



constant soil properties

To whom it may concern

Prof. Rainer Stamminger

on behalf of

Sta-De Testmaterial

Sta-De Testmaterial is delivering
- since more than 25 years -
soils as defined in IEC/EN 60436

▶ Why to use common soils?

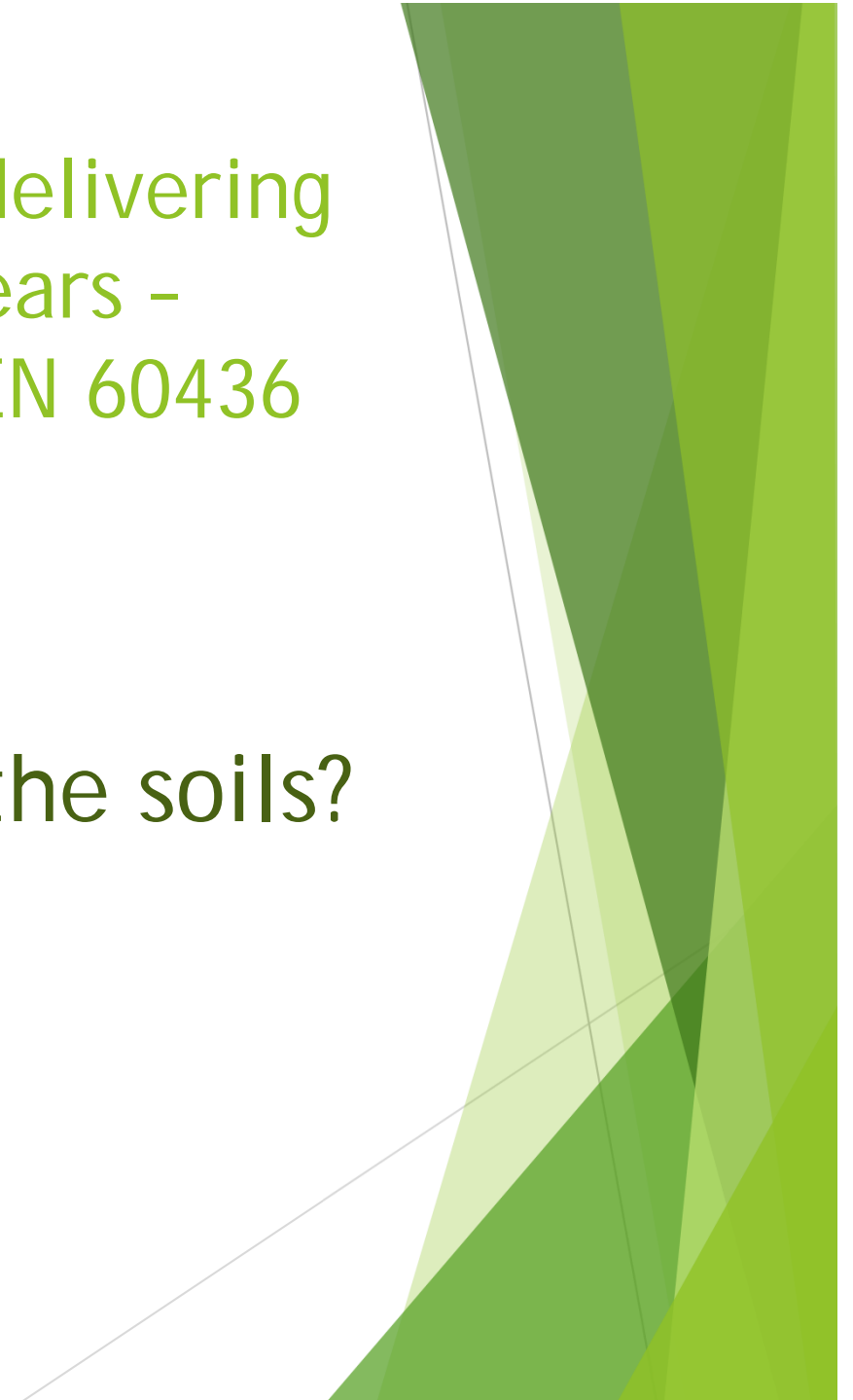


Why common soils

- ▶ Soils are relevant for the cleaning (and less for drying) performance
- ▶ Even if it is tried to eliminate influences by using a Reference Dishwasher and a Reference Detergent, there remain differences if different sources of the requested soil types are used
- ▶ The requested level of cleaning performance is so high (a cleaning result of about 4,0) that influences of the soil type are still relevant.
- ▶ Commonly used soil types avoid or reduce those possible differences
- ▶ Commonly used soil types means to use soils from
 - ▶ the same brand of a manufacturer with high quality requirements
 - ▶ the same batch of production (as long as possible by the use by date)
 - ▶ strictly follow the requirements of the standard (meat preparation)
 - ▶ have an additional quality control (by chemical analyses of the ingredients)
 - ▶ for all clients.
- ▶ Performance tests of a dishwasher are very expensive and decisions based on the results are relevant for the whole company that the highest possible trust on the accuracy of the test results is justified.

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▶ How constant are the soils?

