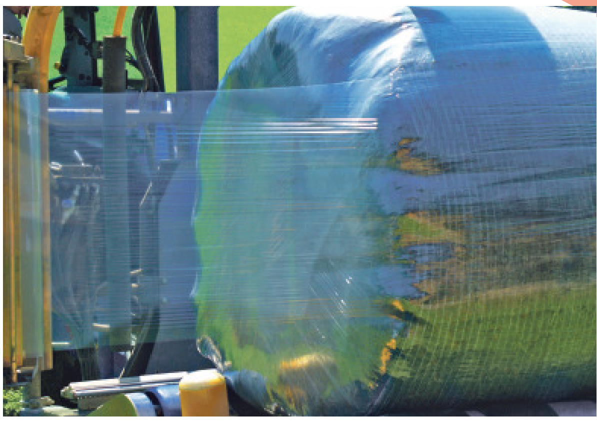
STRETCH FILM: TRANSPARENT INSTEAD OF COLOURED

On Test - Transparent stretch film recently launched in the market; And put through extensive field tests by LFZ Raumberg-Gumpenstein. The results from 2014 have recently been made available.

Round bales in Austria make up more than 30 percent of the silaged grasses and are an important silage system. Since the introduction of round bales in the mid-1980s, stretch films have been offered from white to various shades of green and in less frequent cases also in black. Transparent stretch films are new to the market. The training and research centre LFZ Raumberg-Gumpenstein has been conducting field trials, between the spring 2013 and the summer of 2014, to test if it is possible with these transparent stretch films to achieve an airtight seal and ensure a quality of silage comparable to conventional green coloured standard stretch films.



Development of the exacting trials

Round bales were pressed from the first to the third cutting of a permanent mixed variety meadow in Ennstal. Three different stretch films were used for testing. Two transparent test films with different material composition (transparent stretch film = TF, 25 micron thickness, trade name "Agristretch Crystal") were compared with a normally used control variant (standard stretch film = SF, 25 micron thickness, trade name "Unterland Agristretch grün (green)").

The grass feed was processed with conventional equipment, with the round bales having a diameter of 120 cm. Wrapping was carried out on six wrapping units at the LFZ Raumberg Gumpenstein with a 70 percent pre-stretch. Each bale was weighed and stored until first sampling for at least 76 days. The bales were then re-weighed, samples taken and a series of quality tests carried out. To verify the long-term durability of the stretch films, one bale of each variant has been stored for longer. The sampling of the long-term tests took place on 1 July, 2014.

Contents

In order to make precise statements about the practicality of transparent films, tests were carried out on each of the round bales covering aspects of ingredients, fermentation quality, microbiology, fermentation losses and aerobic stability. The wet chemical analyses were the responsibility of the Rosenau animal feeds laboratory. The target dry weight of 400 g per kg of dry matter (g/kg DM) in the 1st and 3rd growth crop was achieved with almost pin-point accuracy. In the hot summer of 2013 drying-out in the 2nd growth crop was a little too high with a DM of around 50 per cent. In the statistical analysis of dry matter, the ingredients (XP, XF, XA, XZ) and NEL could be observed after three months of storage, whereby there was no significant difference, in any of the three growth crops, of the round bales wrapped with transparent stretch film TF 1 and TF 2 from the bales wrapped with standard green film. The differences after one year of storage could not be attributed to the stretch film, but were in the dispersion pattern of the starting material.

Silage quality

An optimum lactic acid fermentation is extremely important for good silage quality in grass silage. The round bales of grass silage from the individual growth crops, after three months of storage, differed significantly in the parameters pH, lactic acid and butyric acid (see table). For acetic acid in the 3rd growth crop as well as the proportion of ammonia (NH3-N) in the 1st and 3rd growth crops, significant differences between the stretch film variants were found. In the case of acetic acid, 4.1 g less acid was formed with TF 2. The ammonia content of TF 2 was lower than the control by 2.2 percent in the 1st growth crop and by 3.8 percent in the 3rd. growth crop, i.e. the transparent film produced less protein degradation. Overall it was determined that the bales with transparent stretch film after three months of storage exhibited equally good fermentation quality to those with the standard film. After a year of storage the acid composition in general slightly changed (see table). With prolonged storage, no disadvantage was observed with the grass silage of three growth crops, for the bales wrapped with transparent film against the green stretch film.

