



Nordic Sugar
Member of Nordzucker Group

fibrex®

makes a better beefburger

Create juicy beefburgers, hamburgers and meatballs with up to 30% less frying loss



Fibrex® from Nordic Sugar is a natural dietary fibre produced from processed sugar beet. Fibrex® improves the texture and yield of a range of meat products, reducing frying loss and cutting production costs.

The high water holding capacity of Fibrex® is unaffected by cooking, freezing and thawing. By binding water and meat juice, the result is a juicier, more appealing product. Meat and fat content can even be reduced without compromising on overall quality. Add 0.8-2.0% Fibrex® to meat product formulations, and enjoy the benefits of this natural fibre.

Benefits

- High thermostable water holding capacity
- Reduces frying loss
- Improves juiciness, texture and yield
- Enables fat or meat reduction
- Reduces production costs
- GMO-free
- E-number free



Fibrex® makes a better beefburger

Beefburger trial

A series of tests investigated the use of varying dosages of Fibrex® 595 (<0.125 mm) in a standard European beef-burger recipe. With increasing dosages of Fibrex® 595, the amount of beef meat was decreased, while the remaining ingredients remained constant. No beef flavour or spices were used. The water holding capacity and frying loss of the burgers were analysed and the burgers were evaluated by a sensory panel.

Physical evaluation

Water holding capacity

The water holding capacity of the burgers was measured by centrifugation. For each sample, 2 x 25g of meat were weighed into test tubes with a plastic filter and fixed base to collect meat juice and water. All the samples were centrifuged for five minutes at 1990rpm.

Frying loss

Frying loss was measured on all burgers after frying at 190°C/374°F on a Teflon fryer.

Sensory evaluation

The sensory panel comprised 8 trained judges who evaluated the burgers on an 15-point scale, where 15 was high and 1 was low. The burgers were evaluated for their inner and outer appearance, colour, flavour, texture and consistency.

Ingredient	Standard	Fibrex® 0.8%	Fibrex® 1.2%	Fibrex® 1.5%
Beef meat	75.0%	74.2%	73.8%	73.5%
Salt	1.0%	1.0%	1.0%	1.0%
Ground pepper	0.1%	0.1%	0.1%	0.1%
Dried onion	0.5%	0.5%	0.5%	0.5%
Fibrex® 595	0.0%	0.8%	1.2%	1.5%
Water	23.4%	23.4%	23.4%	23.4%
Total	100.0%	100.0%	100.0%	100.0%

Results

Frying loss and water holding capacity

In figure 1 the frying loss of the beefburgers with added Fibrex® compared to the standard is shown. Fibrex® reduces frying loss with 18, 24 and 30% respectively, when 0.8%, 1.2% and 1.5% Fibrex® is added. The results prove that Fibrex® has a water holding capacity of 3-3.5g water/gram. Water holding capacity equals the amount of water bound to the product during manufacturing.

Sensory evaluation

The results from the sensory evaluation is shown in figure 2, the results indicate a positive effect on appearance, colour and texture.

“Roastiness” is a measure of how well the burger is fried on the outside, high values indicate nice and good roasting, and low values indicate pale colour and a less appetizing look. Addition of Fibrex® improve the “roastiness” of the burger. “Redness inside” is a measure of how unfried the burger looks when looking inside, high values equals a red and unfried look and low values equals a cooked and well done look. Overall burgers made with Fibrex® are easier and quicker to fry than standard burgers, the Fibrex® burgers get a better roasting and are not red in the center.

For the parameter “Hole in texture”, high values equals a hole in the middle of the burger indicating bad binding, low values equals no hole in texture and good binding. With Fibrex® the binding of the burger is improved and there is no hole in the texture. Fibrex® also improves the texture of the burger, making it less elastic. There is no significant difference in chewing time for the standard burger compared to the burgers with added Fibrex®.

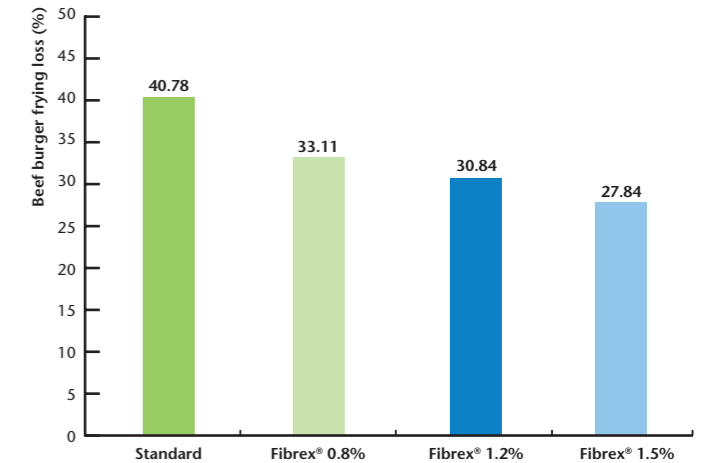


Figure 1. Frying loss of beefburgers, standard without Fibrex® and burgers with 0.8%, 1.2% and 1.5% Fibrex®.