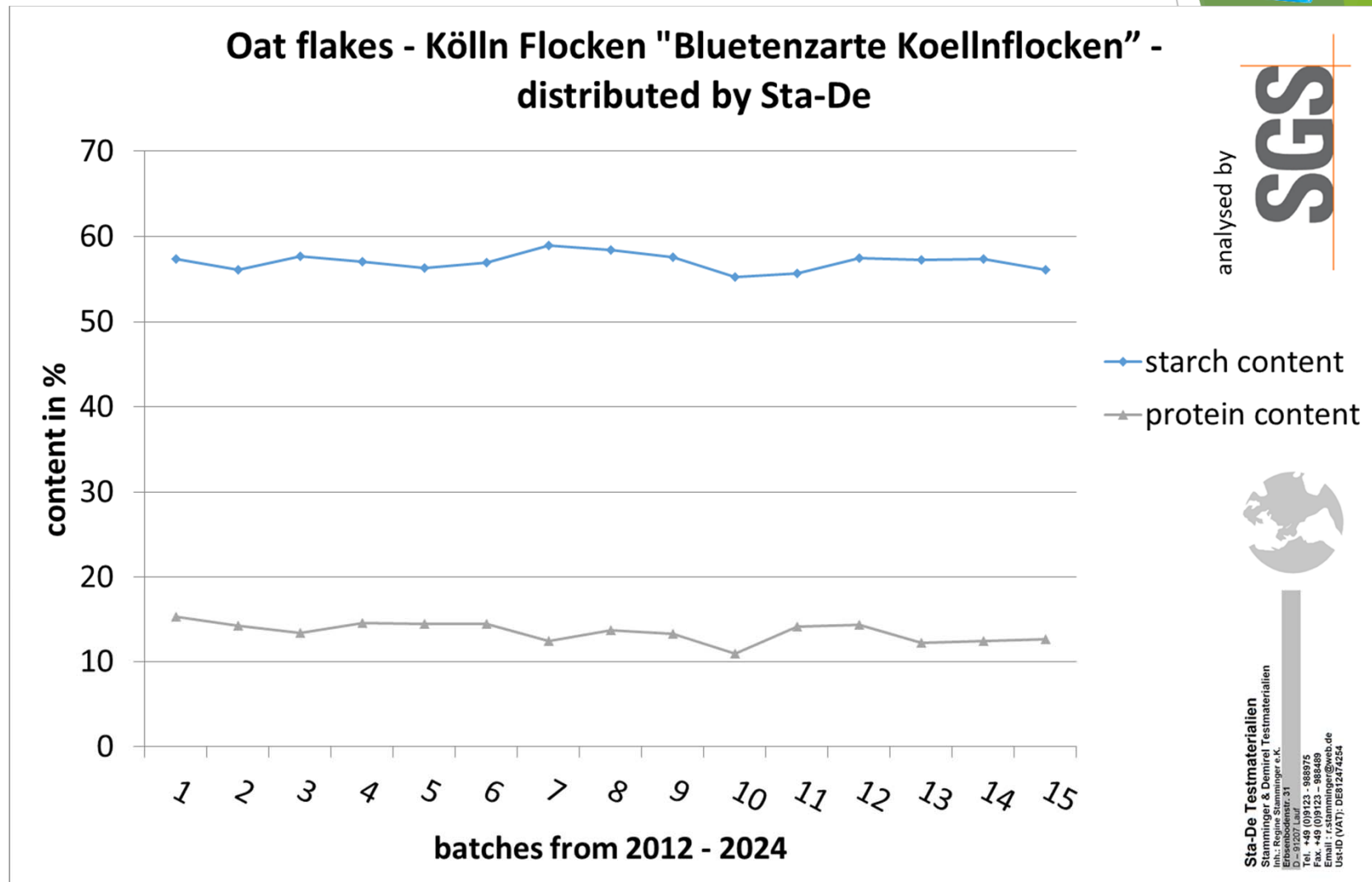


Oat flakes



- ▶ Soil type: porridge
- ▶ Species: seeds of *Avena sativa*
- ▶ Relevant physical process: milled (ground), steel-cut, or rolled??
- ▶ Relevant chemical properties: starch and protein content
- ▶ Way to determine physical and chemical properties
 - ▶ protein content: by Kjeldahl method (ASU 15.00-3)
 - ▶ starch content: by POLARIMETRIC METHOD (ASU L 17.00-5)
- ▶ Possible range of physical and chemical properties:
 - ▶ Starch content: 43% - 73% (according to Kölnflockenwerke)
- ▶ Trade name of established soil: Köln Blütenzarte Haferflocken

