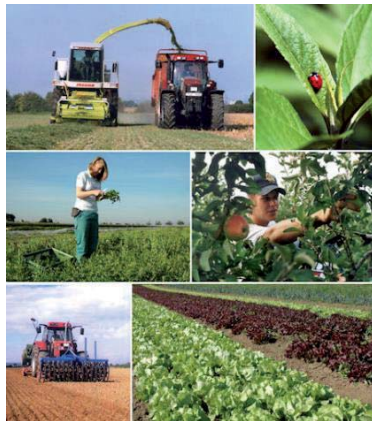




**Technologietrends bei der
Lebensmittelverarbeitung
und -herstellung**



**Die Lebensmittelwertschöpfungskette
vom Feld.....**



....auf den Tisch



Was isst die Welt – Essen pro Woche

Quelle: <http://time.com/8515/hungry-planet-what-the-world-eats/>

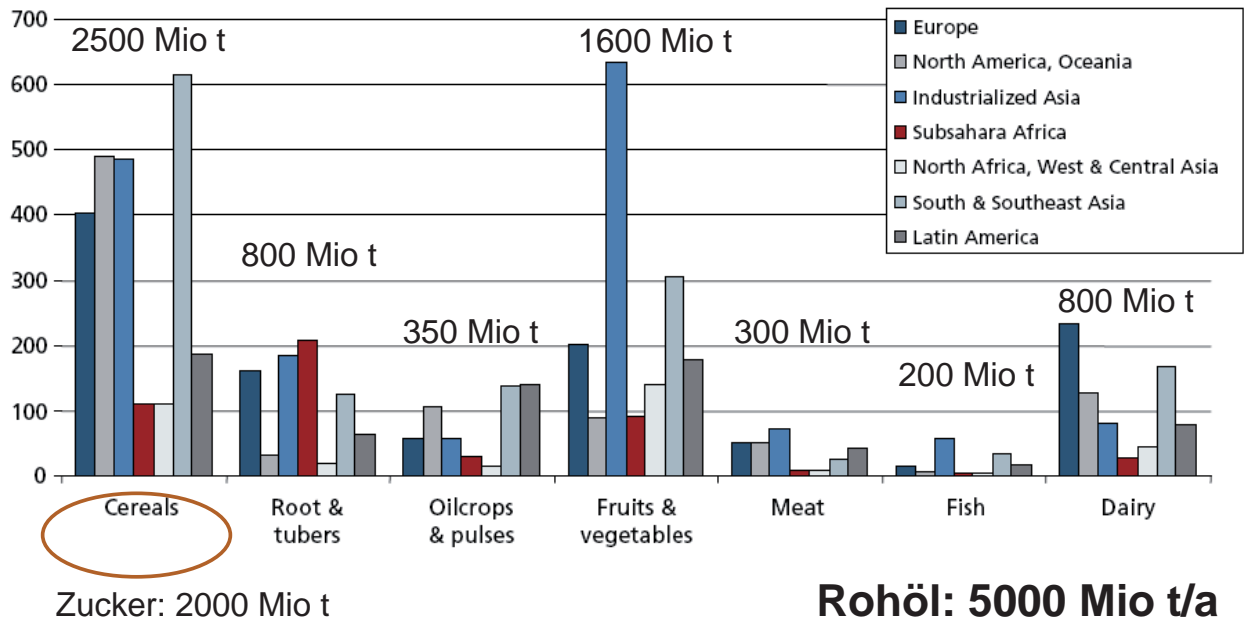


Was isst die Welt – Essen pro Woche

Quelle: <http://time.com/8515/hungry-planet-what-the-world-eats/>



Weltweite Produktion von Lebensmitteln - ca. 10 000 Mio t/a (3,5 kg/Kopf/Tag – Rohgewicht!)



Production volumes of each commodity group, per region [million tonnes]
Source: FAOSTAT 2009; Global Food Losses and Food Waste (2011)

5 | © Bühler | ITS Trends bei Lebensmittelverarbeitung | P. Braun - Bühler | 16.6.2014



Verlust von Nahrungsmitteln – Hauptgefahr heute!

JÄHRLICHER NAHRUNGSVERLUST

1'300 Mio t

- One-third of food produced for human consumption is lost or wasted globally, amounting for 1.3 billion tons annually.

→ This inevitably also means that huge amounts of **resources** and **greenhouse gas emissions** are also used in vain

1'300 L water for 1 kg wheat

15'500 L water for 1 kg beef

Source: Global Food Losses and Food Waste (2011)
The Swedish Institute for Food and Biotechnology (SIK) on request from the Food and Agriculture Organization of the United Nations (FAO).



