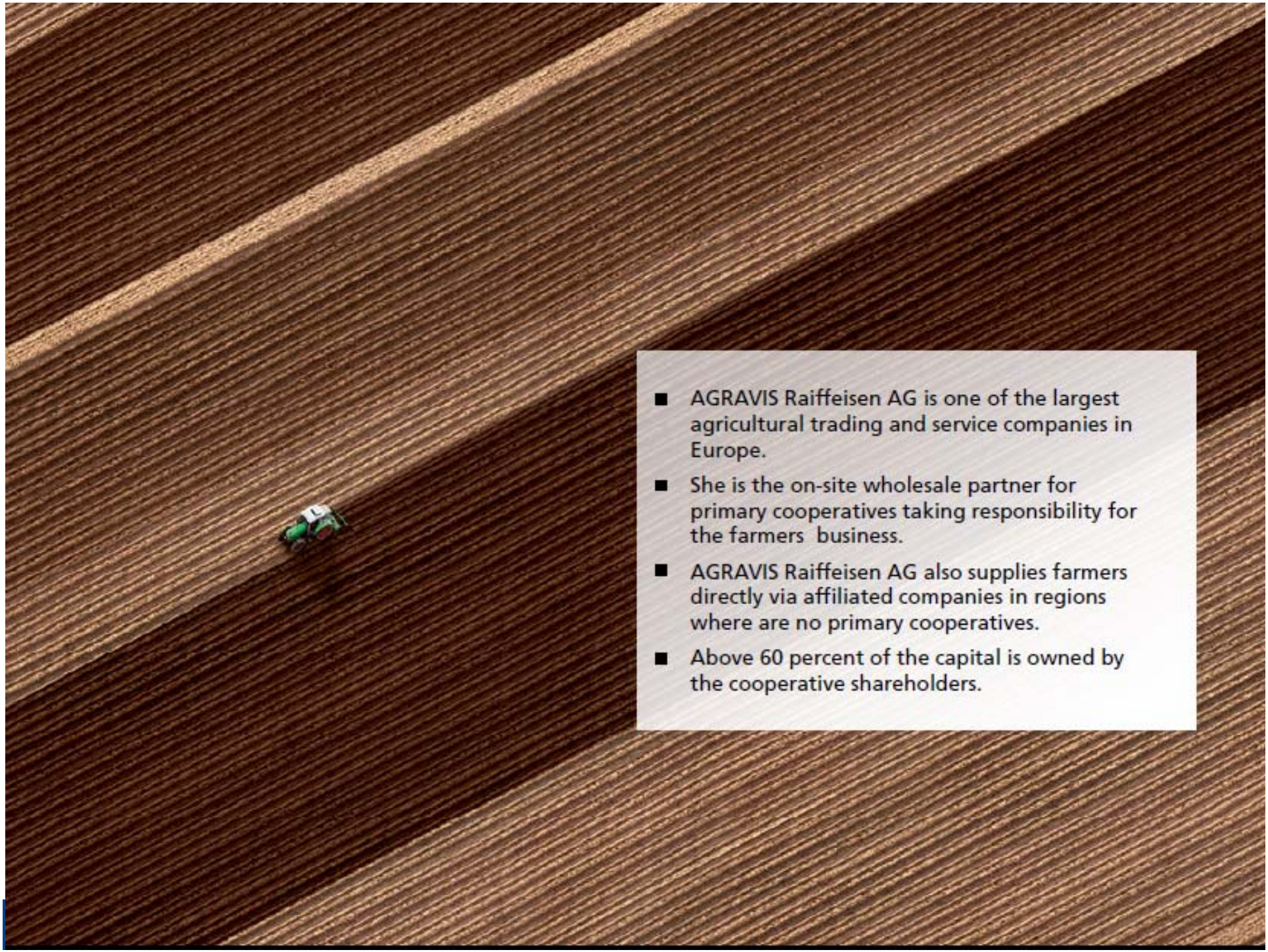
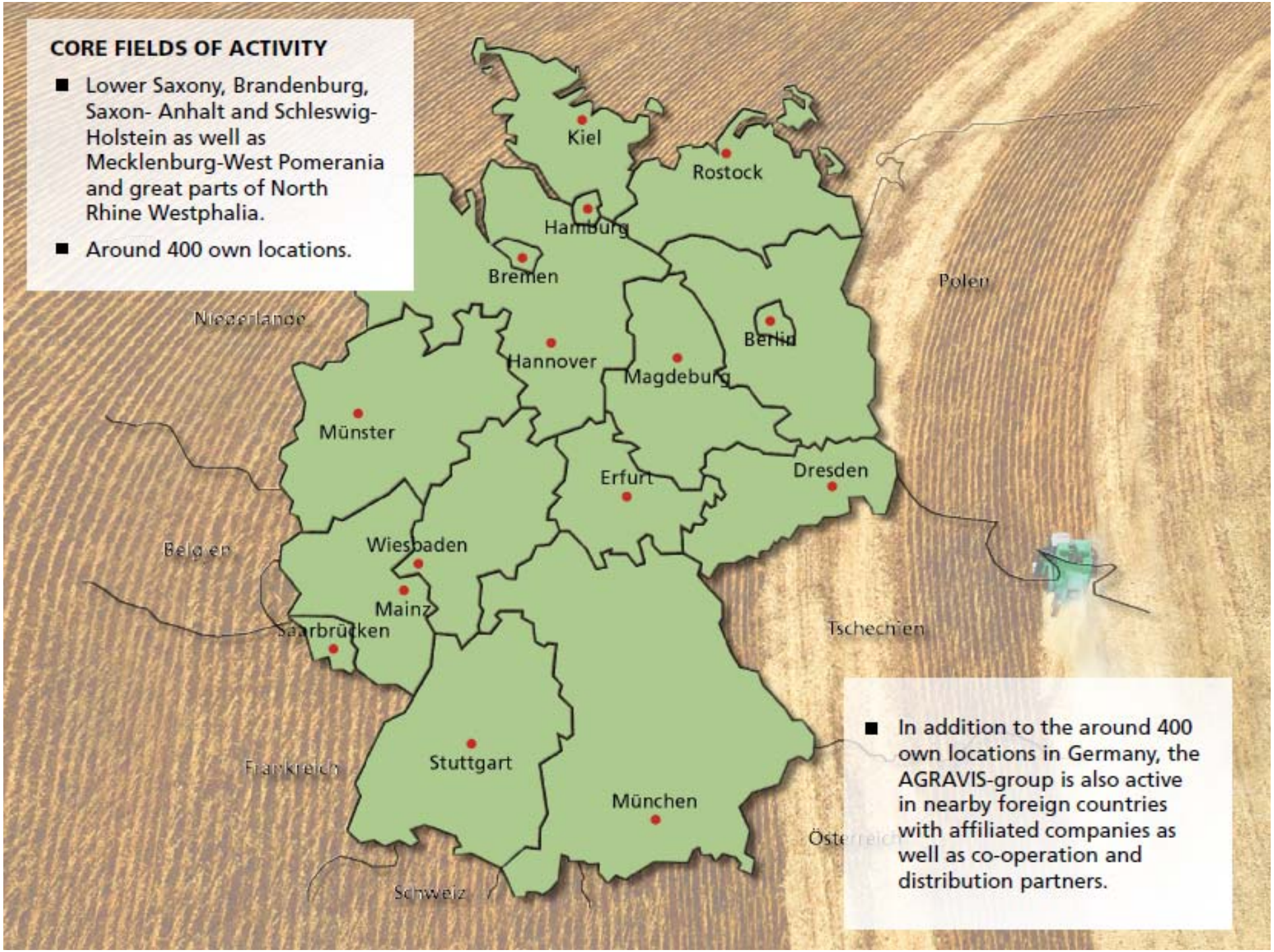
# Influenze ed effetti di CRYSTALYX®
# sul metabolismo ruminale

Gerald Krabbe, Product Manager CRYSTALYX Products GmbH



- AGRAVIS Raiffeisen AG is one of the largest agricultural trading and service companies in Europe.
- She is the on-site wholesale partner for primary cooperatives taking responsibility for the farmers  business.
- AGRAVIS Raiffeisen AG also supplies farmers directly via affiliated companies in regions where are no primary cooperatives.
- Above 60 percent of the capital is owned by the cooperative shareholders.


CORE FIELDS OF ACTIVITY
■ Lower Saxony, Brandenburg, Saxon- Anhalt and Schleswig-Holstein as well as Mecklenburg-West Pomerania and great parts of North Rhine Westphalia.
■ Around 400 own locations.
Kiel
Rostock
Hamburg
Bremen
Polen
Niederlande
Berlin
Hannover
Magdeburg
Münster
Erfurt
Dresden
Belgien
Wiesbaden
Mainz
Saarbrücken
Tschechien
Frankreich
Stuttgart
München
Österreich
Schweiz
■ In addition to the around 400 own locations in Germany, the AGRAVIS-group is also active in nearby foreign countries with affiliated companies as well as co-operation and distribution partners.