Oat flakes: Kölln Flocken



Spinach

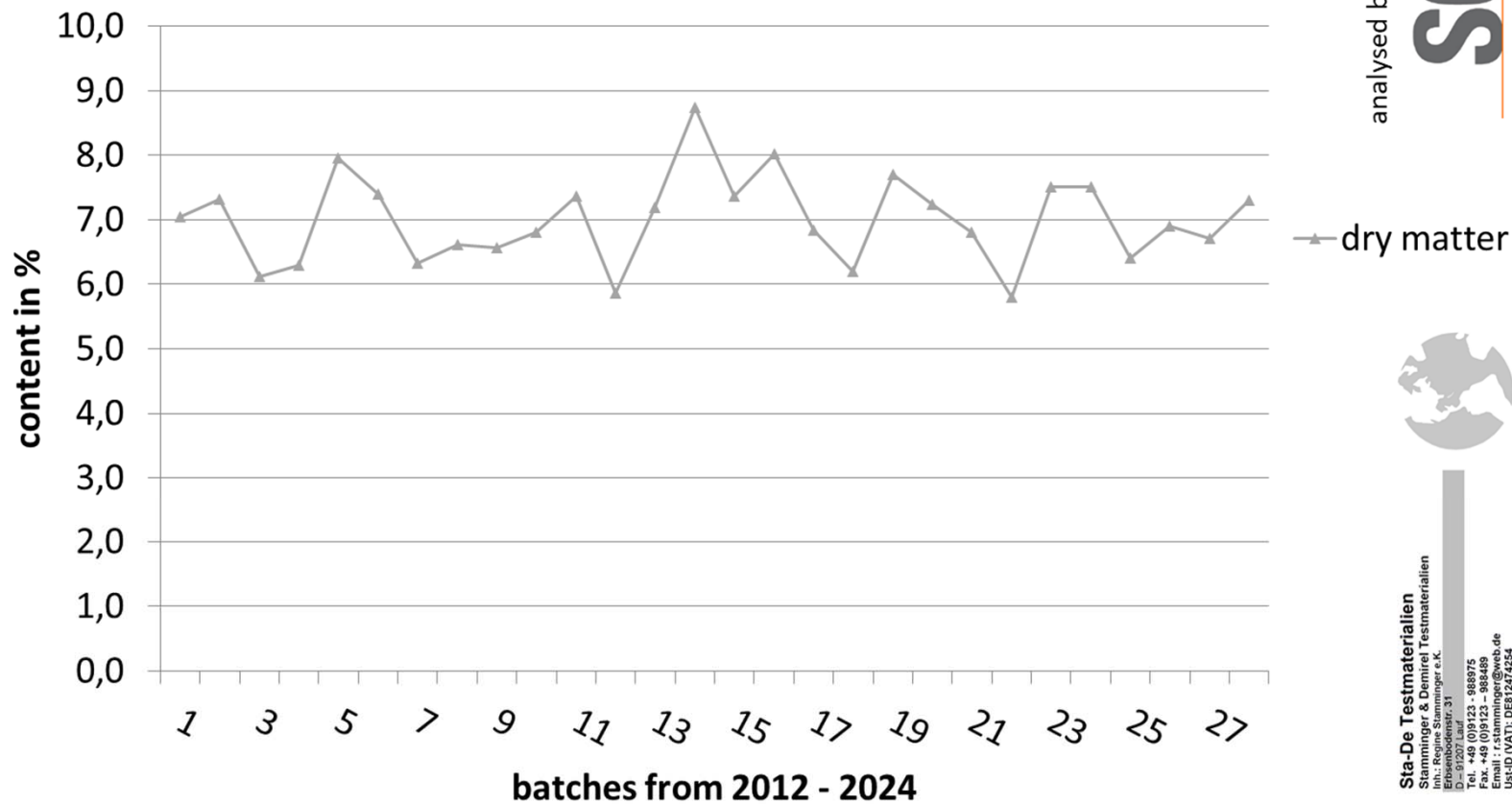


- ▶ Soil type: spinach frozen (or freeze dried)
- ▶ Species: *Spinacia oleracea*
- ▶ Relevant physical process: washed, blanched, shock frosted
- ▶ Relevant chemical properties: protein, dietary fibres
- ▶ Way to determine physical and chemical properties
