



Herbacel<sup>®</sup> Classic Plus AF 60/100 in Rye and Rye-mixed Bakery Products





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*Fig. 1:* left: standard rye bread (dough yield 185); right: rye bread with 4 % Herbacel<sup>™</sup> Classic Plus AF 60/100 and adjusted water addition (dough yield 200)

Rye and rye-mixed bakery products are characterised by a juicy crumb, aromatic taste, typical colour and long fresh-keeping. These are basic differences compared to wheatbased bakery products. Most consumers consider rye bread as nutritionally valuable. Whereas wheat dough is visco-elastic rye dough will be short and plastic. Its baking properties are mainly based on the high amount of water binding pentosans. The stable water binding of Herbacel<sup>™</sup> Classic Plus AF 60/100, a fine milled apple fibre with especially high fibre content, helps to improve dough and pastry properties and gives an additional nutritional benefit.

**INFLUENCE ON DOUGH AND PASTRY PROPERTIES** The water binding capacity of Herbacel<sup>™</sup> Classic Plus AF 60/100 enables the production of dough with increased yield without any negative impact on processing properties. Therefore starch gelatinization during baking will be improved which will lead to a better volume, fresh-keeping and softness of the crumb. Figure 1 shows results of a trial where the dough yield (DY) was increased from 185 to 200. To achieve this outcome, 4 % of Herbacel<sup>™</sup> Classic Plus AF 60/100 (in relation to the rye flour) is added.

Dough with Herbacel<sup>™</sup> Classic Plus AF 60/100 can be processed very well despite the high dough yield. Due to the high water binding the dough is less sticky compared to usual rye dough. Rye and rye-mixed doughs with Herbacel<sup>™</sup> Classic Plus AF 60/100 are therefore suitable for both traditional as well as industrial made breads.

Due to the polyphenolics of Herbacel<sup>™</sup> Classic Plus AF 60/100, the valuable secondary metabolites of apples, colour as well as typical flavour of the bread will be intensified.

#### FRESH-KEEPING OF BREAD AND ROLLS

The appearance of freshness in bread and rolls is influenced by two main parameters: crispiness of the crust and softness/juiciness of the crumb. During storage, the gelatinized starch is losing some of the water that was bound during baking (retrogradation). This moisture is moving from the centre to crust. As a result the crumb will become dry and firm whereas the crust will become softer and moistly. This means that crumb firmness and product moisture are measurable parameters to describe the freshness of bread.

The amount of water plays a central role with regard to the freshness. Therefore increasing the waterbinding ability dough yield is a common approach to prolong the fresh-keeping. In that case it is essential that there is no negative impact on the processability of the dough. When working with Herbacel<sup>TM</sup> Classic Plus AF 60/100 the additionally added water should be 3.5 - 4 times the amount of apple fibre.



In our bakery lab we could prove the positive impact on the fresh-keeping properties by using Herbacel<sup>™</sup> Classic Plus AF 60/100 to increase the dough yield. Sensory evaluation confirms the results given by texture and crumb moisture measurement.

Figure 2 shows the development of crumb firmness during storage. The significantly slower increase in bread crumb firmness shows the effect on fresh-keeping. The firmness of the bread with apple fibre after one week of storage is comparable to the reference after two days. During eight days of storage the residual moisture of the bread with Herbacel<sup>™</sup> Classic Plus AF 60/100 and increased dough yield is constantly higher than the one of the reference bread (figure 3). As both curves are relatively parallel it can be said that neither baking loss increases nor the breads need to be baked for longer.

**Conclusion:** The softness and juiciness in bread caused by the use of Herbacel<sup>™</sup> Classic Plus AF 60/100 as well as the resulting freshness will be prolonged. The comparatively high water binding of this apple fibre will slow down the staling process.



*Fig. 2:* Influence of storage time on crumb firmness of rye bread with and without Herbacel<sup>™</sup> Classic Plus AF 60/100 (tpa analysis using a 25 mm ball, 60 % compression of bread slices 25 mm in high).



*Fig. 3:* Influence of storage time on crumb moisture of rye bread with and without Herbacel<sup>™</sup> Classic Plus AF 60/100 (drying at 102 °C until reaching constant weight).

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#### INCREASING DIETARY FIBRE CONTENT

Even though consumers are aware of the nutritional benefit of wholegrain they often refuse bread whose higher fibre content results out of an increased amount of wholegrain flour. Usually this is due to the firmer crumb but also due to the slightly dry and sandy mouth feel. This impression is given by the low water binding and swelling behaviour of grain husks. By using Herbacel<sup>™</sup> Classic Plus AF 60/100 it is possible to maintain the soft chewing impression and juiciness of the crumb of rye breads while increasing the fibre content at the same time. As a result, both the consumer acceptance as well as the nutritional benefit will be increased. Table 1 compares two different breads made with flour type 1150 (medium to dark rye flour) in regard to a possible fibre claim.

	Rye bread (DY 185)		Fibre rich rye bread with apple fibre (DY 200)			
	Ingredients	Dietary fibre		Ingredients	Dietary fibre	
	g	g/100g	proportionally	g	g/100g	proportionally
Rye flour, Type 1150	700	8	56	700	8	56
Rye sourdough (DY 200)	600	4	24	600	4	24
Salt	22	-	-	25	-	-
Baker's yeast	20	-	-	23	-	-
Water	550	-	-	700	-	-
Herbacel <sup>™</sup> Classic Plus AF 60/100	-	-	-	40	75	30
Dough	1892		80	2088		110
Bread	1630	4,9		1800	6,1*	

Tab. 1: Comparison of Rye bread with Herbacel™ Classic Plus AF 60/100

\*according to EC-Regulation 1924/2006 on nutrition and health claims made on foods: High in fibre ( > 6g dietary fibre/100g bread)

### RECIPES

There are no limits when using Herbacel<sup>™</sup> Classic Plus AF 60/100 in rye or rye-mixed bakery products. Especially in breads with a high part of ancient grains like barley or spelt, which differ in their baking behaviour to wheat, Herbacel<sup>™</sup> Classic Plus apple fibre will help to provide a texture that appeals to consumers. Despite adjusting the water filling no further changes in the baking process are necessary.

Rye-Spelt Bread with Apple Fibre				
Ingredients	g			
Rye flour 1150 (medium dark)	500			
Spelt flour 630 (white)	500			
Sour dough, dry	46			
Salt	26			
Baker's yeast	28			
Water	900			
Herbacel <sup>™</sup> Classic Plus AF 60/100	40			
total	2040			
DY	190			



Rye bread with Apple Fibre and Seeds				
Ingredients	g			
Rye flour 1150	700			
Sourdough one rise (DY 200)	600			
Linseed/Sun flower seeds	200			
Salt	25			
Baker's yeast	25			
Water	650			
Herbacel <sup>™</sup> Classic Plus AF 60/100	30			
total	2230			
DY	195			

Rye-Wheat rolls with Apple Fibre				
Ingredients	g			
Rye flour 1150	250			
Sourdough one rise (DY 200)	500			
Wheat flour 550 (all purpose flour)	500			
Salt	25			
Baker's yeast	35			
Water	630			
Herbacel <sup>™</sup> Classic Plus AF 60/100	20			
total	1960			
DY	188			



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