BUDISSA BAG®

BAG Budissa Agroservice GmbH

Grain storage in bags

- A flexible technology grain storage (dry and wet)
- Also usable for storage of fertilizier, wet or dry industrial by-products, wood pellets and other bulk goods
- High peformance (up to 300 t/h dry grain)
- Short amortization time compared to conventional grain storage
- **Low investment costs** (5 €/t storage and unloading costs)

Loading with:

AKRON GRAIN BAGGER

Storage of grain, corn, fertilizer and other bulk goods

Parameter	unit	AKRON EMD 9400
Bag diameter:	m	2,70 (9')
Steady flow bagging performance:	t/min (t/h)	5 (300)
Power required:	Upm/rpm	min. 60 (540)
Hopper capacity:	l	2,50
Hopper width:	m	2,20
Filling height:	m	3,40
Transport width (working width):	m	2,80 (3,20)
weight:	kg	2.980

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Unloading with:

AKRON UNLOADER

Unloading of grains without losses, High performance up to 280 t/h

Parameter	unit	AKRON EXG 300
Bag diameter:	m	2,70 (9')
Unloading performance:	t/min (t/h)	4,5 (280)
Powered required:	Upm	90
Working width:	m	3,95
Transport width:	m	2,60
Transport length:	m	6,00
Max. loading height:	m	4,50
weight:	kg	2.600

Protection of the bags:

Storage of food grain in silage bags – a safe alternative to commercial storage!

Dr. Andrea Wagner [1] und Dr. Christine Idler [2]
[1] BAG Budissa Agroservice GmbH
[2] Leibniz-Institut für Agrartechnik Potsdam-Bornim e.V., Max-Eyth-Allee 100, D-14469 Potsdam

The importance of short-term storage capacity for grain increases with the price fluctuations in the cereals market.
In order to be able to participate in price developments, conventional storage of grain depending on the size of investment is currently set with 100 to 250 €/t meanwhile the expected costs for a 6-month storage at the country store are about 20 €/t. Supreme rule to avoid deterioration in cereal stocks is the protection against moisture and contamination by birds, rodents, dogs and cats. In Germany, normally drying or cooling is used to storage food grain but unfortunately anaerobic storage largely hasn't been taken into consideration so far. The bag technology works on the principle of air exclusion and is characterized by low losses and high quality. Roughage and industrial by-products (press pulp) are in accordance with this principle ensilaged in silage bags; even by conserving wet grain under anaerobic conditions lactic acid fermentation will take place at 25 % humidity. How will quality parameters be influenced while storing food grain in bags for 6 months so that harvest can take place with storable dry matter content? The answer to this question was the target of a practical experiment.
A new system for ensiling in bags, the grain bagger, enables along with rotor machines and rolling mills the storage of grain and other free flowing bulk goods in silage bags at comparatively lower capital investments.
Using this ensiling system in bags the material will be pressed with an auger into a polyethylene bag with a diameter of 2,70 m. While filling them with the help of a grain wagon, performances of up to 300 t/h can be achieved. Hence, also harvested fresh grain can be processed while combining.

Practical experiment

Therefore, Tarso wheat with a moisture content of 10,9 % was harvested by Budissa Agrarprodukte Preititz/Kleinbautzen GmbH with a yield of 87 dt/ha. With the crude protein content amounts 14,8 % TM, the starch content 67,2 % TM, a falling number of 407, a HL-weight of 79,6 and a Zeleny sedimentation volume of 43.

Storage of maize corn in the bag – alternative of drying.

75 tonnes of cereals were stored in 2 silage bags using the Profi Farm Bagger RB-A. The bags had a diameter of 9 ft (= Ø 2,70 m), the bags thickness of the material amounted 215 µm. In bag 1 four valves were installed on each long side for the later regular sampling, bag 2 had only four valves on one side. Bag 2 should only be sampled after 6 months to exclude a possible change in quality by sampling. To determine the temperature profile in the bags eight data logger in bag 1 and four in bag 2 were inserted through the valves. The bags were covered with sandbags and a protective net against birds. A control batch remained in the warehouse where grain also had been stored after harvesting. Four data logger were inserted in this rick of wheat.

Sampling / Analysis

While storing, after two and four weeks and after three and six months the control batch and wheat from bag 1 was sampled. In the following, samples were taken from all eight valves from two different heights: on one hand just below the surface and on the other hand at a depth of 1,20 m. From the control batch also eight samples were taken, four below the surface, four at a depth of 0,80 m. Samples from bag 2 were included in the studies after 6 months of storage. In all forms of storing the temperature profile was determined during the storage. The following parameters of the samples were investigated: dry matter content, pH-value, starch and crude protein content as well as the quota of bacteria, yeasts and moulds. After six months an additional assessment of the germination characteristics was made by determining the germination potency and capacity.

Results given from the temperature profile

Nearly similar temperature profiles could be identified in both silage bags: a gradual descent of temperature and a reflection towards outside temperatures. The profiles indicated very low microbiological activities (Fig. 1).