## KEY BUSINESS FIGURES 2013

| | |
|---|---|
| Sales Volume | 7,505 Mio. Euro |
| Earnings before tax | 53.2 Mio. Euro |
| Equity capital | 424 Mio. Euro |
| Total assets | 1,670 Mio. Euro |
| Employees | 5,813 |

**PLANTS** Sales volume: 3,775 Mio. Euro

**ANIMALS** Sales volume: 1,155 Mio. Euro

**MACHINERY** Sales volume: 689 Mio. Euro

**CONSTRUCTION** Sales volume: 118 Mio. Euro

**RETAILING** Sales volume: 144 Mio. Euro

**ENERGY** Sales volume: 1,585 Mio. Euro

# Contents

- **What is CRYSTALYX®?**
  - **Successful international brand**
  - **Mode of production**
  - **Mode of action on rumen metabolism**

- Why to feed CRYSTALYX®?
  - Scientific practical trial work
  - Benefits for the farmer
  - Convincing arguments
  - Feeding concepts for sheep

# CRYSTALYX® - A Successful International Brand

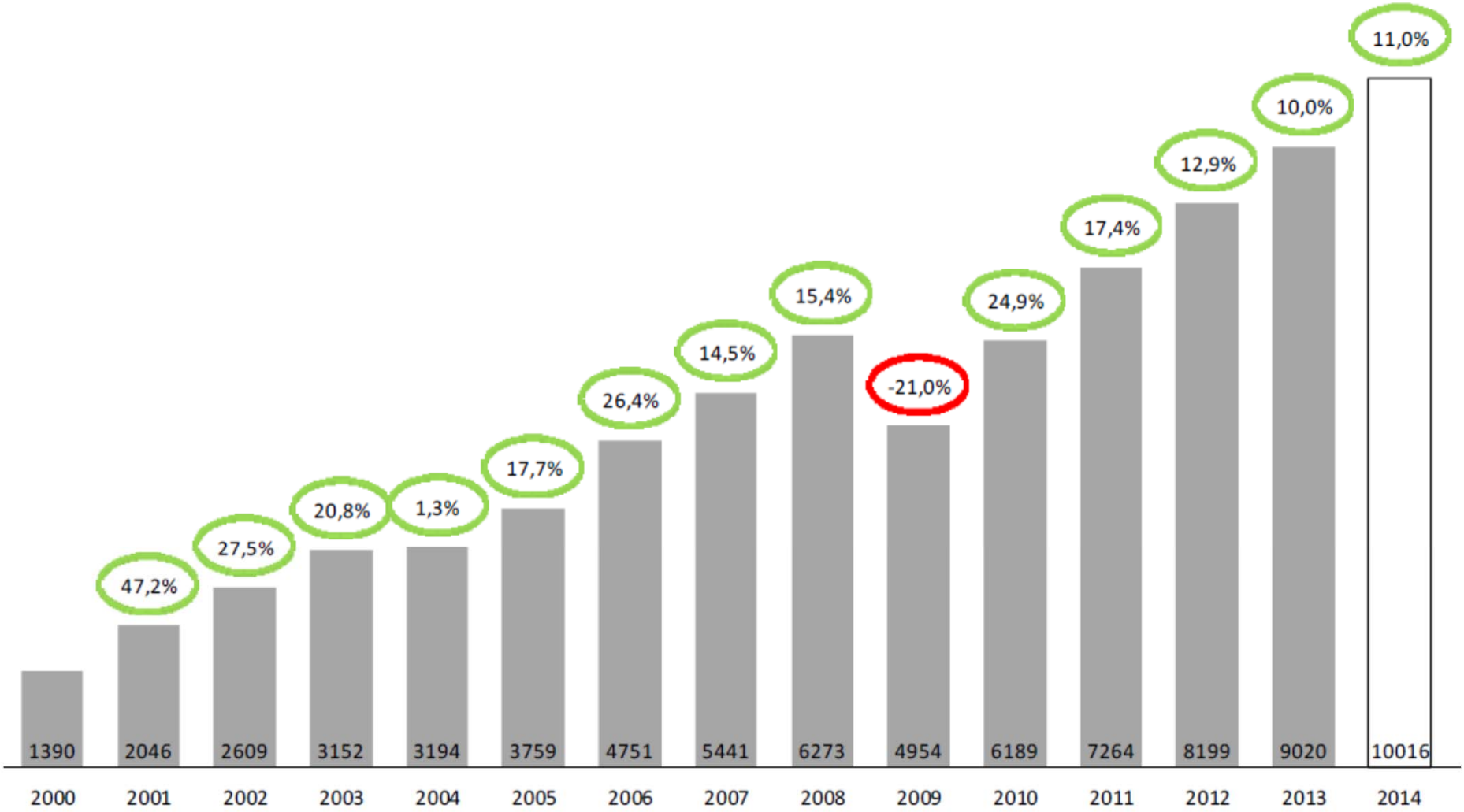
**Silloth, Wigton, United Kingdom**

**2014 = 26.000 t**

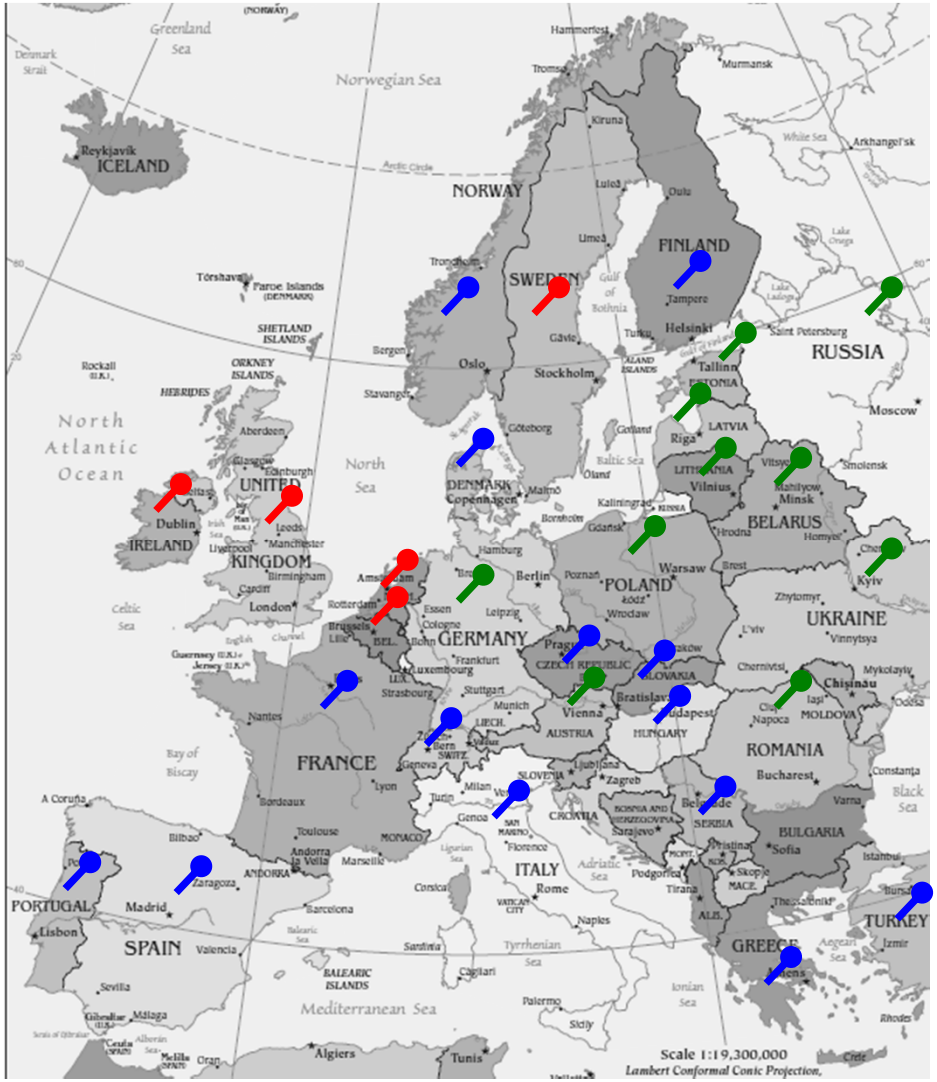
**Oldenburg, Lower Saxony, Germany**

**2014 = 10.000 t**

# Development Quantity in Tonnes (German Plant)

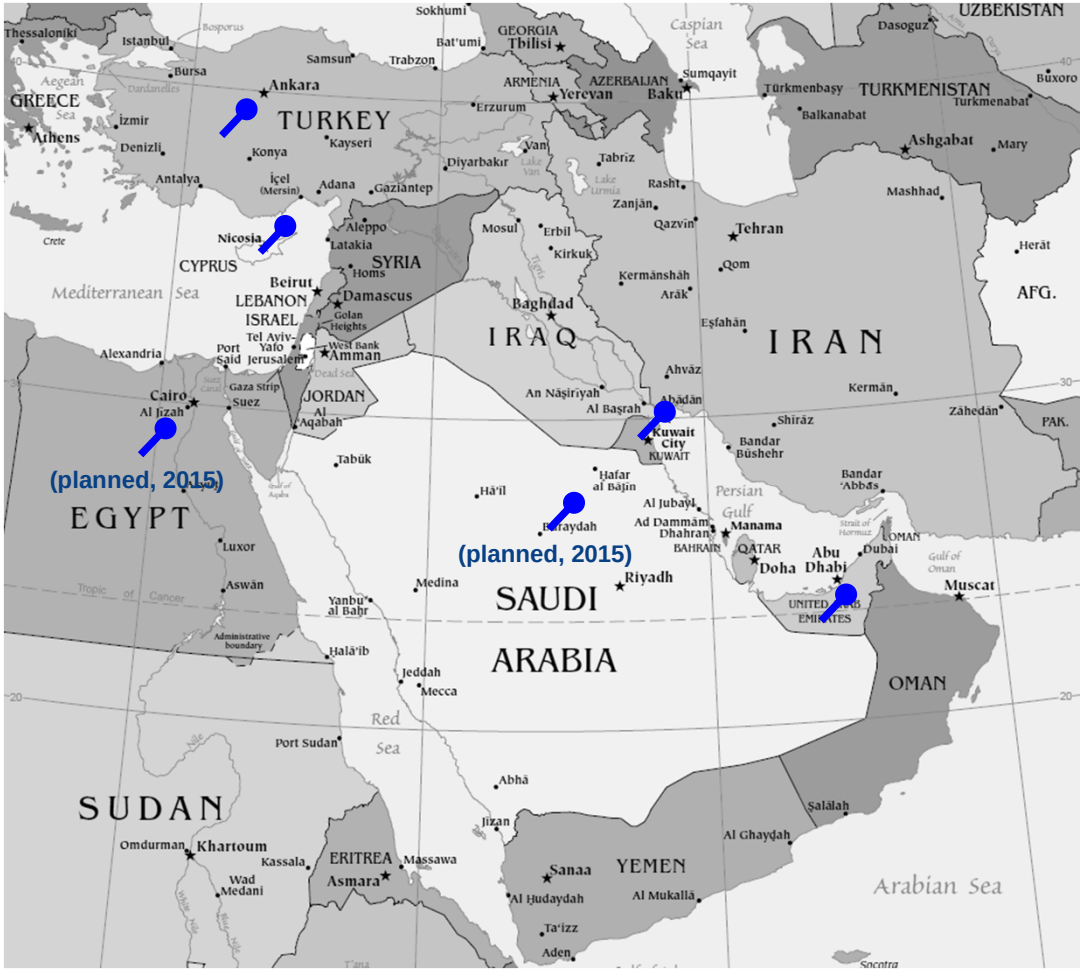


