Improved fructan accumulation in perennial ryegrass transformed with the onion fructosyltransferase genes 1-SST and 6G-FFT

Carbohydrate limitation has been identified as a main cause of inefficient nitrogen use in ruminant animals, which feed mainly on fresh forage, hay and silage. This inefficiency results in suboptimal meat and milk productivity. One important molecular breeding strategy is to improve the nutritional value of ryegrass (Lolium perenne) by increasing the fructan content through expression of heterologous fructan biosynthetic genes. We developed perennial ryegrass Lines expressing sucrose:sucrose 1-fructosyltransferase and fructan:fructan 6G-fructosyltransferase genes from onion (Allium cepa) which exhibited up to a 3-fold increased fructan content. Further, the high fructan content was stable during the growth period, whereas the fructan content in an elite variety, marketed as a high sugar variety, dropped rapidly after reaching its maximum and subsequently remained low. (c) 2007 Elsevier GmbH. ALL rights reserved.