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INDUSTRIALIZED WORLD

300 kg/capita

- Per-capita basis, much more food is lost in the industrialized world than in developing countries. However, in developing countries impact of food loss on **food security** and **social stability** is dramatic.

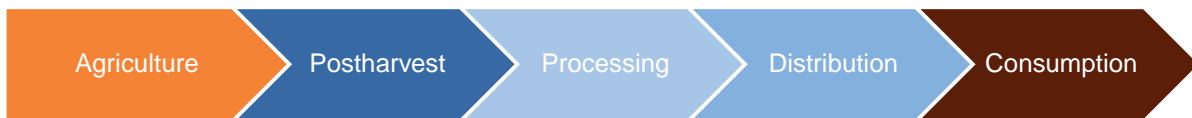
DEVELOPING COUNTRIES

170 kg/capita

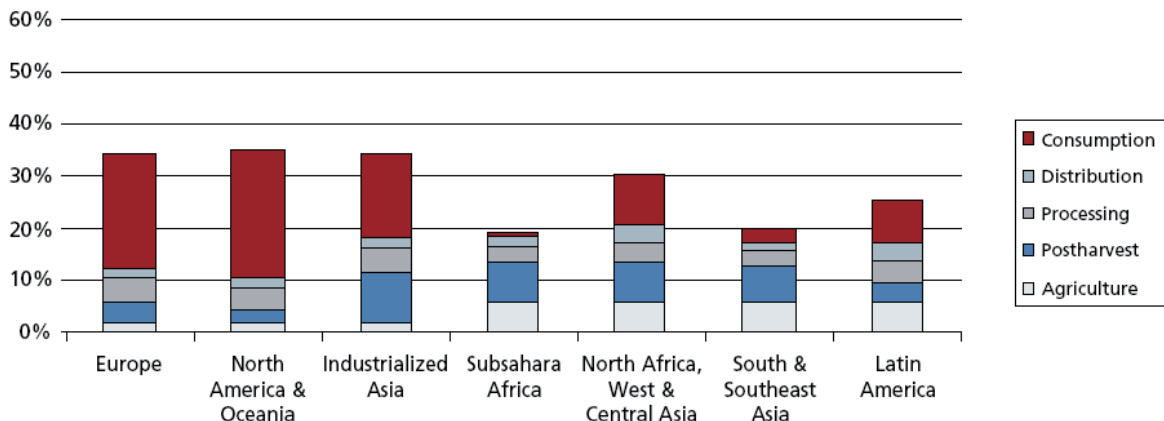
Source: Global Food Losses and Food Waste (2011)

The Swedish Institute for Food and Biotechnology (SIK) on request from the Food and Agriculture Organization of the United Nations (FAO).

Cereals are lost throughout the food supply chain, from initial agricultural production down to final household consumption, but to different extent worldwide.



Food losses - Cereals



Source: Global Food Losses and Food Waste (2011)

The Swedish Institute for Food and Biotechnology (SIK) on request from the Food and Agriculture Organization of the United Nations (FAO).

Trends & Herausforderungen in der Lebensmittelverarbeitung

- Versorgung von Massen mit Massen
 - Industrielle Fertigung in hoher Qualität
 - Lebensmittelsicherheit – High Tech & Automatisierung
 - Hohe Produktivität - High Tech & Automatisierung in Produktion

- Nachhaltigkeit
 - Lokale Erzeugung und Verarbeitung vs. globalen Warenverkehr
 - CO2 – Footprint
 - Energieausnutzung & Konvertierung
 - 1kg Fleisch benötigt in Erzeugung 6 mal mehr Energie als es liefert

- Ernährung und Bevölkerungsgesundheit
 - Übergewicht
 - Healthy Aging, Healthy lifestyle

Getreide – optische Sortierung Verringerung von Verlust und Garantie der Qualität

- Sort a variety of grains by colour and shape

- Cutting edge technologies for accuracy and efficiency
 - Up to 15t/h rice sorting
 - Over 0.5 billion grains per hour, **150,000 grains per second**
 - **~7400 grains per second rejected.**



Durum wheat, 3.0 – 30 tons/hour

Defects: Dark, discoloured, close in colour round foreign seeds and sticks.