# CRYSTALYX® - A Successful International Brand




- **CRYSTALYX Products GmbH**
- **Caltech**
- **AGRAVIS Raiffeisen AG (and daughter companies)**

# CRYSTALYX® - A Successful International Brand




- CRYSTALYX Products GmbH
- Caltech
- AGRAVIS Raiffeisen AG (and daughter companies)

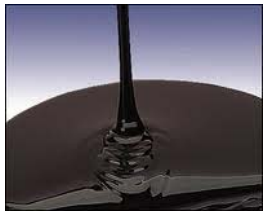
# What is CRYSTALYX® ?

# CRYSTALYX® Makes the Difference!

- **CRYSTALYX® is unique!**
  - Patented production process
  - Boiling process ➢ vacuum process ➢ cooling down ➢ hardening
  - Unique mode of action

- **CRYSTALYX® contains:**
  - Dehydrated molasses
  - Plant fatty acids
  - Proteins
  - Sucrose ester of fatty acids
  - Minerals and feed additives

- **<u>CRYSTALYX® = Natural supplementary feed lick, rich in energy</u>**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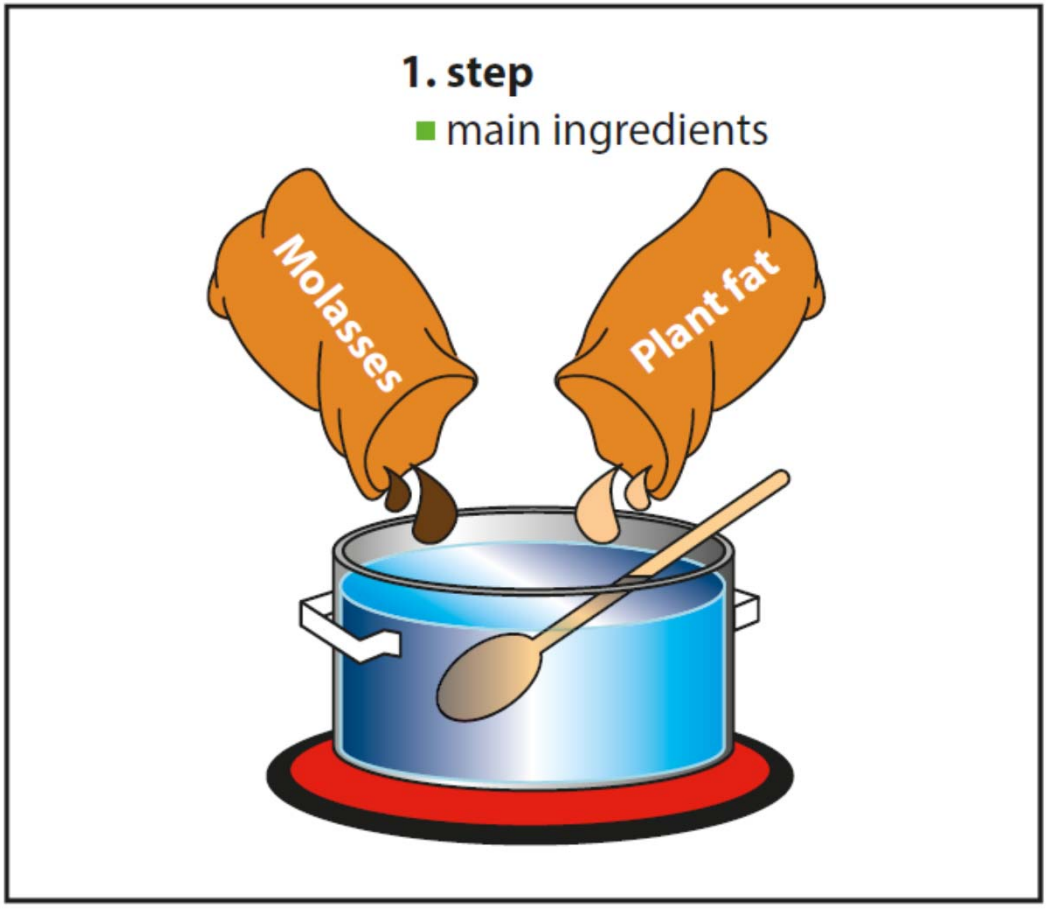
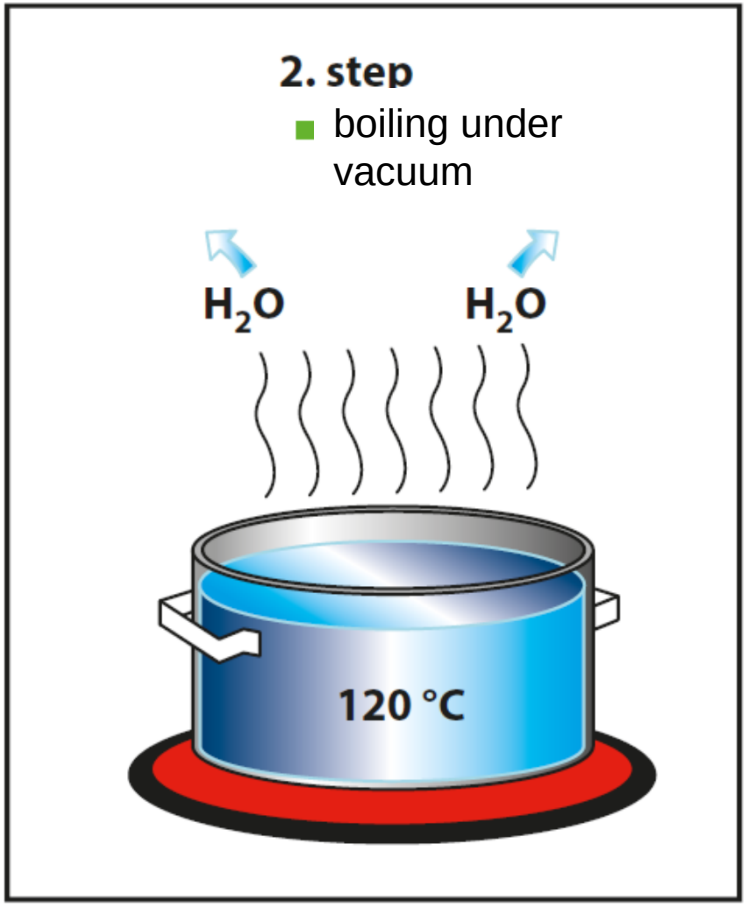
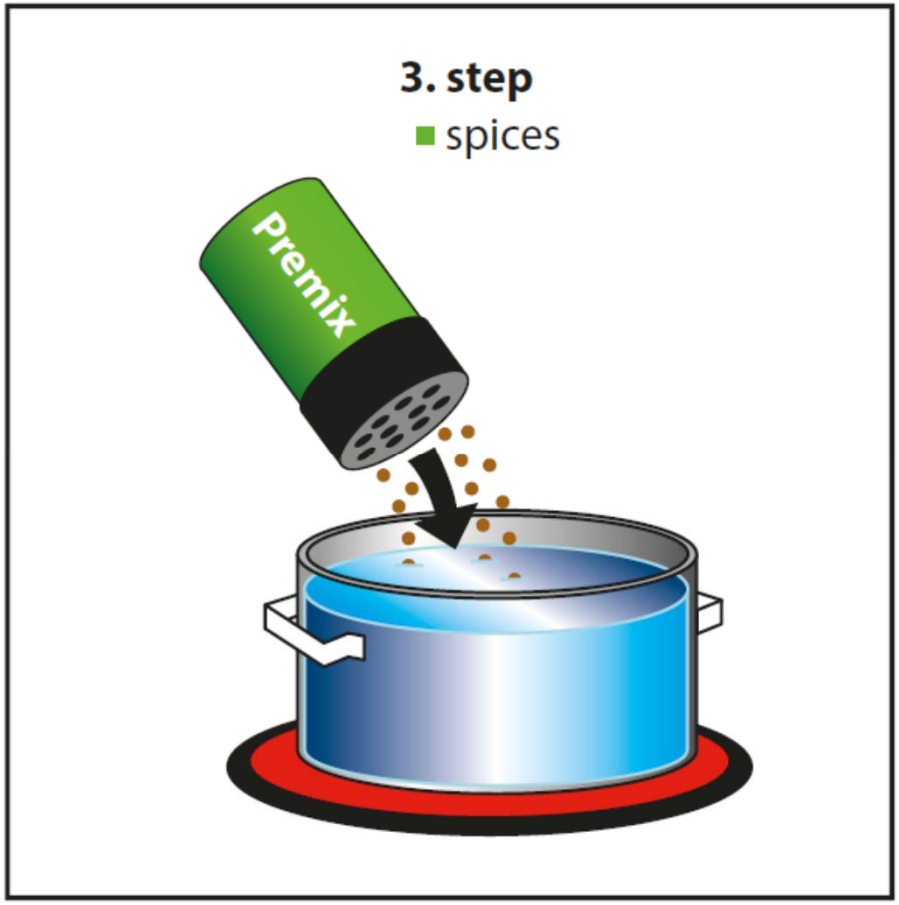
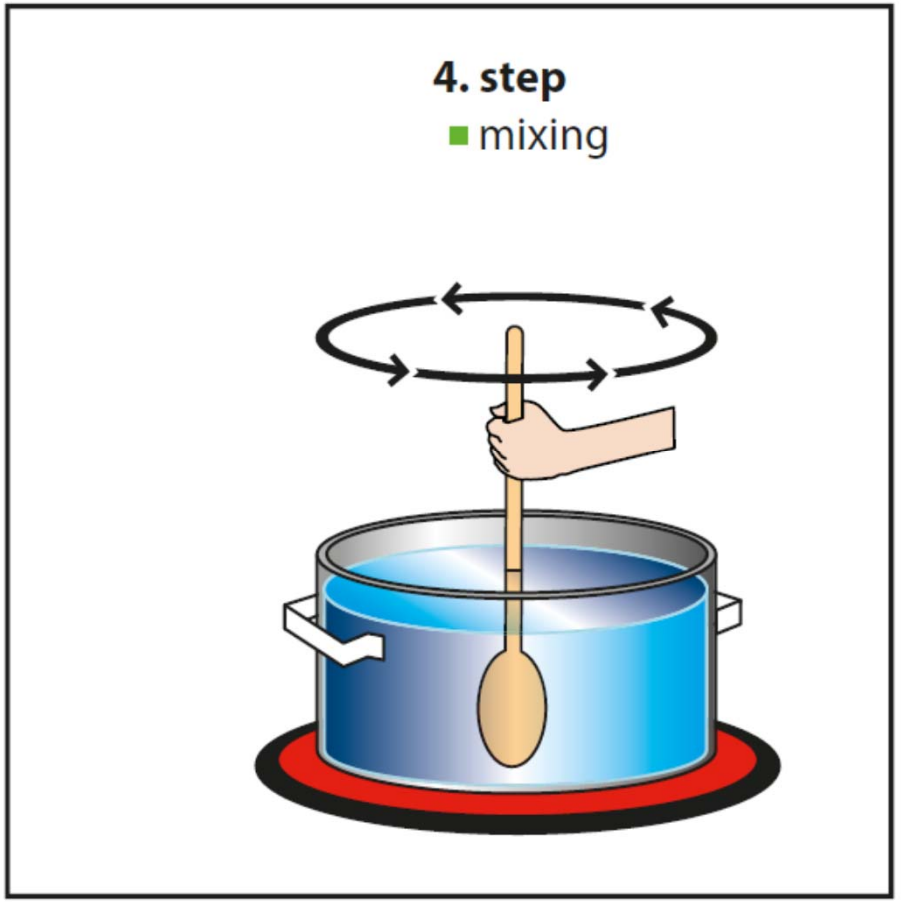
# How is CRYSTALYX® produced?