Results in quality parameters

Comparing the results of all storage methods, the average chemical and microbial results are very similar (Fig. 2).
The substances crude protein and starch detected before storing did not change their value, also the pH-value was unchanged and there was no detected increase of the investigated groups of microorganisms. The contents of the investigated groups of germination are in range of reference values for ground grain products of the DGHM (2007).

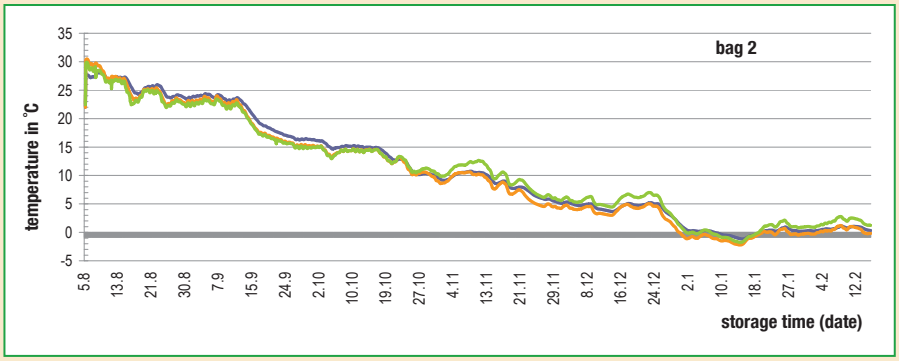

Fig. 1: Temperature profile in the silage bag

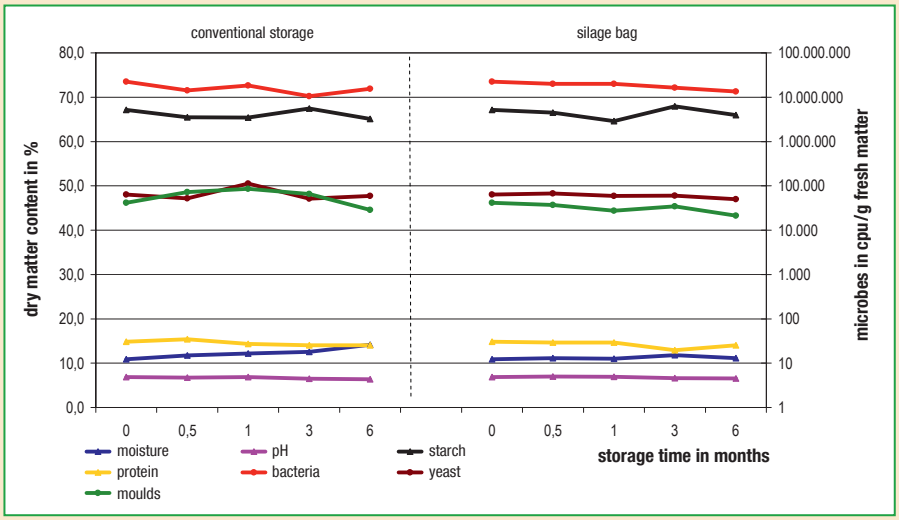

Fig. 2: Chemical and microbiological parameters of wheat during the 6-months storing depending on the form of storage

Grains storage in bags

The process costs for using the grain bagger are made up of costs for machines, labour and bags. The investment costs depending on the equipment is at an average of 15.000 €. With an increasing efficiency machine costs will decrease. A silage bag with a diameter of 2,70 m and a length of 60 m can store about 250 t. The figures show that a machine can be amortized with a low tonnage in a short period of time with costs of about 3 to 4 €/t (Table 1).

Conclusion

To sum up, the practical experiment showed that wheat can be storege in bags up to six months without losses of quality. Both in terms of labour economics as well as in quality and cost terms storing in silage bags is very well competitive with the conventional grain storage.

Costs of the system BUDISSA BAG

Type of machine	AKRON Grain Bagger	AKRON Unloader
	price / bag: 495 €	
Investment:	15.000 €	25.000 €
Performance:	200 t/h	200 t/h
Bag diameter:	2,70 m	2,70 m
Bag lenght:	60 m	60 m
Bag content:	maximal 250 t	maximal 250 t
Basic performance:	5.000 t/year	5.000 t/year
Using time:	6 years	6 years
COSTS per Year:		
Capital costs:	2.500 €	4.167 €
Return on investment (1/2 capital, 5 % per year):	375 €	625 €
Repairs:	250 €	417 €
Tractor [1]:	2.000 €	2.000 €
Labor costs (max. 0,80 €/t) [2]:	900 €	900 €
Sum per year:	**6.025 €**	**8.108 €**
COASTS per tons:		
Machine costs:	1,21 €	1,62 €
Costs for bags:	1,98 €	0,00 €
Total costs:	**3,19 €**	**1,62 €**

[1] operating hours per bag 2 € je oh (incl. diesel): 50 · [2] oh per bag: 3 €/h: 15

BAG Budissa Agroservice GmbH · Birnenallee 10 · OT Kleinbautzen · D-02694 Malschwitz
Fon: +49 35932 35630 · Fax: +49 35932 35656 · Mail: info@budissa-bag.de · Web: www.budissa-bag.de