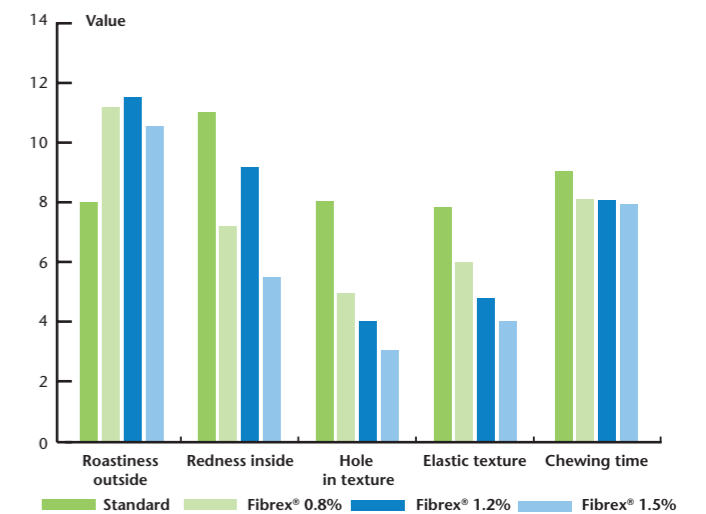


Figure 2. Results of the sensory evaluation of beefburgers, standard without Fibrex® and burgers with 0.8%, 1.2% and 1.5% Fibrex® added.

Conclusion

- Frying loss is reduced by 18-30% by the addition of 0.8-1.5% Fibrex® respectively.
- The addition of Fibrex® has a significant positive effect on appearance, colour and texture.
- Adding Fibrex® enhances texture and consistency in water rich meat systems by binding the meat and making the end product less elastic.
- Add Fibrex® to beefburgers and reduce cost.



Further analysis

Pictures of the burgers were taken using a Videometer-Lab2 Grey Tone Cooccurrence Matrix (GTCM), which are a colour and texture measurement vision system based on a high-intensity integrating sphere illumination with light-emitting diodes (LED) and a high resolution B/W camera. The system easily measures the colour and texture of, for example, meat, bread and cheese. The burgers were measured with 18 UV and NIR wavelengths, enabling the results to be compared with the results of the sensory panel. In figure 3, the sensory panel's evaluation of chewing time is correlated with a GTCM picture. Results indicate a positive correlation between VideometerLab2 GrayTone Co-occurrence Matrix (GTCM) and sensory values, showing that it is possible to predict sensory parameters such as chewing time from GTCM.

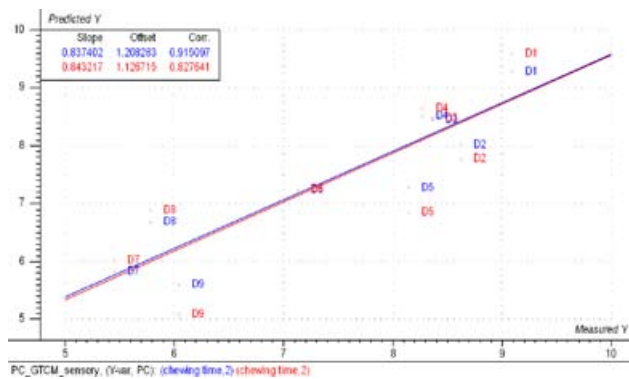


Figure 3. Correlation of chewing time evaluated by the sensory panel and GTCM pictures. The equipment is available at the Dansico innovation site in Denmark and enables us to make easy predictions of the sensory profile of different products.

Composition of FibreX®

Average nutritional value/100g	
Energy KJ/kcal	800/200
Protein (g)	8
Sugar (g)	5.5
Fat (g)	1
Dietary fibre (g)	67*
Minerals (g)	4

*According to AOAC 45.4.07/NMKL 129. Some hemicelluloses, particularly arabans are exceptionally soluble in alcohol and therefore not recovered in the fibre analysis. However, their degree of polymerisation is well above 10 and they are therefore fibre according to current Codex Alimentarius and EU definitions. Taken this into account, the total fibre content is approx. 73%.

FibreX® is available in different particle sizes

FibreX® type	Size in (mm)
FibreX® 575	<0.032
FibreX® 595	<0.125
FibreX® 600	<0.5
FibreX® 608	<2.0
FibreX® 610	0.4-1.4
FibreX® 620	Coarse, not milled
FibreX® 630	Flaked

