16 to 18
- **DJAZAGRO** - Algiers, Algeria, April 23 to 26
- **SIAM** - Meknès, Morocco April 25 to 29
- **ASIAN PAPER** - Bangkok, Thailand, April 23 to 27
- **IRAN AGRO FOOD & BEVTEC** - Tehran, Iran, May 20 to 23
- **INTSOY shortcourse** - Urbana, IL, USA, June 3 to 8
- **MODERN BAKERY** - Moscow, Russia, June 13 to 15 - stand 7C1
- **FISPAL** - Sao Paulo, Brazil, June 12 to 15
- **IFT** - Las Vegas, NV, USA, June 25 to 29
- **Aqua Sur 2012** - Puerto Montt, Chile, October 10 to 13 - stand B122
- **PET SOUTH AMERICA** - Sao Paulo, Brazil, October 16 to 18
- **IPA** - Paris, France, October 21 to 25