 - ▶ Dry matter content: ASU L 06.00-3
- ▶ Range of allowed physical and chemical properties: ??
- ▶ Trade name of established soil: IGLO "Junger Spinat" fein gehackt

Spinach



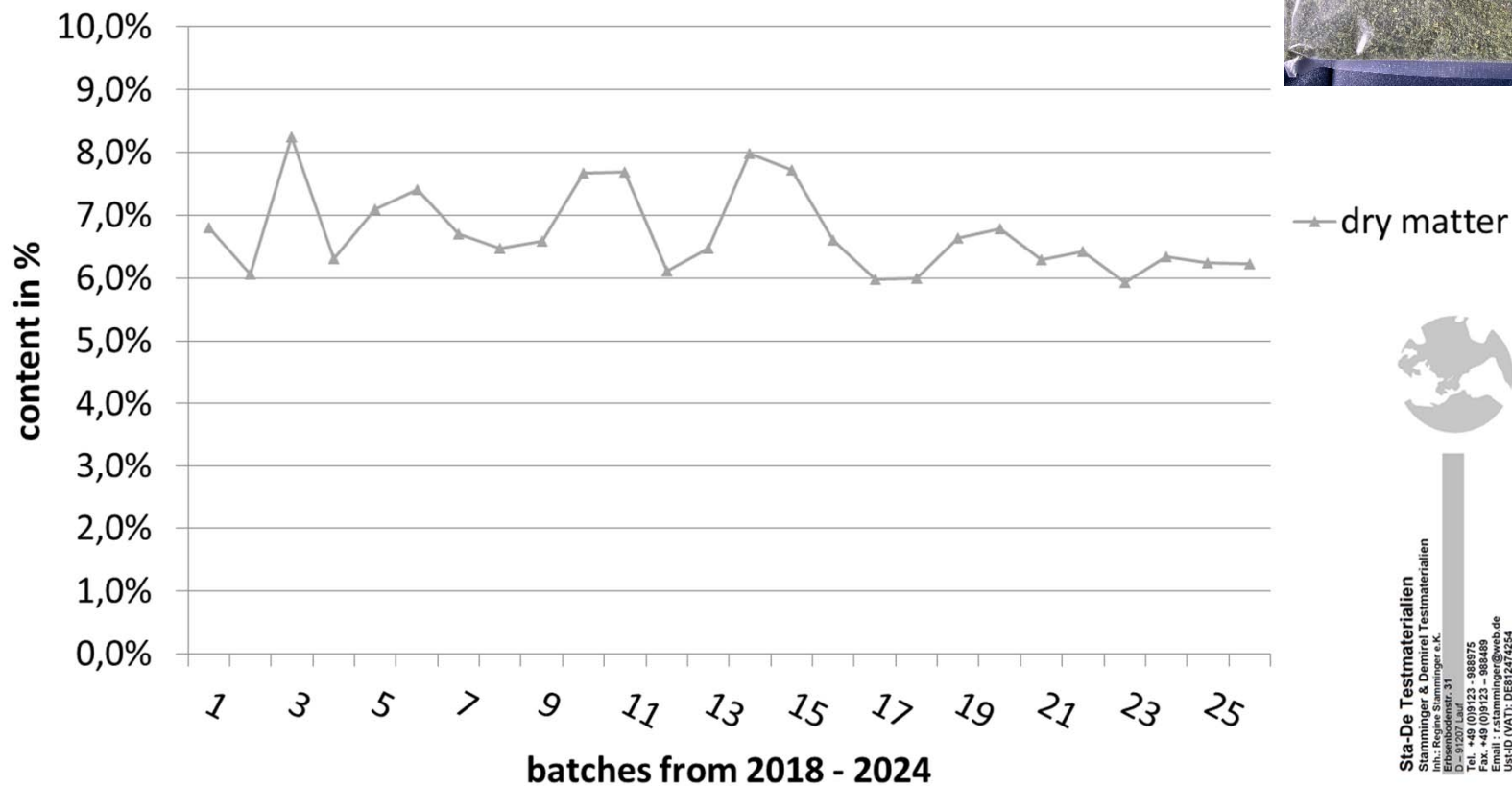
Spinach - IGLO Junger Spinat fein gehackt - frozen - distributed by Sta-De