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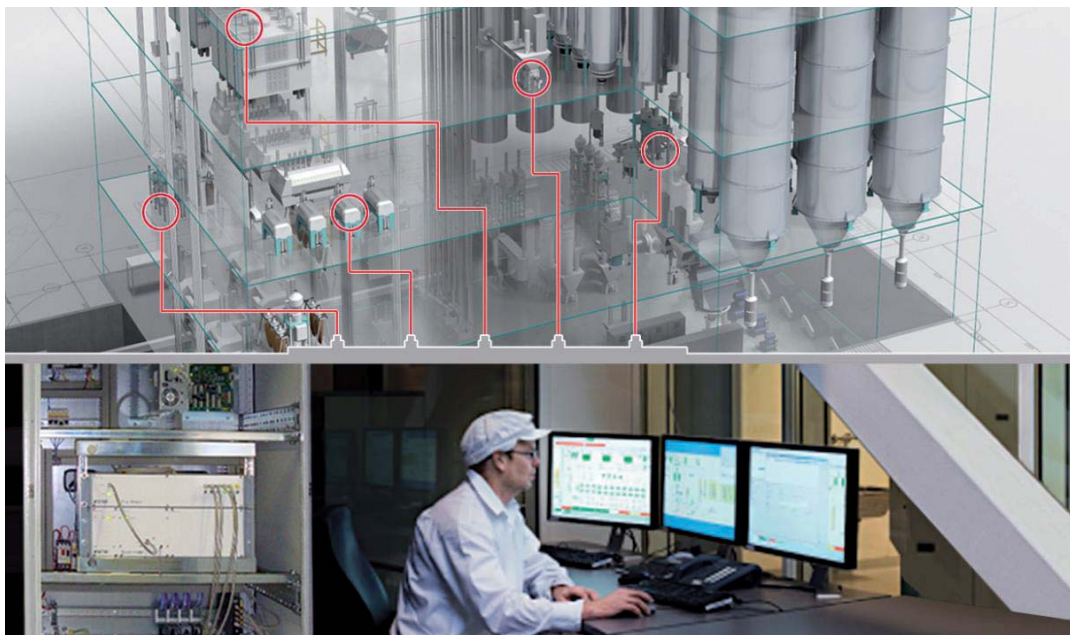
Durum wheat, 3.0 – 30 tons/hour

Defects: Dark, discoloured, close in colour round foreign seeds and sticks.



Fusarium affected
barley grain – pink mould

Intelligente Prozess Steuerungen – Prozesssicherheit & Qualität – Konstanter Input & Output



Online Partikel Grössenmessung

Wie fein ist das Korn – Anwendungen

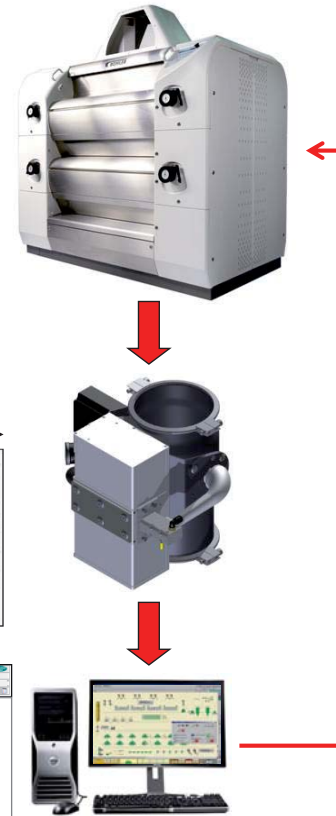
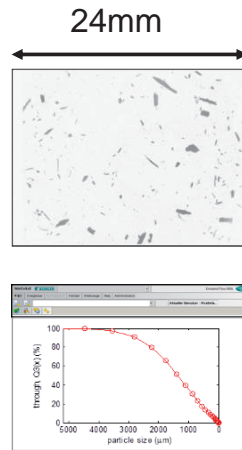
Prozesssicherheit - Qualität - Verluste

- Wheat mill:
 - ⇒ Process optimization by installation in first break product
 - ⇒ Final product monitoring and quality control

- Durum wheat mill:
 - ⇒ Monitoring of the particle granulation
 - ⇒ Consistent product quality

- Additional applications:
 - Corn grits / instant corn
 - First break product in breweries
 - Rye mill