Feed hygiene

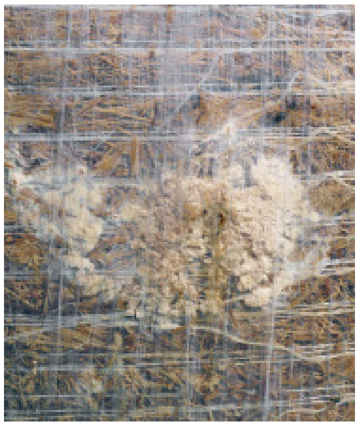
The microbiological investigation showed no difference after three months storage between the stretch film variants for the three growth crops for the pathogens; aerobic bacteria, fungus and yeasts (see table). A fungus growth could be detected in the transparent stretch films (TF growth 2, 1). A pinhead size hole appears to have been the cause. This restricted fungus nest did not have any negative impacts on the total quality and losses of the this bale. After one year of storage, fungus and yeast growth could not be found in any of the bales, i.e. the transparent
films maintained airtightness just as well as the standard films and snothing was spoilt.

Fermentation losses

A mass balance of dry matter and energy (NEL) was created to explore the fermentation losses of the individual variants. From the table it is clear that between these balance values, after three months storage , Wrapping of round bales with transparent film in the three field tests ran without problems.

QUALITY PARAMETERS OF SILAGE BALES FROM THREE GROWTH CROPS IN RELATION TO THE STRETCH FILM USED AND STORAGE DURATION

Parameter	Unit	Test year	1. Crop (17 May 2013)			2. Crop (16 July 2013)			3. Crop (4 Sept. 2013)		
			SF*	TF** 1	TF 2	SF	TF 1	TF 2	SF	TF 1	TF 2
Dry mass (DM)	g/kg DM1	2013	380.0[a]	360.7[a]	386.0[a]	489.0[a]	508.7[a]	513.3[a]	414.7[a]	396.0[a]	409.3[a]
		2014	397	388	353	508	576	531	420	336	377
pH		2013	5.0[a]	5.0[a]	5.0[a]	5.2[a]	5.2[a]	5.3[a]	4.6[a]	4.6[a]	4.7[a]
		2014	5.0	4.9	4.8	4.8	5.5	4.8	4.9	4.7	4.7
Lactic acid	g/kg DM2	2013	11.0[a]	12.2[a]	8.0[a]	4.5[a]	4.3[a]	4.4[a]	33.2[a]	32.8[a]	26.4[a]
		2014	5.3	4.9	7.4	14.0	4.2	16.4	18.1	32.2	36.9
Citric acid	g/kg DM	2013	4.0[a]	3.8[a]	3.7[a]	3.6[a]	3.4[a]	2.9[a]	12.8[b]	11.2[ab]	8.7[a]
		2014	4.8	4.9	5.1	5.3	3.0	6.2	5.2	7.7	10.1
Butyric acid	g/kg DM	2013	13.1[a]	19.4[a]	11.7[a]	2.[3a]	2.0[a]	3.2[a]	4.3[a]	3.9[a]	3.[6a]
		2014	11.3	8.2	8.2	1.6	0	0	1.4	5.4	1.9
NH_3-N of total N	%	2013	3.3[b]	3.9[b]	1.1[a]	3.8[a]	3.9[a]	3.5[a]	5.8[b]	1.3[a]	2.0[a]
		2014	5.6	4.9	4.7	4.0	2.0	3.1	3.9	7.9	8.1
Aerobics		2013	41,383[a]	81,383[a]	41,383[a]	111,000[a]	113,333[a]	130,000[a]	140,000[a]	203,333[a]	223,333[a]
Bacteria	CFU[3]/g FM	2014	50,000	20,000	30,000	100,000	40,000	100,000	100,000	100,000	60,000
Fungus	CFU/g FM	2013	< 1000[a]	< 1000[a]	< 1000[a]	< 1000[a]	< 1000[a]	< 1000[a]	< 1000[a]	< 1000[a]	< 1000[a]
		2014	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000
Yeasts	CFU/g FM	2013	< 1000[a]	< 1000[a]	< 1000[a]	3400[a]	< 1000[a]	16,733[a]	< 1000[a]	< 1000[a]	< 1000[a]
		2014	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000
DM losses	%	2013	-3.2[a]	-3.8[a]	-4.8[a]	-3.1[a]	-2.7[a]	-3.3[a]	-3.6[a]	-3.3[a]	-3.4[a]
		2014	-3.5	-3.2	-4.4	-3.5	-2.1	-3.0	-3.3	-4.0	-3.7
NEL[5] losses	%	2013	-5.1[a]	-7.4[a]	-8.4[a]	-6.5[a]	-5.4[a]	-5.8[a]	-6.6[a]	-6.5[a]	-6.2[a]
		2014	-6.9	-7.6	-7.3	-4.6	-5.7	-5.0	-7.2	-6.9	-6.4



