SUET Saat- und Erntetechnik GmbH
Strassburgerstr. 2, P.O.-Box 780
D-3440 Eschwege
Federal Republic of Germany

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Saturday, March 6
Section A, Agronomy, Marina 1

Hans Lamprecht and **Jürgen C. Knolle**, SUET Saat- und Erntetechnik GmbH, Strassburgerstr. 2, D-3440 Eschwege, Germany:

Quality Assurance, a main object of a company servicing seed processing.

ACHTUNG :
Neue Telefonnr.: 05651/927-5
Neue Faxnr. : 05651/927-324

Lamprecht, Hans, and Juergen C. Knolle, SUET Saat- und Erntetechnik GmbH, Strassburger Str. 2, D-3440 Eschwege, Germany. - Quality Assurance, a main object of a company servicing seed processing. (ABSTRACT)

Liability on seed quality is a big question for a company, processing more than 1,000 tons p.a. in 600 lots and 370 varieties of sugar and fodder beet seed to be grown in more than 2 million acres and not owning any of the seeds. Could Insurance contracts replace a Seed Quality Management? An answer is presented by its Quality Assurance system, which is built by qualified organization, methods and regulations for thorough seed and product testing. From post-harvest processing via grading, pelleting and applying protective chemicals until the final seed product, analyses results and quality documentations are obtained before packing. The package labels decipher all reliable and traceable quality records of respective lots for legislation and customer information purposes. From each lot, depending on its size and extent of pilot processings, 14 to 50 samples are taken. More than 300 lots are tested in glasshouse by examining 500,000 individual plants on colour and bolting properties. Further 20,000 samples or 8 million seeds are examined in laboratory tests. About 35,000 chemical analyses indicate the application quality. The permanent quality controls request 16 % = 23 experted personal staff : 2 in seed processing, 4 in pelleting-coating, and 13 in quality labs attached. Additional 4 R&D experts, at 0.5-0.7 million US-$ p.a. for beet seeds only, permanently work on material and process quality. Targets among other interests: Conditioning of seed physiology by pretreatments, controlling the efficacy of protective chemicals by technics of formulation and application, and adapting combinatory effects of suitable seed treatments with materials to soil and climate. Last but not least, with new chemicals or formulation, the methods of selective tracing the molecules have to be developed, for shelf-life and soil or plant residues.
The enormous amount of samples needed for seed quality assurance can easily be enlightened by respective Binominal distribution tables : Based on only sampling deviations and no other faults, of 400 seeds analyzed ("true germination" = 90 %) only 26 % of all results will represent the true value, another 34 % indicate too high and 40 % too low values. To assure highest confidentiality of results, the number of f.i. Monogerm seeds analyzed from each lot exceeds a total amount of 15,000 grains, of which 94 independent test results for 17 different quality criteria are produced : Physical quality data as humidity, mass and size as well as purity, germination and vitality.
By X-raying the seeds as a quick and non-destroying method for filling degree and monogermity, decisive results on germination quality are obtained, comparable with the longer lasting standard germination tests. Vitality tests under soil allow adaptions of pelleting components to seeds and growing conditions. Pelleted and coated for protective application, further 16,000 seed grains are analyzed to produce 126 test results for decisive 26 final product quality criteria, which concern also the mass and sizes of pellets, their mechanical and sanitary stability for perfect sowing.
In view of liability, certified germination and vitality of a seed lot are considered as essential as an exact concentration of seed and plant protective chemicals applied to the lot and individual seeds. So step by step the procedures of processing are accompanied by quality analyses documentation, which enhance not only the security of fabrication quality, but also the success of the customers using the seeds. This success is granted by the company label on each packet, wherefrom any quality criteria can be detailed back from the ident number : To the seed lot, charge, day and shift of processing with respective recipes, components, humidity, drying temperatures etc etc.
This Permanent Quality Control outvalues any Insurance. Money from a liability case will never satisfy the farmer, as he has still no highgrade seeds. Nor the processing company, as it will have lost its customer.

