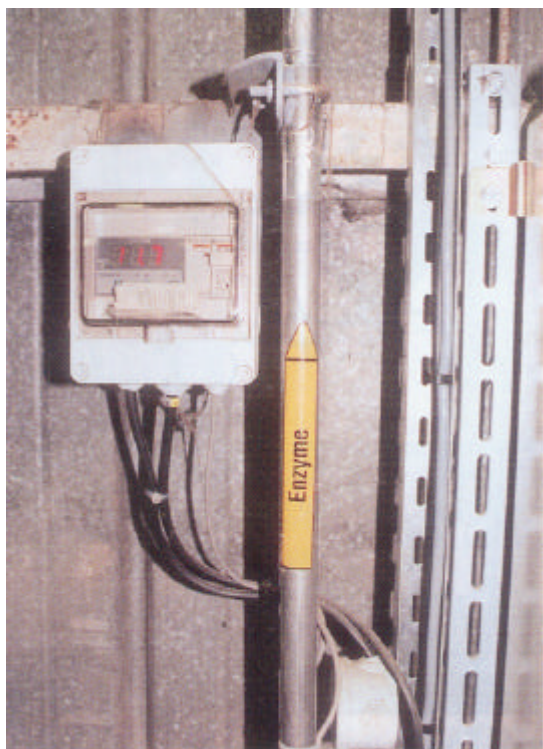


# Liquid enzymes take over when pellet quality is important

By Dick Ziggers

Coopagri is one of the larger French co-operatives with a production quantity of 675,000 tonnes of feed annually. Most of their turkey feed is produced in the Pontivy feed mill, about a hundred kilometres west of the regional capital Rennes. Since 1997 liquid enzymes have been added to the turkey pellets. Production manager Jean-Pierre Peire says they started using enzymes in the feed around 1993. With the help of Sanofi Nutrition Animale they used dry enzymes to increase the energy value of the wheat. Sanofi is the sole distributor in France of Finnfeeds' Avizyme enzyme for poultry diets. "There was a trend to increase the share of wheat in the diet for poultry. Once it was clear that adding enzymes would benefit the energy content of wheat, the decision to use enzymes was quickly made," says Peire.



Temperature of the liquid enzyme is continuously measured and the liquid is heated if temperature is below 5°C.

*Turkeys require a good quality pellet, or they will spill too much of the feed, but when more wheat is used in the diet the added dry enzymes are limiting pelleting temperature, and thus pellet hardness. French feed manufacturer Coopagri overcame this problem by adding liquid enzymes after pelleting.*

There were several considerations to start increasing the wheat content of the feed. Firstly, if wheat is cheaper than maize, and the energy content of the wheat can be increased, it makes a cheaper feed. Secondly, wheat has the disadvantage of causing wet litter, due to its viscous properties. Enzymes reduce viscosity and therefore improve litter quality. And thirdly, with more wheat in the diet it is easier to maintain the white skin of the broiler. Maize is limited because of its yellow pigmentation effects.

## Pellet quality

Once Coopagri decided to use enzymes, their pelleting process had to be revised, as the enzyme in a powdered form was mixed with the feed ingredients,



Because of the risks to human health, the tanks with liquid enzymes are stored behind a fence in a secured area.

## Processing



*In the control room a separate control panel is installed to manage the process. Jean-Pierre Peire points out that control of the system is very important.*

and then pelleted. Pelleting temperature should not exceed either 85°C for longer than 15 minutes, or 90°C for just a few seconds, to avoid the destruction of the enzymes. This means that pelleting temperature is a limiting factor for pellet quality. Higher temperatures are sometimes necessary to produce a hard pellet, for example for turkeys. These birds need to be fed hard pellets with little dust or meal to avoid spillage of the feed. With powdered enzymes in the feed this is sometimes difficult.

Once the solution to this problem was found, Peire immediately stepped in. "We had a good look at the advantages of liquid enzymes to powdered ones, and decided to change over to the new system. We wanted to do this thoroughly, so it took us almost a year before the system finally was installed. Apart from the benefits to pellet quality we also saw some benefits in avoiding human risks. Adding liquid enzymes means less handling, more automation, so people have very little risk to come into contact with the enzymes."

According to Peire the adding of liquid enzymes is cheaper, because less product is needed. With powdered enzymes the dosage was around 600 to 1000 grams per tonne of feed. With the liquid product only half of that is needed. The biggest advantage is the unlimited pelleting temperature, because the liquid enzymes are added after pelleting.

### Defining the system

Peire had a good look around at other feed mills before he decided how to implement the equipment at the Pontivy plant. "First we had to define the minimum and maximum safety margins," he says. "And then we

had to decide how to inject the enzymes, how the automation had to be laid out, how the traceability worked out, and define the minimal risks to the people that work with the products. Because enzymes are proteins we have to prevent people inhaling dust containing enzymes, because allergic reactions may occur. All air around the equipment is now immediately removed through an exhaust pipe."

The enzymes are stored in two 1000 litre containers. One is actually used, and the second one is a buffer, to make sure there is always liquid enzyme available. From this big tank the enzymes are pumped into a small 35 litre tank. This small buffer tank is joined to another 35 litre tank that contains just water. In future, this extra tank may also be used to add another liquid enzyme, such as phytase, which is becoming more relevant in France.

From these two small tanks the enzymes and the water are pumped and dosed to a static mixer, where the enzymes are diluted with water on a one to one ratio. The last step is spraying the diluted enzymes on the feed with two nozzles.

### Diluting necessary

The actual adding of the enzymes to the pelleted feed is in the fat coater, right after the fat has been sprayed on the pellets. Dilution of enzymes is needed to provide a volume that can actually be sprayed on the



*From the large container the enzyme is pumped to this buffer unit (left tank with green sticker). The other unit contains water to dilute the liquid enzymes before spraying.*

## Processing

pellets. Since only 300 to 500 grams per tonne are needed spraying of 'pure' liquid enzymes would create a very fine mist, that will not bind to the feed enough. When diluted with water, the enzymes will be sprayed on in small droplets that bind better, and the distribution through the feed is better. Laboratory tests showed that 91 percent of the enzyme was traced back from the pellets after being sprayed on this way. Coopagri uses a continuous system of fat coating, where there is only a very short period of time for adding the enzymes. Production speed is around 12 to 20 tonnes per hour, which is an improvement of one to two tonnes per hour, because pelleting temperature and therefore pelleting speed is no longer limiting.

Located in Brittany in the heart of the French animal industry, the co-operative is involved in all types of animal production, and produces feed for all species in six mills altogether. Around 45 percent of production capacity is dedicated to poultry feed and 45 percent to pig feed. The remaining ten percent consist of feed for cattle, horses, and sheep. Poultry feed production estimates 300,000 tonnes of which two thirds consists of turkey feed and one third of broiler feed. No feed for layers is produced. So far the system is only installed in the Pontivy plant. In the other plants powdered



*Actual spraying is done right after fat coating in the fat coater. Here temperature is nearly room temperature and the enzymes keep their full properties. Two nozzles are used to secure better spreading of the product.*

enzymes are still used. Peire is confident, that he did the right thing by taking so long for preparation of the system. "One should take his time when deciding to start using liquid enzymes. It is not a decision that can be made from today to tomorrow," he says.

### Key Words

Avizyme 1300, Avizyme 1310, liquid, turkey