LH2 – An impact mill does the trick

MILLING EXPERTS FROM THE LINDMÜHLE HAVE DEVELOPED A PATENTED PROCESS WHICH YIELDS A VERY UNUSUAL WHOLEMEAL FLOUR

++ figure 1

++ **figure 1**
In Switzerland, flour is commonly delivered in bags

++ **figure 2**
Feeding station at the impact mill. The second milling process is computer-monitored

++ **figure 3**
The quality of the flour is constantly checked in the internal flour laboratory

++ **figure 4 (page 38)**
The impact mill

By producing a flour which generates a light, but also soft crumb in the baked item, combined with an extremely high water binding capacity while at the same time providing all nutritional benefits of wholemeal flour – Albert Lehmann, miller at the Lindmühle in Birmenstorf, near Baden, Switzerland, has achieved what seemed to be impossible. It is not by chance that Fredy Hiestand – well-known health and quality fanatic – is one of the biggest admirers of Lehmann and also – due to the close proximity of his plant – one of the biggest customers of the Lindmühle.

Albert Lehmann operates two mills in Switzerland. The Lindmühle – in the Middle Ages it supplied flour to the Monastery Königsfelden, near the Reuss River – is a family heritage. This mill processes about 14,000 tons of grain into conventional flour, organic flour and LH2 flour each year. A second mill, in Eastern Switzerland, was also acquired and produces organic feed.

When Albert Lehmann took over the Lindmühle in 1988, the farmers sold their crop directly to the Swiss Confederation for guaranteed prices and the Confederation distributed it amongst the individual mills. Today, the Swiss grain market is much more liberated and the Lindmühle buys its own crop, preferably from the region. The grain is then processed into flour products which comply with the quality requirements of the mill and the customer specifications.

Amongst the product range are organic flours and also LH2 flours. Later ones comprise a range of wheat and spelt flours produced in a patented process that was developed in the mill.

First of all, the grain is ground using a conventional process. A second milling process follows where some parts of the flour are subsequently ground in an impact mill. In this mill, the flour particles rub against each other, thus producing heat. In-feed air and holding time of the flour particles in the mill are used to control the temperature which, in


++ figure 2


++ figure 3

general, is between 40 and 60 °C. In the milling process, the particles are reduced in size, thus increasing the surface. Due to the heat developed during the milling, the proteins in the flour coagulate and the gluten becomes more effective. At the same time, the damage to the starch during the milling process ensures a higher water binding capacity.
According to the patent specification, the interaction of these three factors results in the production of a softer ▸


++ Albert Lehmann


++ figure 4

Conventionally produced flour (U) and Lindmühle flour (E)		
Sedimentation value	U 39 ml	E 54 ml
Extensogram		
Resistance to extension	U 520 EU	E 735 EU
Extensibility	U 163 mm	E 121 mm
Ratio	U 3.2	E 61
Energy	U 175 cm²	E 147 cm²
Changes in starch properties		
Damaged starch	U 4.4%	E 10.2%
Maltose content	U 3.5%	E 4.8%
Amylogram		
Maximum viscosity	U 595 AU	E 545 AU
Maximum temperature	U 89.5 °C	E 90 °C
Changes in structure/particle size (Sieving analysis, mechanical sieving)		
Particle ‹ 85 µm	U 70.6%	E 97.4%
Particle ‹ 112 µm	U 91.8%	E 100%
Particle ‹ 155 µm	U 98.5%	E 100%
Farinogram		
Water absorption	U 65.2%	E 72.2%
Water absorption 14%	U 62.0%	E 67.8%
Dough development time	U 6.0 minutes	E 9.5 minutes
Dough stability	U 7.5 minutes	E 14.5 minutes
Dough softening	U 70 FU	E 50 FU
Quality number	U 90 mm	E 165 mm

dough which does not run. Such dough is firmer and can be processed in machines despite the higher water absorption. The dough does not stick so no additional flouring is required during dough make-up. This is certainly an advantage. Also, the higher water absorption results in an increase in taste.

The protein coagulates in the impact mill can be demonstrated in a comparison of sedimentation value and in the extensogram of conventionally produced flour (U) and Lindmühle flour (E), both made from identical raw materials (see table).

Depending on the degree of baking, bread made with Lindmühle-flours has a 4-10% higher moisture content compared to bread made with regular flour.

The LH2 flours that Fredy Hiestand uses for the production of crescent rolls, in amounts of up to 20%, which do not change the color of the crumb, have a shelf life of 10 months even though the germ of the grain has been ground as well. In Switzerland, this flour is about 3% more expensive than conventionally ground flour. According to Albert Lehmann, this higher cost will be easily compensated for by the higher water binding capacity.

The Lindmühle customers are located in Switzerland and beyond the borders. However, as the milling capacities are limited, Lehmann is now talking to several foreign mills and producers of baking improvers who might use the process as licensees. +++

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