SUET® SUET Saat- und Erntetechnik GmbH

SEED TECHNOLOGY & MANUFACTORING

Seed Fabrication Services	since	1948
Employees	abt.	200

Annual Beet Seed Fabrication :	600	Lots
of Sugar Beet	250	Varieties
of Fodder Beet	120	Varieties
with Pesticide Treatments	35	Combinations
for Pelleting - Coating	2,000	Orders

Beet Seed Processed :	1,000	Tons,
Pelleted and Coated :	1 Million	Units
(1 Unit = 100,000 Seeds)	= 100 Billion	Seeds
(Sown on 2.16 ac)	= 2.16 Million	Acres
(or 0.834 ha)	= 834,000	Hectares

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SEED QUALITY SYSTEM

Employees	Seed Processing	12	(2)*
	Pelleting-Coating	77	(4)*
	Tech., Maintenance	30	
	Research & Dev.	12	(4)*
	Quality Controls	13	(13)* = 9 %
* Beet Seed Quality Management			23 = 16 %

Annual Quality Controls

Pilot Processings (monogerm seed)	1,000
(multigerm seed)	50
Samples p. Lot (dep. Lot Size)	14 - 50
Glasshouse, No of Lots Tested	300
Individual Plants Examined	510,000
Laboratory, No of Tests	20,000
Germination Boxes	80,000
Seeds Examined	8 Million
Chemicals Analyses	35,000

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Pesticide Combinations Homologated in Europe

Fungicides	Insecticides	Countries
12* THIRAM	30* Carbofuran	D+ Ukraine
12 THIRAM	6 Methiocarb	D, I
12 THIRAM + 5,6 Hymexazol	30 Carbofuran	Slovenia
12 THIRAM + 18 Hymexazol	30 Carbofuran	PL+D +CSR
4 THIRAM + 18 Hymexazol	40 Furathiocarb	DK
4,8 THIRAM 8,4 Hymexazol	40 Carbosulfan	S
12 THIRAM + 14 Hymexazol	6 Methiocarb	E
4 THIRAM + 14,7 Hymexazol	6 Methiocarb	B
4 THIRAM + 14,7 Hymexazol	6 Methiocarb	NL
4 THIRAM + 14,7 Hymxazol	6 Tefluthrin	NL
4 THIRAM + 14,7 Hymexazol	90 Imidacloprid	B, NL
1,5 Iprodion + 14 Hymexazol	4 Tefluthrin	F
1,5 Iprodion + 14 Hymexazol	12 Tefluthrin	F
1,5 Iprodion + 14 Hymexazol	3 Carbofuran	F
1,5 Iprodion + 5,6 Hymexazol	45 Carbofuran	F
1,5 Iprodion + 28 Hymexazol	3 Carbofuran	F
1,5 Iprodion + 28 Hymexazol	4 Tefluthrin	F
1,5 Iprodion + 14 Hymexazol	90 Imidacloprid	F
Number of Combinations (of tot. abt. 35):		**18**

(* = Grams Active Ingredient p. Unit = 100,000 Seeds)

Seed Physiology - Conditioning : 20 % Adaption to Individual-Soil-Climate Needs by Mech. and Phys-Chem. Pretreatment etc.
Seed Treatment - Plant Protection : 40 % Efficacy, Storability, Environmental Impact on resp. Molecules and Combinations of - Fungicides - Insecticides - Bio-Antagonists etc.
Process Technology - Innovations : 40 % Selection, Conditioning, Application of - Pelleting Material - Chemicals Formulation - Additive Ingredients etc.
Quality Assurance - Management : Strategy, Planning, Organization of - Specs on Products, Processes, Procedures - Methods, Analyses, Evaluations, Compilations - Internal and Customer Information - Certification

RE : QUALITY CONTROLS of Seeds (Monogerm) par Lot

Quality Parameters	Samples	Results
- Grain Humidity	1 x 10 g	1
- Mass of 1,000 Grains	1 x 5 g	1
- Sieve Spectrum (Ø)	1 x 50 g	7
- X-Ray Analyses	4 x 100 Grains	
(Filled, Empty, Bi-Germs, Twins,		16
"Filling Degree and Monogermity")		2
- Purity of Non-Beet Grains	1 x 50 g	5
- Germination Tests	2 x 4 x 100 Grains	
(Velocity 4 d, Roots > 5 mm)		8
(Vitality 4 d, Roots > 15 mm)		4
(Germination 7 - 14 d, Evaluation of Anomal, Dormant, Dead Germs)		32
- Vitality under Soil	2 x 5 x 100 Grains	10
Total No of Seeds Analysed :	abt. 15,000 Grains	
Total No of Results Obtained :		94
Quality Criteria Evaluated thereof :		17

RE : QUALITY CONTROLS of Pellets (Monogerm) par Lot

Quality Parameters	Samples	Results
- Grain Humidity	1 x 20 g	1
- Mass of 1,000 Grains	2 x 500 Grains	2
- Sieve Spectrum (Ø, #)	2 x 50 g	14
- Hardness - Stability	1 x 100 g	1
- Germination Tests	2 x 4 x 100 Grains	
(Velocity 4 d, Roots > 5 mm)		8
(Vitality 4 d, Roots > 15 mm)		4
(Germination 7 - 14 d, Evaluation of Anormal, Dormant, Dead Germs)		32
- Vitality under Soil	2 x 5 x 100 Grains	10
- TLC Pesticides Analysis (Thin Layer Chromatography)	2 x 100 Grains	54
Total No of Pellets Analysed :	abt. 16,000	
Total No of Results Obtained :		126
Quality Criteria Evaluated thereof :		26

RE : WHY SO MANY DATA per Lot ?