# How is CRYSTALYX® produced?



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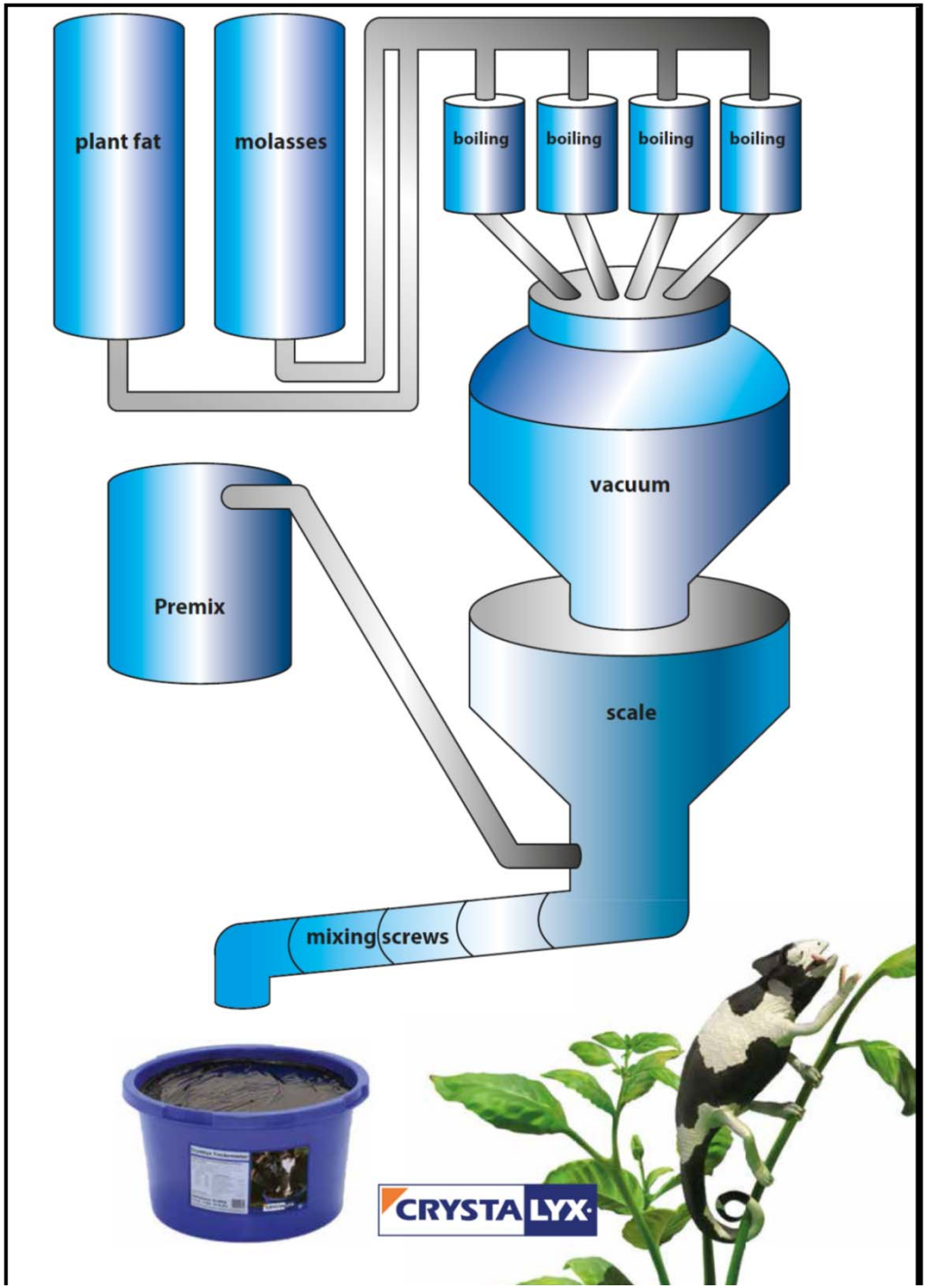
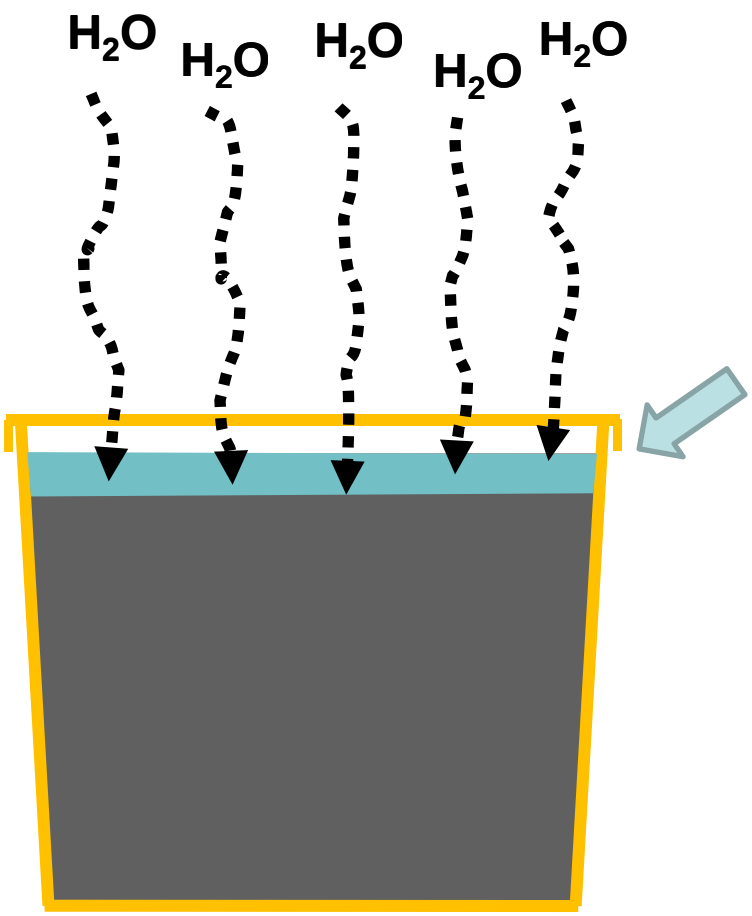



