Oat molecular weight

The molecular weight of the beta glucans is essential to obtain the health benefits.

Viscosity in the small intestine is determined by the concentration, the molecular weight and the solubility of oat beta glucan. It has an important impact on the physiological function, such as reduction of blood cholesterol levels, moderation of blood glucose and insulin levels, as well as possibly for sensation of satiety. Viscosity, solubility and molecular weight are important control parameters in order to know that physiological effects from a product with oat beta glucan can be achieved at sufficient intake.

The unprocessed oat kernel has a natural molecular weight of 1730-2800 kDa. The SWEOAT Brans have approximately the same, 2000-2500 kDa which actually is the highest weight in all matrices we have observed in our analyses. Other oat products compared by us range from below 100 kDa up to 1960 as the highest. For barley beta glucan, the observed product ranged 80 kDa.

The process used by Swedish Oat Fiber to produce SWEOAT Brans is designed and optimized to preserve the original and natural structure of the molecules of beta glucans.

When the beta glucans, the soluble dietary fibers of oats, are digested, they form a gel. This makes the content of the stomach and the small intestine more viscous, so it acts like a net. This ‘viscous net’ then traps cholesterol-related particles preventing them from being absorbed into the bloodstream. They are then passed, harmlessly, out of the body.

It is this - the high viscosity of oat beta glucan that produces this cholesterol-lowering effect. The oat beta glucan must have a high molecular weight so it can be easily released from the food matrix during digestion, thereby producing the viscous gel inside the small intestine. The molecular weight can be maintained during the food production process through careful monitoring and control,
so that even during processes such as extrusion, there will be no significant loss of molecular weight.

Maintaining high molecular weight and the consequent viscosity is also important in retaining the benefits in controlling glucose and blood sugar levels. The rise in viscosity caused by oat beta-glucan slows down digestion and so acts to prevent sudden fluctuations in blood sugar levels after a meal, effectively delaying the time at which they will return to the pre-meal level.