FDS - Freeze-dried spinach



Spinach - IGLO Junger Spinat fein gehackt
- minced & freeze-dried FDS -
distributed by Sta-De



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Tea

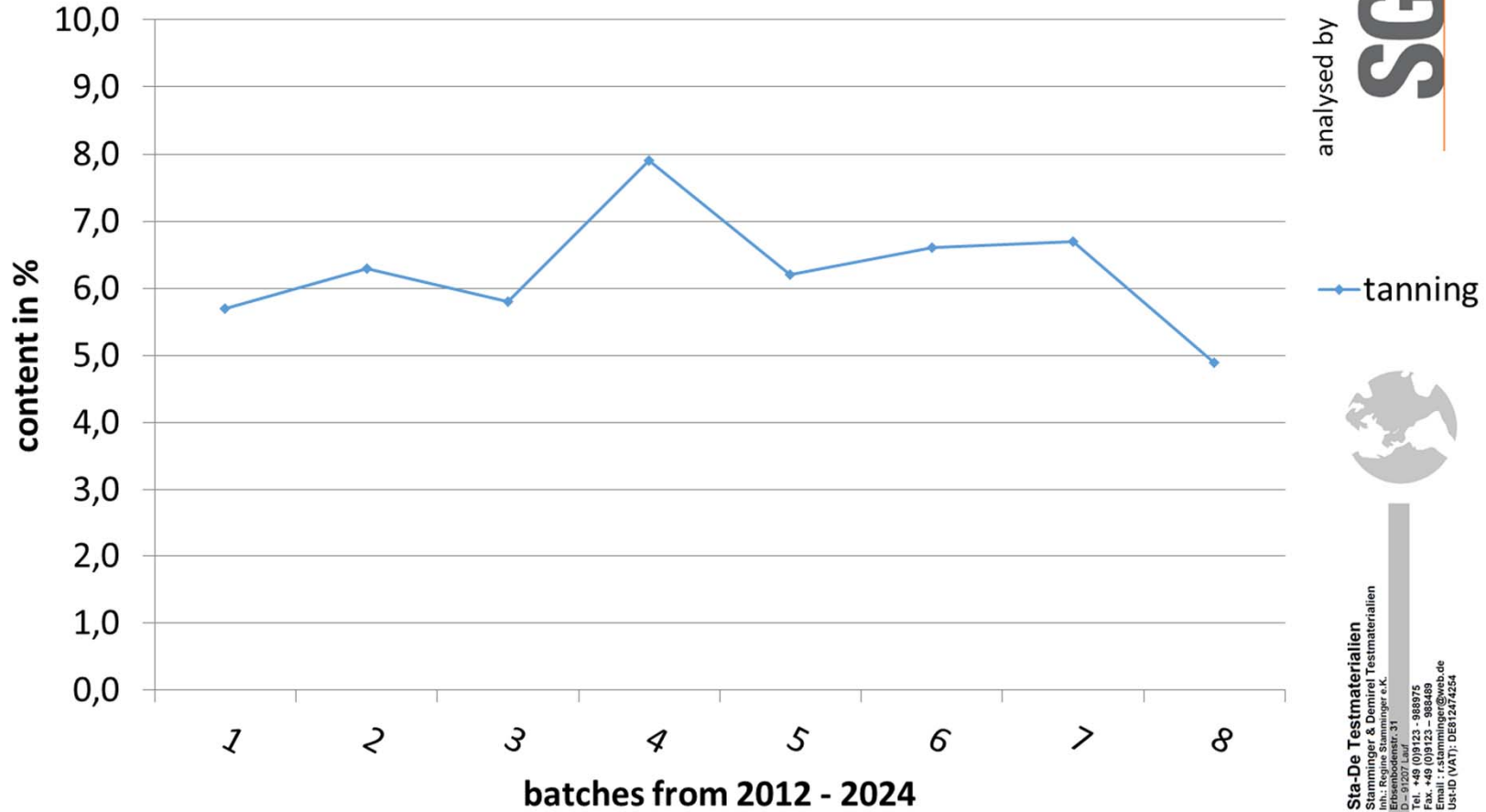
- ▶ **Soil type:** Finest tea blend from Indian and Ceylon tea gardens in India and Ceylon
- ▶ **Species:**
- ▶ **Relevant physical process:**
- ▶ **Relevant chemical properties:** tanning component
- ▶ **Way to determine physical and chemical properties:**
 - ▶ **Tanning:** DETERMINATION OF TANNINS IN HERBAL DRUGS or calculated as Pyrogallol Ph. Eur. 2.8.14(1)
- ▶ **Range of allowed physical and chemical properties: ??**
- ▶ **Trade name of established soil:** Sir Winston Tea Broken Orange Pekoe by Teekanne GmbH