CRYSTALYX®

## How is CRYSTALYX® Produced?

# Chemistry Behind the CRYSTALYX® Process




- The dehydrated molasses leads to **hygroscopic** properties

**Syrup layer**

➢**Controlled consumption**

# Chemistry Behind the CRYSTALYX® Process

## Special Sugar Combinations Lead to a More Efficient Rumen!

- During the production process a part of the sugar in the molasses reacts with plant fatty acids to form **sugar ester compounds**.
- This sugar ester acts **as an emulsifier** in the rumen, so that less foam is produced.
- Additionally, the surface tension of the rumen fluid decreases. This results in a **better penetration of the rumen fluid into the forage particle**.

➢ **A lower foaming and improved penetration of the nutrients lead to more efficient rumen metabolism.**

(Prof. Dr. J. Drouillard, Kansas State University, 2012)

# CRYSTALYX® - Mode of Action

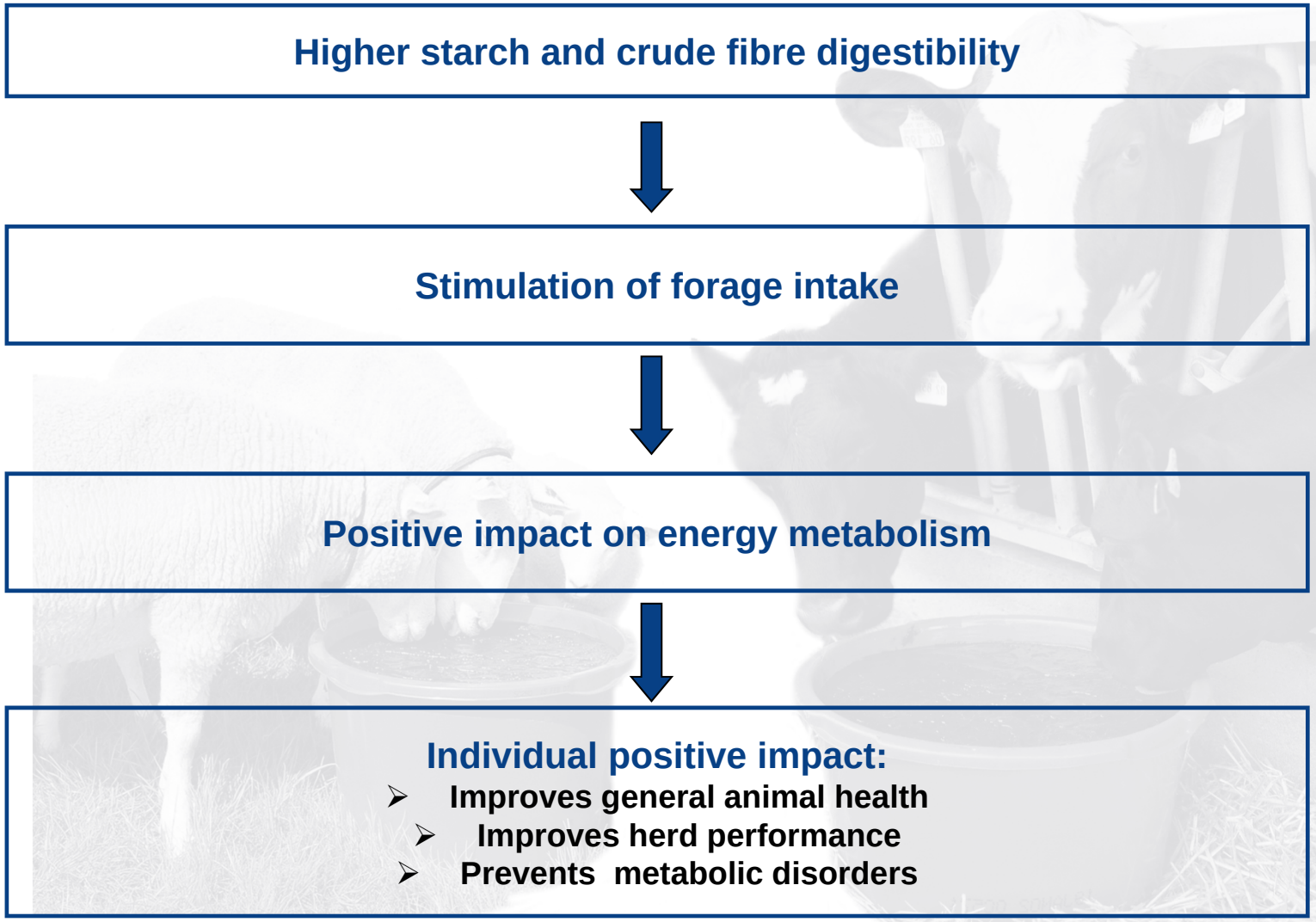
**Repeated licking in small amounts several times a day**

**Direct stimulation of the rumen microbes**

- Through increased saliva production
- Through the high availability of energy from sugar, fat, protein and minerals
- Through the effect of the sucrose esters of fatty acid – acting like an emulsifier (less foam production, less surface tension)

**Supports the starch and crude fibre digestibility (faster degradability)**

# Mode of Action – Effects on Ruminants



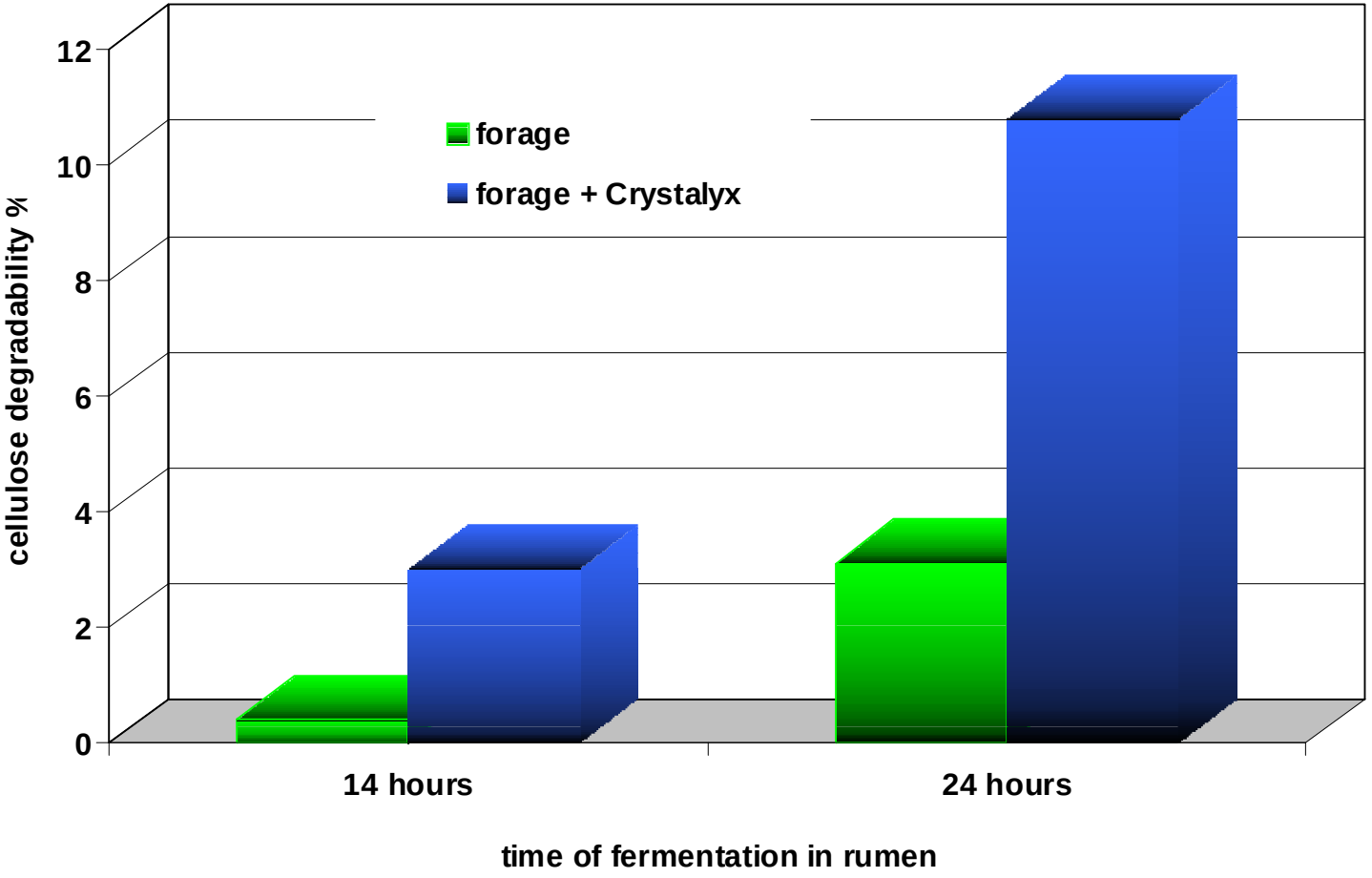
# CRYSTALYX® - Increases Number & Activity of Rumen Microbes

