With six study areas and a multitude of study programmes, VIVES is a university of applied sciences where various sectors meet. This is also reflected in its research, which is increasingly drawing the map of multidisciplinarity. As a result, VIVES creates innovative knowledge that solves real problems, bridging the gap between fundamental research, industrial production and operation applications.

VIVES University of Applied Sciences engages in hands-on research. VIVES reaches out to companies and organisations that face modern day challenges. By offering a solution to these challenges, it improves its knowledge and adjusts its insights in and on education.

Impact on social development

VIVES, the largest university of applied sciences in West-Flanders, provides higher education and practice-oriented research. With its research VIVES wants to participate in innovation on a regional, national and international scale. “The integration of innovations resulting from this research in the educational programs ensures that this offer remains future proof and retains its high level of quality. For us, staying in line with current professional practices is not enough. We want to go much further,” says Isabel Vanslembrouck, director VIVES Research and Development.

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On the five VIVES campuses, an average of 16,000 young people annually opt for a study programme in health care, education, applied social studies, biotechnologyapplied engineering & technology or commercial sciences, business management and informatics. “There is a centre of expertise for each field of study. Together,

approximately 200 employees deliver scientific research there," says Isabel Vanslembrouck.

VIVES combines high-tech infrastructure, which is crucial for preparing students and companies for the latest industrial developments, with an innovative view on trends in research and services. At the same time, VIVES also works in a future-oriented and human-centered manner in the fields of health and well-being, food innovation, climate, entrepreneurship, empowerment, educational technology, digital transformation and smart mobility. Most leading researchers combine their research activities with teaching.

"As a university of applied sciences, we focus on practice-based research that is increasingly being initiated by a demand from the professional field," says Vanslembrouck. "We work on research questions evolving from knowledge institutions and companies/organisations from a wide range of other sectors."

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Centre of Expertise for Agriculture & Biotechnology

VIVES research activities are organised in six centres of expertise. Its Centre of expertise for Agriculture & Biotechnology focusses on five domains: food processing, food & health, urban forestry, smart farming and animal behaviour.

Product development

"Within food processing, three lines of research are currently running," explains coordinator Yves De Bleecker. "First, there is the development and optimisation of food products. In this line, we look at new possible sources of protein, among other things. Insects are one such source, but also macro-algae, the so-called vegetables of the sea. Limited use already exists in the food industry. In addition to their nutritional contribution, we are investigating, among other things, to what extent we can exploit their foaming potential in food products. Our efforts are part of an overall drive towards greater sustainability. In doing so, we aim to partially replace proteins of animal origin

with proteins of vegetable origin.” Another project revolves around the use of the yacon tuber as a sugar substitute. “This opens interesting perspectives for diabetics.”

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Valorisation of by-product streams

The valorisation of by-product streams forms the second line of research. “For example, we already created a salmon croquette from the cutting losses of salmon in fish processing plants. In doing so, we paid attention to the typical taste of salmon and an optimal texture of the croquette’s filling, so that it does not burst open during frying.” In cooperation with 23 companies, the centre of expertise is also pursuing operational chain to develop food from brewers spent grain, a residual mass from beer production. “Traditionally, brewers spent grain is already processed in animal feed. In Belgium, it is about 230,000 tonnes a year. It is rich in protein and fibre. Therefore, it can be more usefully processed in food for humans, such as bread, biscuits and meat substitutes.”

Microwave technology

The third line of research is all about microwave ovens. “Besides the familiar household applications, microwave ovens offer other interesting possibilities. The heat they generate is very suitable for drying and pre-cooking food. Pre-cooking meat can be useful for improving the energy efficiency of baking lines. Under the right conditions, drying in microwave ovens preserves aroma and colours well. Recently, we discovered that drying walnuts with microwaves takes much less time than methods traditionally used for this purpose.”

FoodLab

In a brand-new building, the first incidentally on the POM West Flanders' Food Innovation Park in Roeselare, VIVES recently housed its FoodLab. Among other things, it contains a semi-industrial kitchen, where we conduct research into the quality of meals and meal components," says FoodLab coordinator Lien Van den Broeck. "We now span the whole chain from raw material to balanced meal on the plate."

The kitchen is equipped with the latest equipment available for preparing and regenerating meals in a large-scale kitchen. "In care facilities, large numbers of meals are produced. They are prepared and kept warm until serving time or prepared, cooled and then reheated. We can mimic these processes perfectly. For instance, we look for the ideal temperature/time combination for regeneration. In our labs, we then investigate the impact of keeping warm/reheating on the quality of the meals. Besides the physical characteristics of the product (colour, texture, moisture content, etc.), we also assess its organoleptic properties (taste, smell, texture, etc.).

For this purpose, we use test persons in sensory labs. In one of our ongoing studies, we are investigating how to prevent broccoli from acquiring a dull appearance upon regeneration."

Eldercare

FoodLab's capabilities and projects are far from limited to developing and optimising meals. FoodLab's infrastructure also includes a gymnasi – um and various devices to measure people's body composition. These are used in our research into sarcopenia, the loss of muscle strength and muscle mass, due to age or as a result of an underlying condition. Strength training combined with extra protein are key there."

"That's why we develop nutrition tailored to specific target groups," Van den Broeck explains. "For example, elderly people need extra proteins. We study what effects adding them to foods has on their nutritional value, appearance and (after)taste. We also focus on chewing and swallowing problems. To remedy these, we also try to adjust the texture of food products by thickening or grinding them, for example."

The FoodLab presents itself as a dynamic place where students and researchers engage in practice-oriented research, education and service around the themes of food and health. Researchers from both the agriculture and biotechnology centre of expertise and the centre of expertise in care innovation are particularly active in the FoodLab.

"Companies and healthcare actors are also welcome there to make use of the available

research infrastructure.” The nutrition research team has ten full-time equivalent staff members, supplemented by students who do their internship there or do their final work through a research project.

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