Tea



Tea - Sir Winston Tea - Broken Orange Pekoe - distributed by Sta-De



analysed by
SGS

—●— tanning

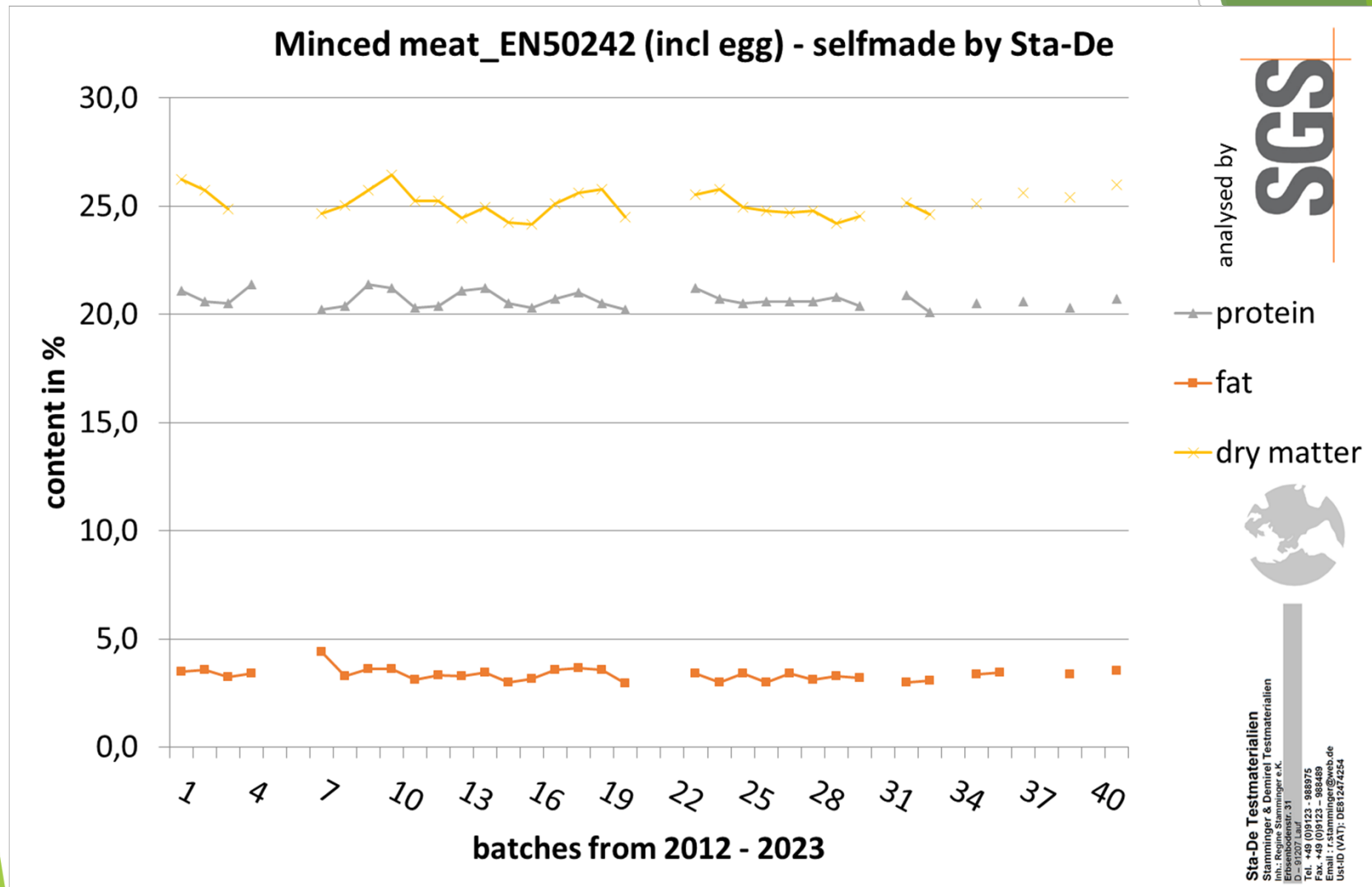