Video images of ruminal fluid from unsupplemented and Crystalyx® supplemented cattle (100-fold magnification)

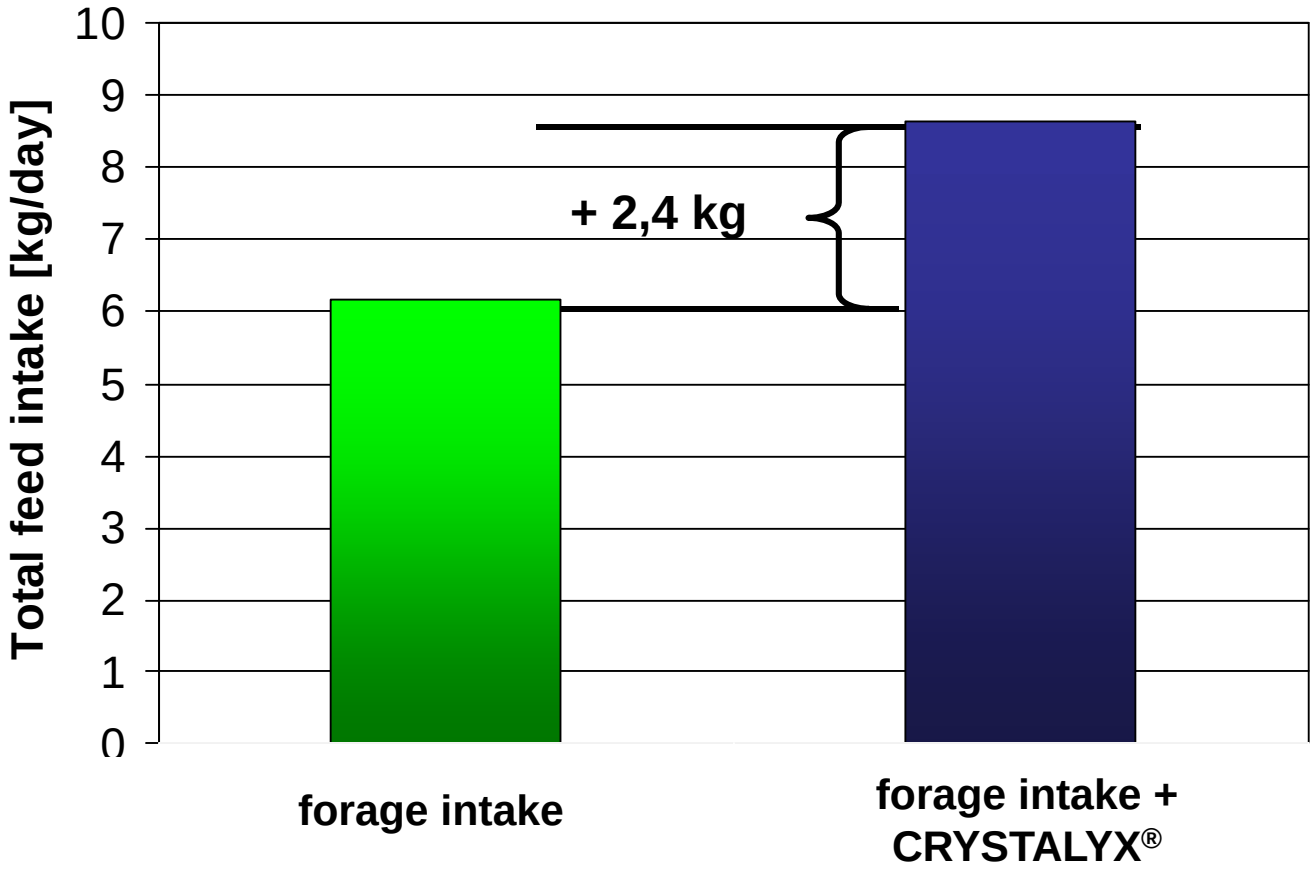
**unsupplemented**

**supplemented with CRYSTALYX®**

# CRYSTALYX® - Increases Cellulose Digestibility



# CRYSTALYX® Increases Forage Intake



# Newcastle University In-Vitro Trial

UNIVERSITY OF NEWCASTLE
Department of Agriculture

## CRYSTALYX® increases dry matter digestibility

| | Spring | Autumn |
|---|---|---|
| Grass-Clover | + 5.3% | + 3.4% |
| Ryegrass | +10.1% | + 6.3% |
| Perm. Pasture | + 3.9% | +10.7% |
| **Average** | **+ 6.4%** | **+ 6.8%** |

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  - **Convincing arguments**
  - **Feeding concepts for sheep**

# Energy and Protein Requirement for a 70kg Ewe

| | ME (MJ/d) | CP (g/d) |
|---|---|---|
| Maintenance | 8.8 | 80 |
| Tupping/Flushing | 16.5 | 95 |
| Lambing (twins) | 16.5 | 176 |
| Early Lactation | 25.0 | 400 |

# Effect of Energy and Protein Intake on Ovulation Rate

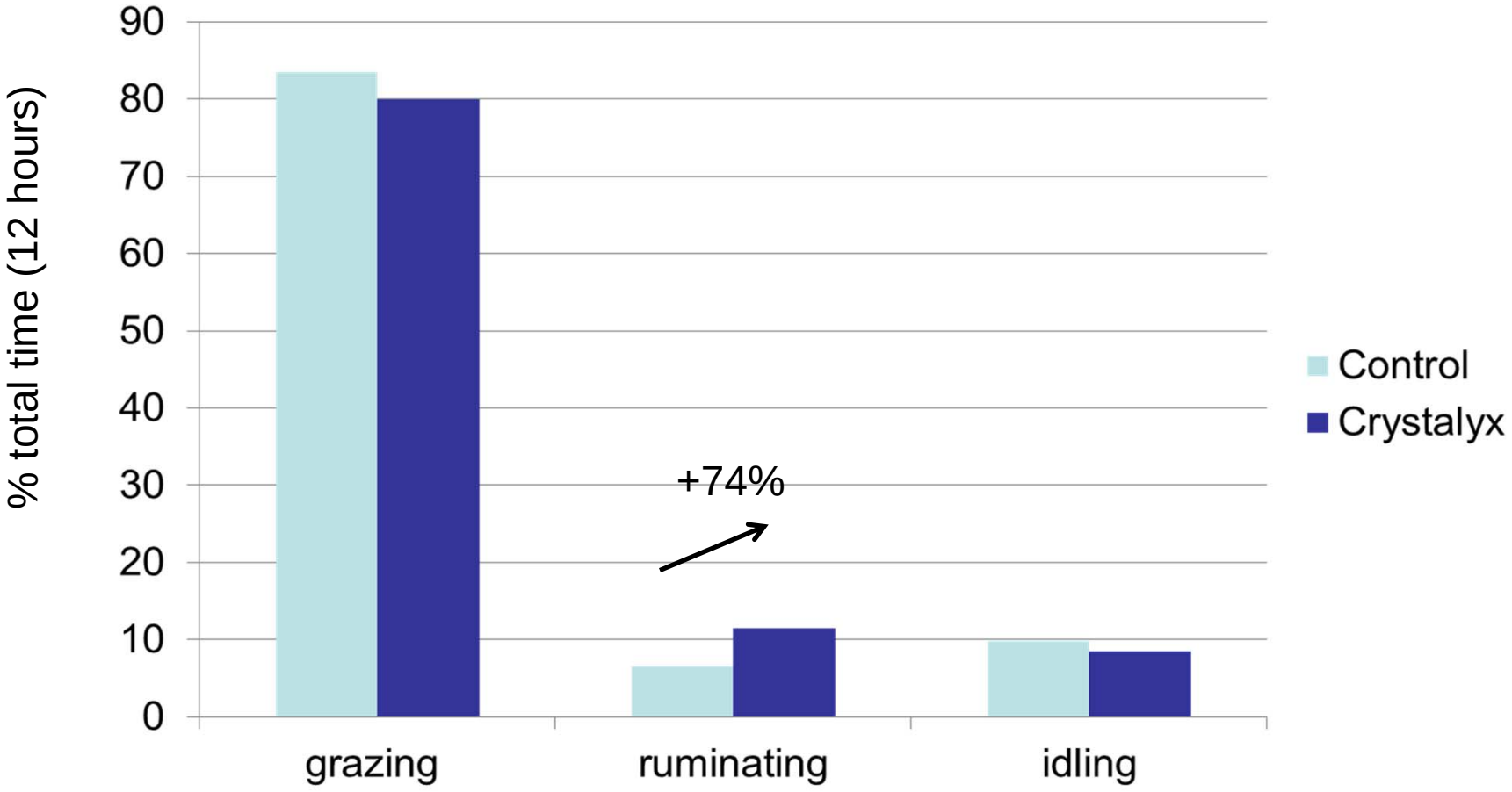
| ME (MJ/d) | %Ewes | CP (%/kg) | %Ewes |
|---|---|---|---|
| 4.4 MJ | 17.5 | 12 | 33.9 |
| 8.8 MJ | 27.2 | 15 | 33.5 |
| 13.2 MJ | 42.5 | 18 | 30.7 |
| 17.6 MJ | 55.6 | 22 | 34.6 |