Mould is quickly identified with transparent film

*Comments: *) SF = Standard film, **) TF = Transparent film; [1]) FM = Fresh mass, [2]) DM = Dry mass, [3]) KBE = Colony forming unit, NEL = Nett Energy Lactation*

2013 Sampling after 97/77/76 days (there are significant differences when superscript letters behind the number vary.) 2014 Sampling. 1 July no significance test possible

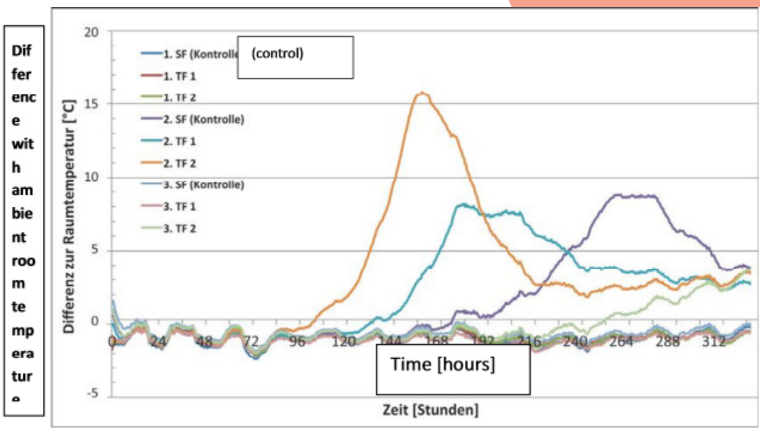
hello@coveris.com
www.coveris.com

COVERIS™

Stretch film

no significant differences can be detected. The DM losses vary between -2.7 and -4.8 percent. Due to breakdown of sugar, energy deficiencies of between -5.1 and -8.4 percent occurred.

The losses with the DM and NEL balances after one year storage varied by a comparable amount to three months. No appreciable losses were therefore determined through the extended storage. Wrapping with transparent film brings no disadvantage in respect of fermentation losses.



Temperature curve durability test of the growing crops 1 to 3 after long-term storage

(SF = Standard film; TF = Transparent film)

GRAPHIC: RESCH

Grass silage stability

The stability of fermented feed is an important criteria from the aspect of feed quality. As soon as oxygen from air comes into contact with the grass silage, microbiological processes can more or less lead to rapid spoiling. Therefore after opening the silos at the LFZ Raumberg-Gumpenstein, the grass silage samples were subject to a number of days exposure to oxygen The stability of fermented feed is an important criteria from the aspect of feed quality. As soon as oxygen from air comes into contact with the grass silage, microbiological processes can more or less lead to rapid spoiling. Therefore after opening the silos at the LFZ Raumberg-Gumpenstein, the grass silage samples were subject to a number of days exposure to oxygen from the air at an ambient temperature of approx. 20 C. During this period the temperature of the silage was measured using probes at 30 minute intervals.

After three months storage all variants of the three growth crops were stable, i.e. they showed no significant increase in temperature. In the durability test the prolonged storage of the bales of one year produced varying results (see diagram). The bales from growth crops one and three were stable for 14 days, as the silage temperatures did not rise more than 5 degrees above the ambient temperature in any of the cases. With the grass silages from the 2nd growth crop, the TF2 variant was unstable after five days and the TF 1 after seven. The green stretch film (control) remained stable for 9.5 days. It is to be assumed that the DM content of more than 500 g/kg fresh weight in this grass silage is in general responsible for reduced stability. In practice the lower result of the transparently wrapped bales should not be a cause for concern, as a grass bale for feeding is usually used up within five days.

PRACTICAL IMPLICATIONS

The development using transparent films produces the same good grass silage quality for bales as with traditional coloured standard films. This was the conclusion of an extensive series of experiments at the LFZ Raumberg-Gumpenstein under field test conditions and a bale storage duration of up to one year. In addition, transparent bales ensure the ability to visually check the contents. And at least for the animal feed trade they represent a welcome innovation. Further information is available in the final report at www.raumberggumpenstein. at