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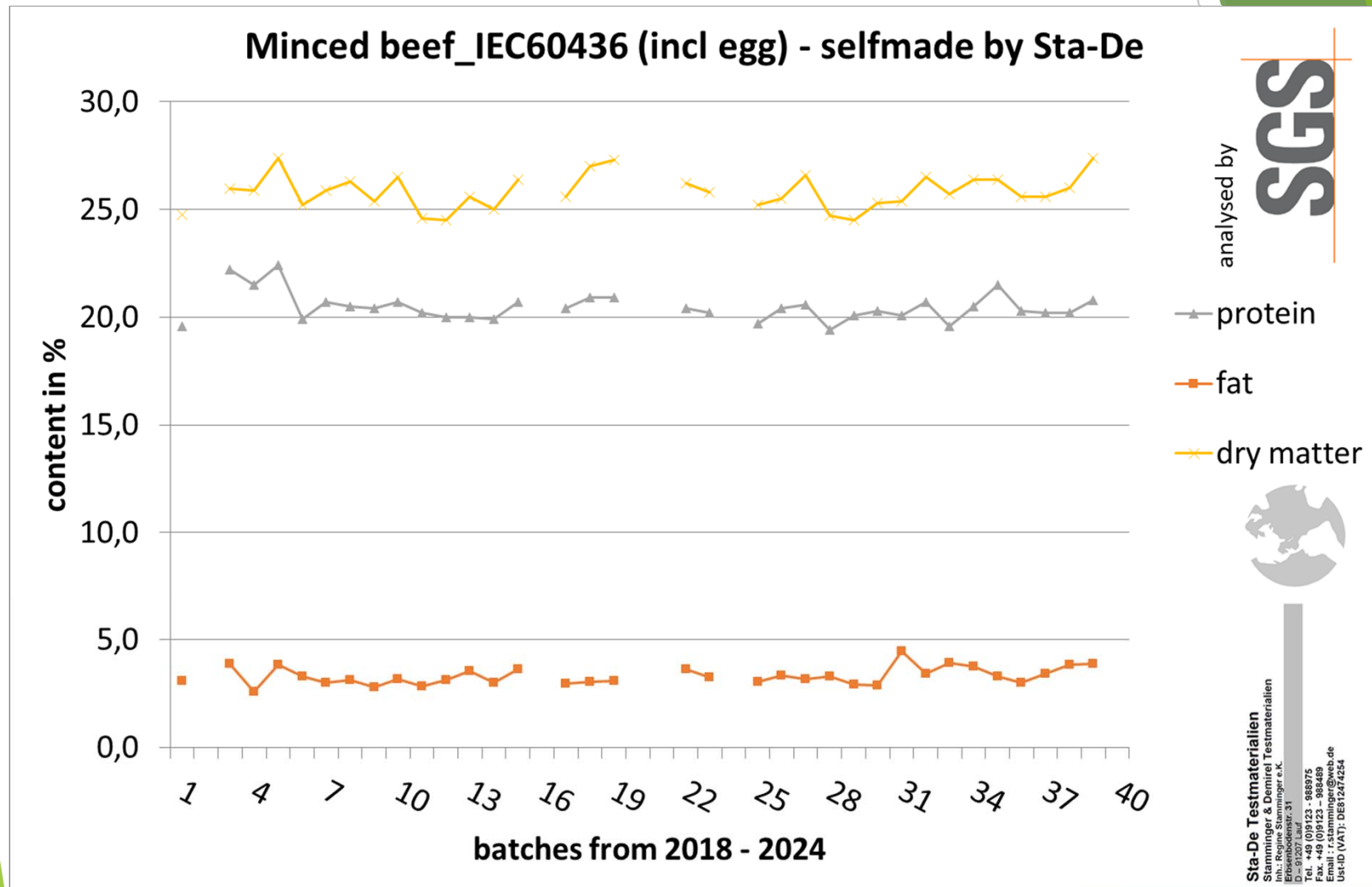
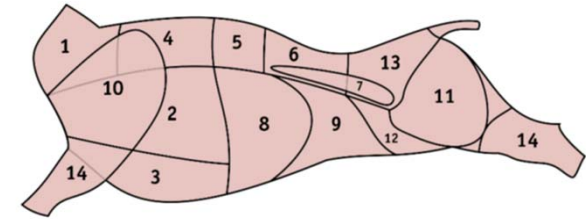
Minced meat