**%Ewes = % of ewes with multiple ovulating.**

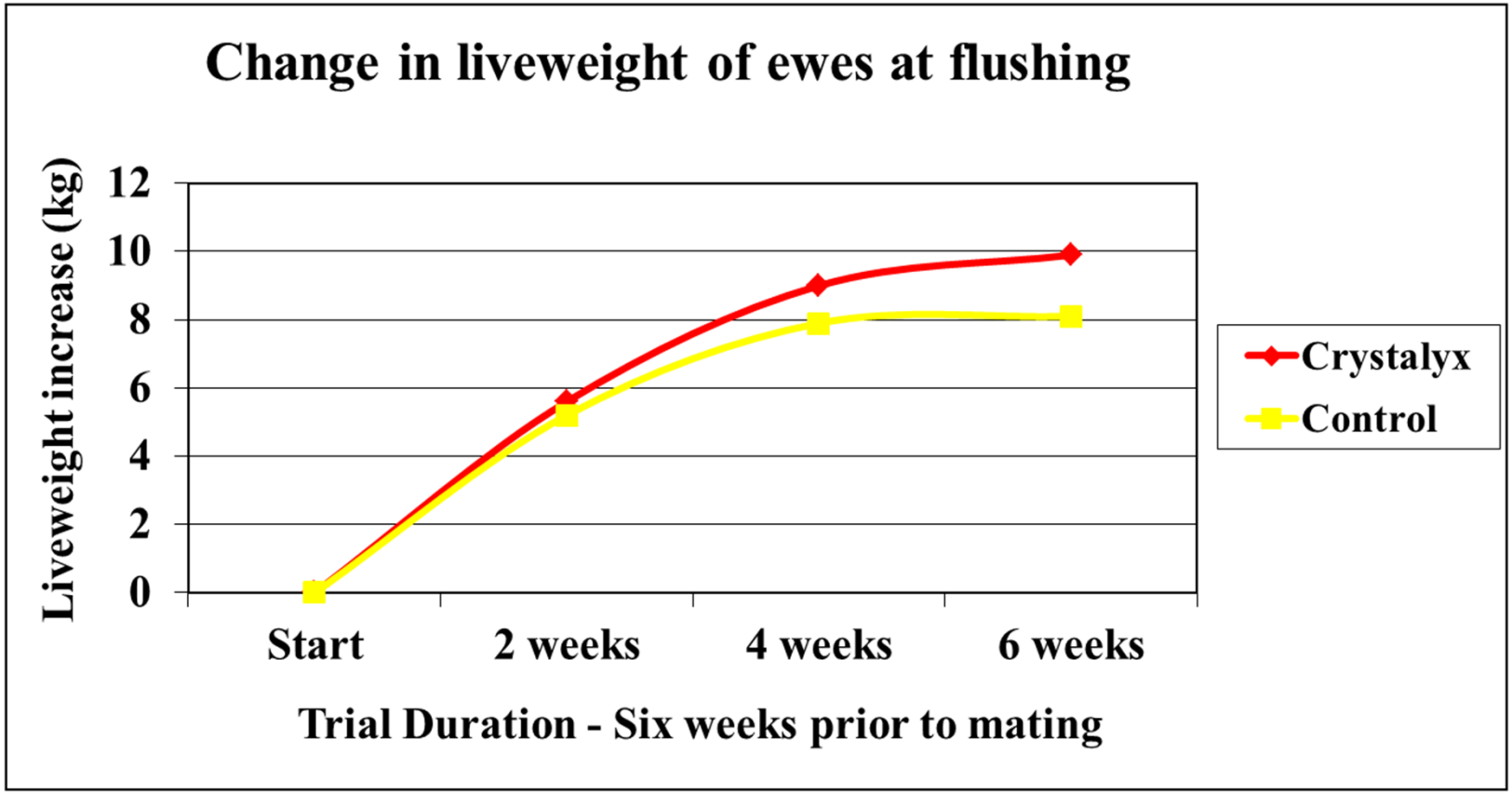
# Dry Matter and Energy Intakes of 70kg Lowland Ewes on Autumn Grass

| Sward height(cm) | DMI (kg/day) | ME (MJ/day) |
|---|---|---|
| 1 | 0.19 | 1.9 |
| 2 | 0.57 | 5.7 |
| 3 | 1.00 | 10.5 |
| 4 | 1.45 | 15.2 |
| **5** | **1.65** | **18.2** |
| 6 | 1.70 | 18.7 |

# Animal Behavior During Grazing Period on 18/01/2013 and 25/01/2013



# Ewes With Access to Crystalyx Gained Weight Faster During Flushing (Study 1)




**CRYSTALYX® intake = 56g/day in average**

# Effect of Severe Underfeeding in Mid-Pregnancy (Months 2 & 3)

## Scottish Blackface ewes

| | M | 0.15M |
|---|---|---|
| Liveweight change | +4% | -14% |
| Condition score (60d) | 3.5 | 2.7 |
| Litter size | 1.7 | 1.7 |
| % lambs alive @ 48h | 160 | 100 |

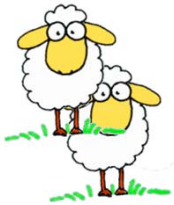
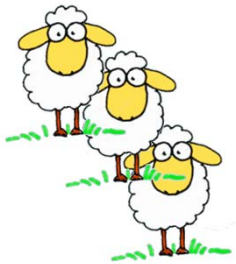
M = Maintainance

# 85% of Foetal Growth Occurs in the Last 8 Weeks of Pregnancy

The consequences of under feeding in late pregnancy are:

- Thin ewes
- Twin lamb disease
- Small, weak lambs
- Poor colostrum quality and yield
- High lamb mortality
- Poor milk yield

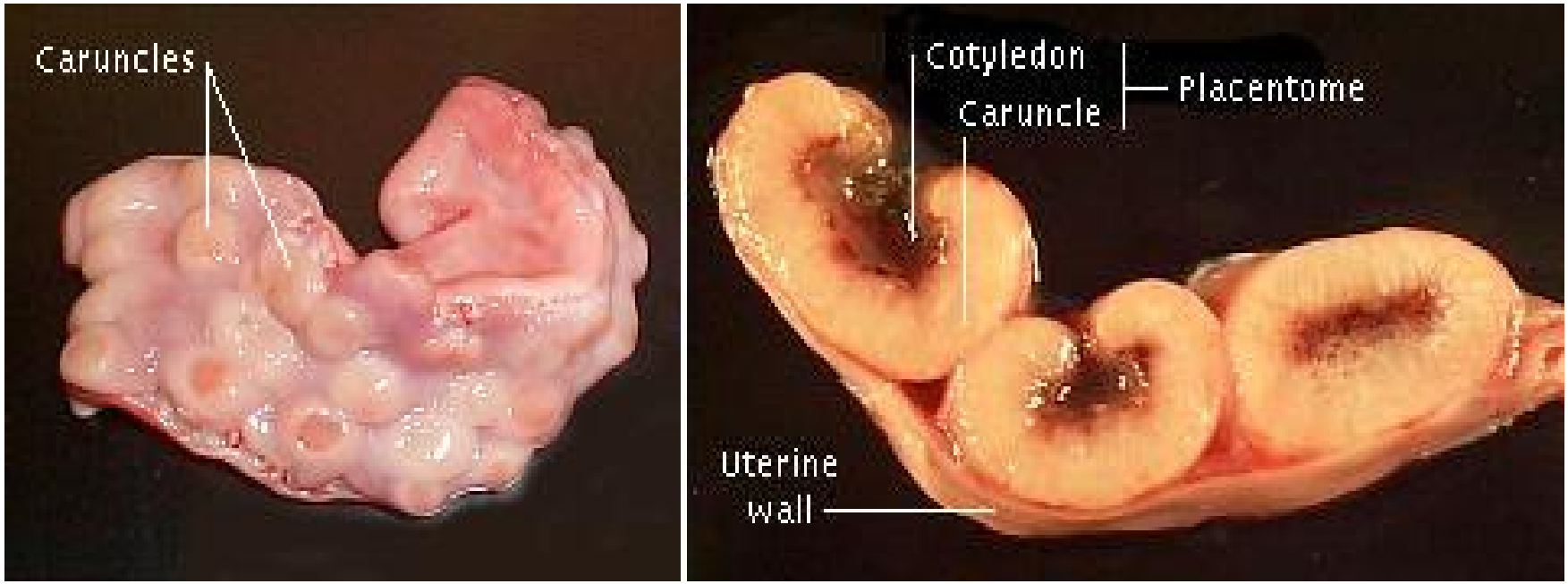
# Ewes With Access to CRYSTALYX® During Pregnancy Bear More Twins and Less Singles (Study 2)

| Lambing data | Singles |  Twins |  Triplets | Lambing % (live lambs) |
|---|---|---|---|---|
| Control | 21% | 58% | 21% | 193 |
| CRYSTALYX® | 7% | 75% | 18% | 205 |