Binominal Distribution of Gemination Results, for n = 400 Seeds and Different True Germinations

		True Germination p (%)		
		94	90	85
Binominal Distribution of Germination Results %	100			
	99			
	98	0.1		
	97	1.2		
	96	7.3		
	95	22.6		
	94	32.1	0.5	
	93	23.6	3.0	
	92	9.0	10.2	
	91	2.5	20.6	
	90	0.4	26.2	0.2
	89	0.1	21.4	1.3
	88		12.1	4.8
	87		4.5	11.4
	86		1.3	18.6
	85		0.1	22.5

At 90 % True Germination, 34.5 % of all germinations tests will result > 90 %, further 39.4 % will result < 90 %, and only 26.2 % of all tests will result in theTrue Germination (the table is built on inevitable deviations of sampling only, no other faults !).

Contents :

100,000 Sugar Beet Pellets

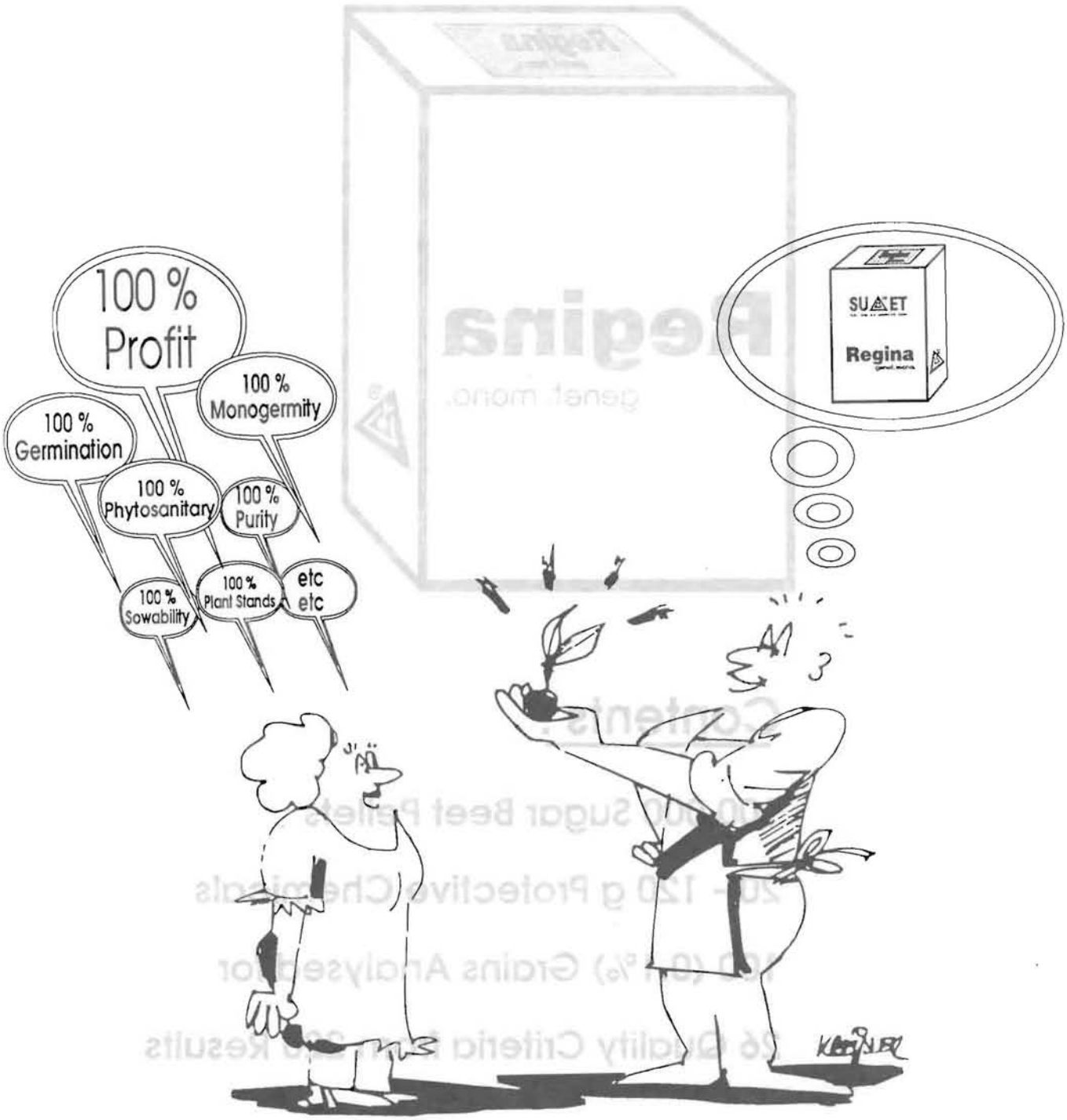
20 - 120 g Protective Chemicals

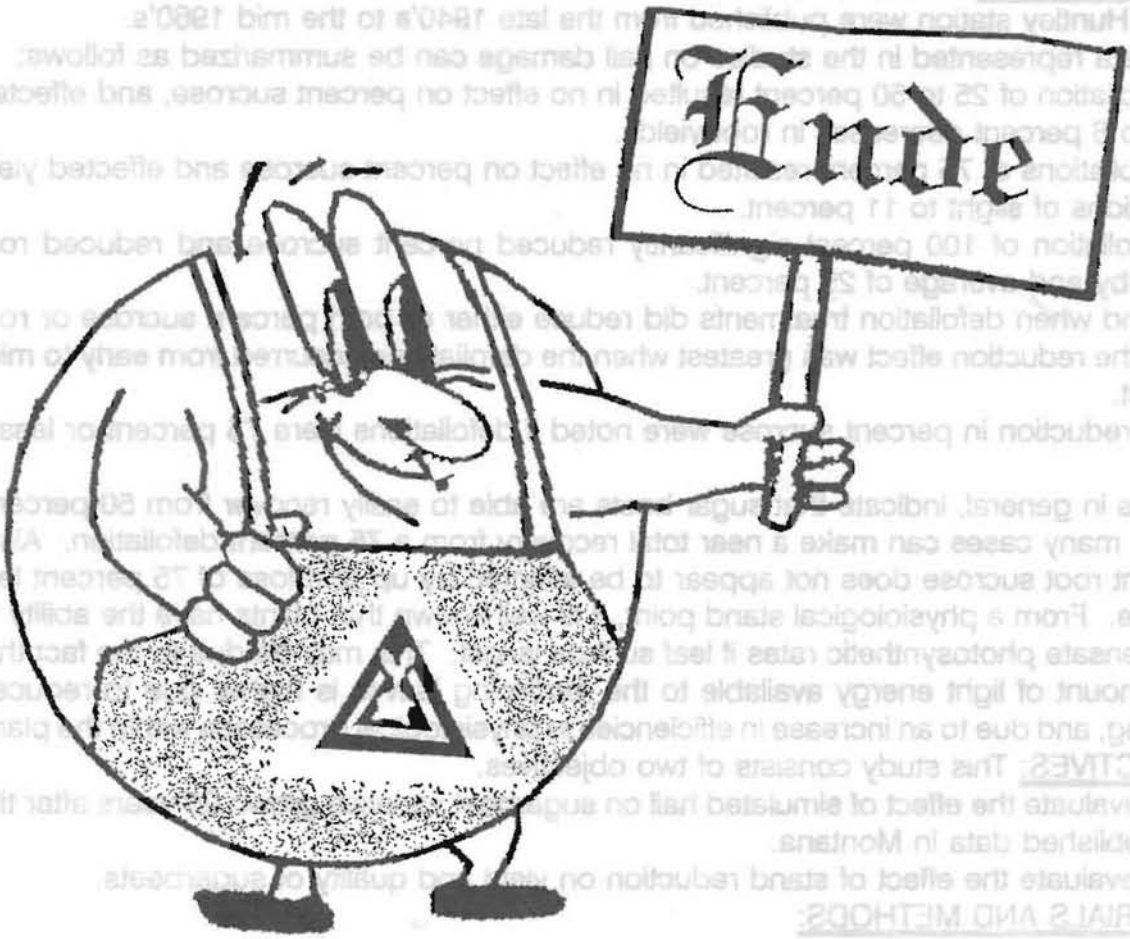
100 (0.1%) Grains Analysed for

26 Quality Criteria from 220 Results

0.5 - 0.7 Million US-$ in R&D p.a.

45 Years of Experience and Security


100 %
Profit
100 %
Germination
100 %
Monogermity
100 %
Phytosanitary
100 %
Purity
100 %
Sowability
100 %
Plant Stands
etc
etc
SU ET
Regina



Auf Wiedersehen