- ▶ **Soil type:**
 - ▶ IEC 60436 4th ed: 100% beef meat + 1/3 of whole egg
 - ▶ EN 50242: 50% : 50% pork and beef meat + 1/3 of whole egg
- ▶ **Species: not defined - In IEC 60436: beef pieces defined**
- ▶ **Relevant physical process: slaughtering?**
 - ▶ “Remove all fat and sinew from the meat before mincing.”
 - ▶ “Use an electric meat grinder, with a perforated disc, with between 45 and 55 holes of 4,5 mm diameter”
- ▶ **Relevant chemical properties: aging?**
- ▶ **Way to determine physical and chemical properties:**
 - ▶ Water: calculated
 - ▶ Protein: ASU L 06.00-7 mod.
 - ▶ Fat: ASU L 06.00-6
 - ▶ Dry matter: ASU L 06.00-3
- ▶ **Range of allowed physical and chemical properties: ??**

Minced meat (beef + pork)



Minced beef




Statistics of chemical analyses of soils from Sta-De Testmaterialien

all values in %		average	± stand. dev.	± analytical uncertainty (p=95%; k=2)
Oat flakes				
	starch content	57,0	1,1	2%
	protein content	13,5	1,2	2%
Spinach				
	Frozen spinach - dry matter	7,0	0,7	4%-13%
	FDS (Freeze-dried spinach) - dry matter	6,7	0,7	4%-13%
Tea				
	tanning	6,3	0,9	
Minced meat (50% pork / 50% beef + egg)				
	protein	20,7	0,4	2%
	fat	3,3	0,3	9%
	dry matter	25,1	0,6	4%
Minced beef mixture (100% beef + egg)				
	protein	20,5	0,7	2%
	fat	3,3	0,4	9%
	dry matter	25,8	0,8	4%

Variation if almost completely within analytical uncertainty of the chemical analysis

Summary

- ▶ Sta-De is delivering - since more than 25 years - a constant quality of the soils defined in IEC/EN 60436 to its clients
- ▶ This is possible due to:
 - ▶ Using the recommended products (Iglo, Teekanne & Koelln), as those brands use their own quality control system to produce products of constant quality
 - ▶ Using well branded products (Deli, Weihenstephan), as those brands use their own quality control system to produce products of constant quality
 - ▶ Buying large batches (especially tea, oat flakes & spinach) and delivering all clients from the same batch
 - ▶ Following rigorously the requirement of the standard IEC 60436 in 6.4.4.1: „Remove all fat and sinew from the meat before mincing“ for self-made minced meat and minced beef
 - ▶ Performing regular analytical chemical analyses (SGS) to confirm the component content
 - ▶ With the unique FDS spinach the global delivery is possible at reasonable costs (as transport is without dry-ice at a much lower weight)



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