**In total 12% more lambs per ewe**

## Non-Pregnant

## Mid-Pregnancy




Cotyledon: the foetal side of the placenta

Caruncle: the maternal side of the placenta

Placentome: a cotyledon and caruncle together

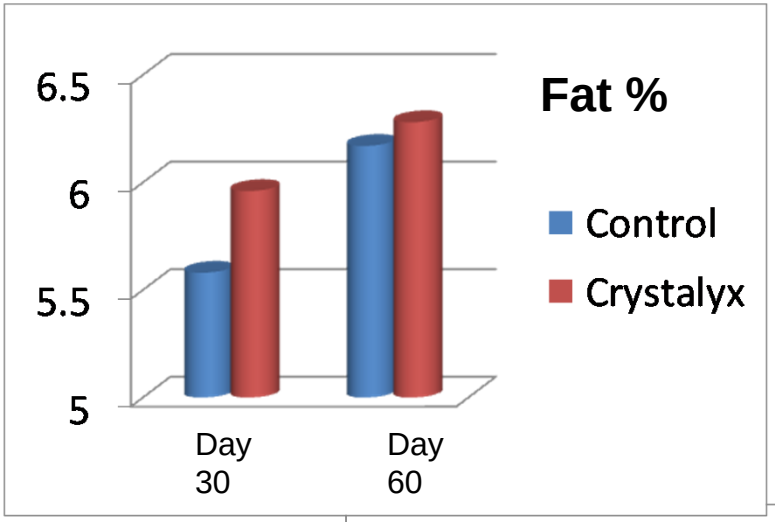
Pregnant sheep have between 75 and 100 placentomes

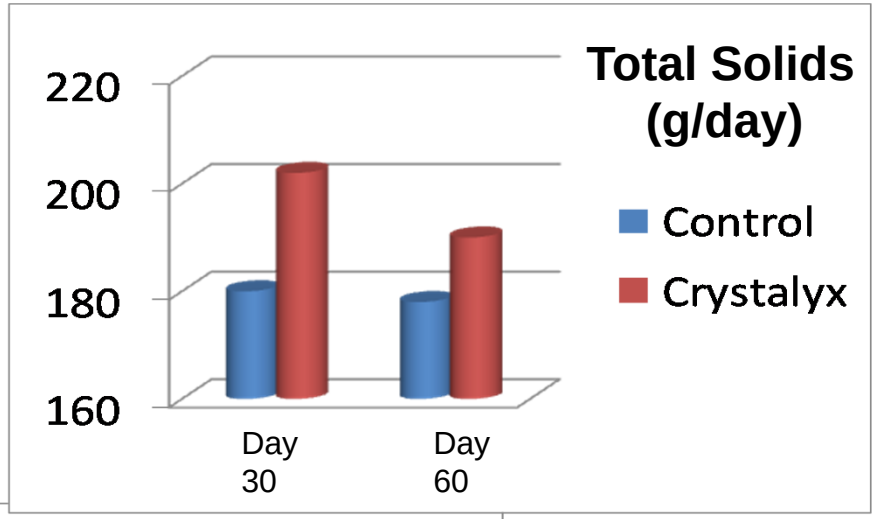
# Udder Development

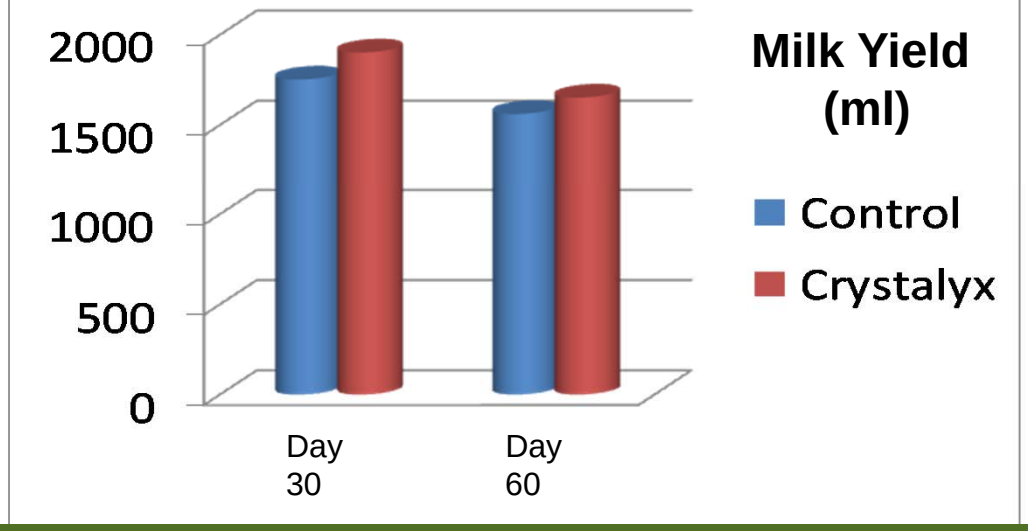
- EWES 95-98% mammary development pre-lambing
- COWS 60-70% development pre-calving
- HEIFERS/EWE LAMBS – reduced placenta size can decrease secretory cell numbers
- MATURE COWS/EWES – secretory cells are already there but placenta size determines how well they fill out.

**Placenta size determines milking ability!**

# Lactation Performance Post Weaning



# Convincing Arguments

- **Improves the nutrient and mineral supply**
- **Supports the energy metabolism**
  - Positive influence on flushing / fertility
  - Smooth start into the lactation period
  - Prevention of metabolic disorders
- **Balances individual nutrient deficiencies**
  - In the stall and on pasture
  - In extreme climate conditions
  - When changing the basic forage
- **Personal, individual indicator for the farmer**

# Convincing Arguments

- **Highly palatable and digestible, therefore ensuring continuous intake (pasture/shed).**
  - Contains high energy ingredients
  - The principle of self-feeding, which saves work, expense and time
- **Self-limiting consumption**
  - No luxury consumption (Syrup layer)
  - Limited saliva production limits the daily intake of CRYSTALYX®

# Convincing Arguments

- **CRYSTALYX® is weatherproof**
  - Dry matter content at least 95 percent
  - Hardening through crystallisation/caramelisation (no chemical additives)
  - Patented production process in two feedmills in Europe

# CRYSTALYX® Product Range

## Pre Calver

22,5 und 80,0 kg

## Mentholyx

5,0 und 22,5 kg

## Extra Energie

22,5 und 80,0 kg

## Vitalyx

22,5 und 80,0 kg

## Garlyx

22,5 und 80,0 kg

## Cattle Booster

22,5 und 80,0 kg

## Standard

22,5 und 80,0 kg

# CRYSTALYX® Extra Energie

**For ewes and lambs:**

**Increases the basic forage intake while at the same time covering the mineral requirements**

- Positive impact on the vitality of pregnant ewes, leading to a reduction in lambing problems
- Ideal as flushing feed, leading to a reduction in fertility problems
- Improved fertility: more lambs per ewe!
- Improved body condition
- Increases daily weight gains of lambs
- Prevents metabolic diseases

# CRYSTALYX® Mentholyx

## The cough sweet!

## Supports the respiratory systems

- Reduces coughing and respiratory problems
- Stimulates an early intake of forage and compound feed and such stimulates the rumen development
- Balances individual nutrients and mineral deficiencies after weaning
- Potential toxins are bound by yeasts
- Minimises reciprocal navel suckling and licking as well as other undesirable behaviour patterns

# CRYSTALYX® Garlyx

## To support the natural repellence of flying insects

- To reduce nervousness and agitation caused by airborne biting insects and flies
- To increase the activity and number of rumen microbes, thereby increasing the intake and digestibility of forages
- As a self-feeding concept, to balance feed rations with essential vitamins and minerals (Carry out ration calculations!)

**Warning:**
**Garlyx must not be fed to lactating dairy cows or sheep (milk for consumption) because garlic granules are included. In the case of finishing cattle/sheep, discontinue feeding four weeks before slaughter.**

# CRYSTALYX®– For Ecological Production

**According to (EG) Nr.834/2007 and (EG) 889/2008**

**DE-ÖKO-039**

## For cattle, sheep and goats

### Crystalyx Organyx Plus

- to provide animals in the ecological milk and meat production with essential minerals
- to increase the activity and number of rumen microbes, thereby increasing the intake and digestibility of forages
- to balance poor quality pasture, and fluctuating pasture growth

80,0 kg

22,5 kg

### Crystalyx Organyx Garlic*

- like Organyx plus, reduces additionally nervousness and agitation caused by airborne biting insects and flies

22,5 kg

Warning:
Organyx Garlic must not be fed to lactating dairy cows (milk for consumption) because garlic granules are included. In the case of finishing cattle, discontinue feeding four weeks before slaughter.

# CRYSTALYX® - Makes The Difference!

- ☑ **CRYSTALYX® increases the feed digestion and intake**
- ☑ **CRYSTALYX® supports the energy metabolism**
- ☑ **CRYSTALYX® is a unique and patented product, no competition**
- ☑ **CRYSTALYX® does not affect your mineral feed business**
- ☑ **CRYSTALYX® can be used for all ruminants!**