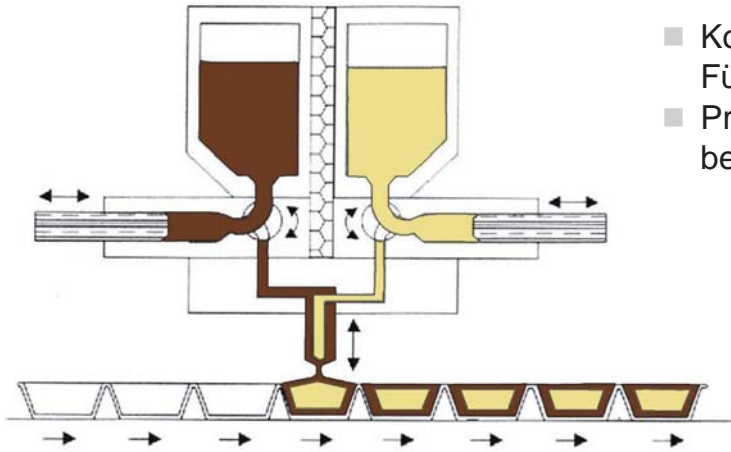
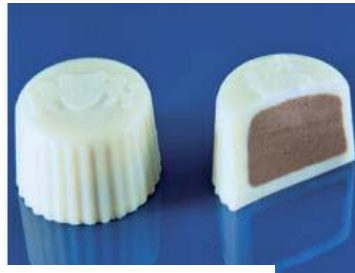
- Process automatization



Schokolade – Süsses, dass es in sich hat!



Pralinen – Fliesseigenschaften und Dosier- Formprozess



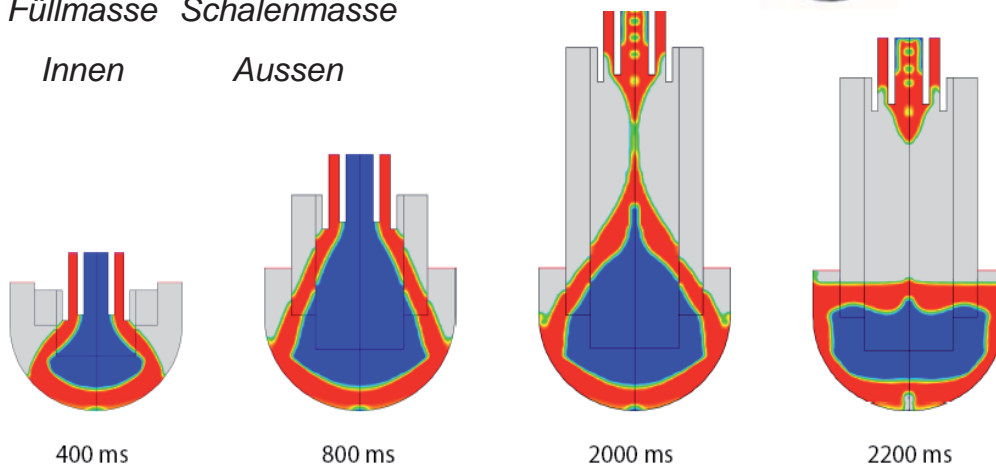
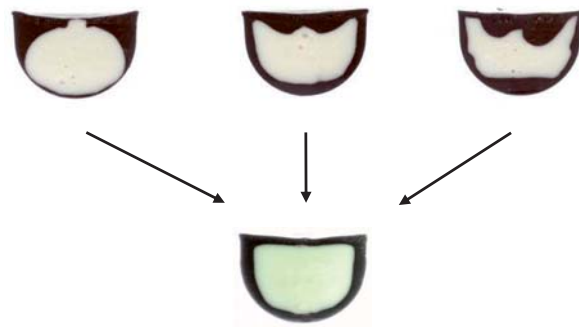
- Koextrusion von Schalen- und Füllungsmasse
- Produkt- und Prozessparameter bestimmen das Resultat



Fragestellung – Kann Prozess modelliert werden?



Füllungsmasse Schalenmasse
Innen Aussen



Gedruckte Lebensmittel – Neue Möglichkeiten der Zusammensetzung

From the Lab to Your Feet to Your Plate

Now

Modern Meadow multiplies bovine cells, obtained from a biopsy, in a cell culture medium.



The cultured cells multiply over the course of about 30 days, forming sheets of tissue that will become meat or hide.



The company's current focus is leather. CEO Andras Forgacs holds a credit-card-size lab-grown sample.

Lab-grown hides will give designers who don't use animal products an option beyond faux materials.



Someday

Cultured meat is harder to synthesize and could raise regulatory questions. It's likely 5 to 10 years away.



3D FOOD PRINTING



3D printed carrots manufactured by Fused Deposition Modeling for the PERFORMANCE project



First complex 3D printed chocolate globes for gastronomy



3D printed free-form pasta product



Savory snacks produced by Selective Laser Sintering