



BAKINGTECH 2018

SUSTAINABILITY-SUCCESS THROUGH PEOPLE

PRODUCTS AND PRODUCTIVITY

*Food waste, and how to combat with
sustainable enzyme solutions*



Corbion

Presented by
Kathy Sargent
Market Director, Corbion



HOW YOUR SANDWICH CHANGED THE WORLD



The Carbon Footprint of One Sandwich | NPR's Skunk Bear



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Key Topics

Importance of a Sustainable Bakery Industry

Using Enzymes as a Tool to Deliver on Sustainability Goals

Responsible Sourcing, Operations & Ingredients Solutions

Life Cycle Assessment of Bread



Bread is one of the most commonly discarded foods

Consumers throw away 286 million tons of cereal products

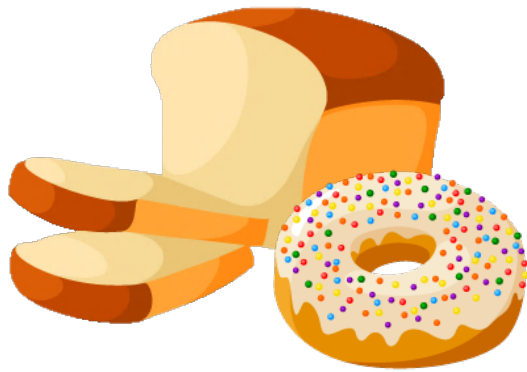


Source: Global food losses and food waste, SIK / FAO, 2011



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What are the causes?



Product Quality
Staleness



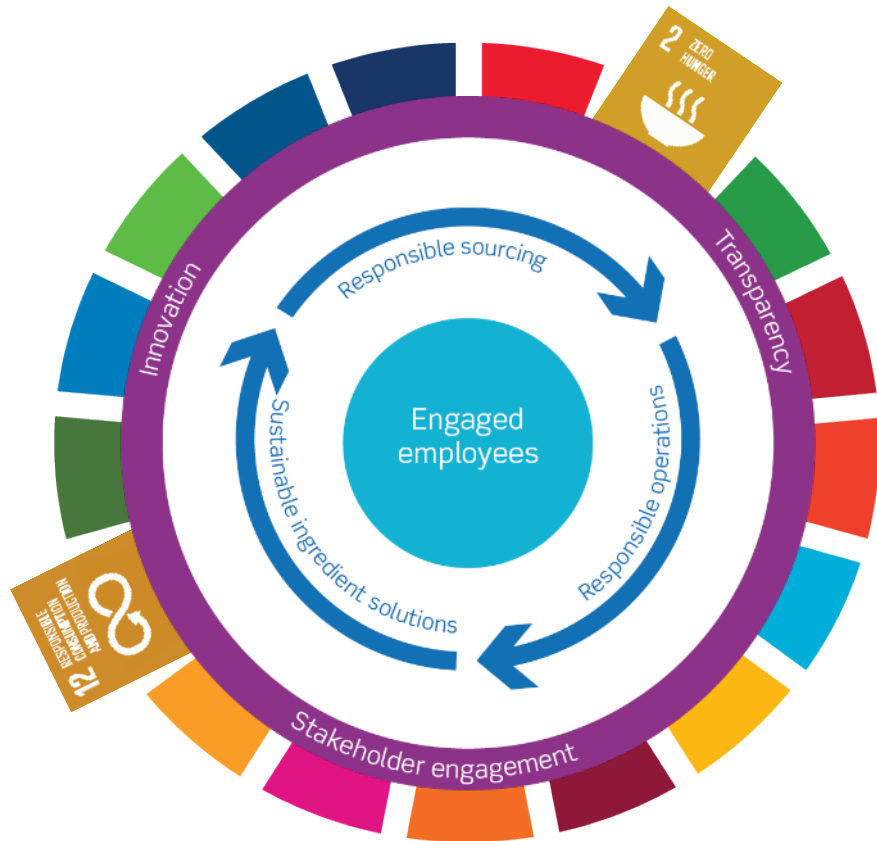
Consumer Behavior
Planning, Expiring
“Best Before” Dates



Supply Chain
Lack of coordination
in the supply chain

Creating a positive impact by growing our business in sustainable ingredient solutions

and maximizing our contribution to zero hunger and responsible production and consumption



Ambitions

Responsible sourcing

Create a sustainable supply chain for agricultural materials

Responsible operations

Create a zero-incident and zero-waste business

Sustainable ingredient solutions

Create solutions based on renewable resources to improve the quality of life for people today and for future generations



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Section 2

HOW CAN ENZYMES BE A TOOL TO DELIVER ON OUR SUSTAINABILITY GOALS?



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Why do we use enzymes in baking?

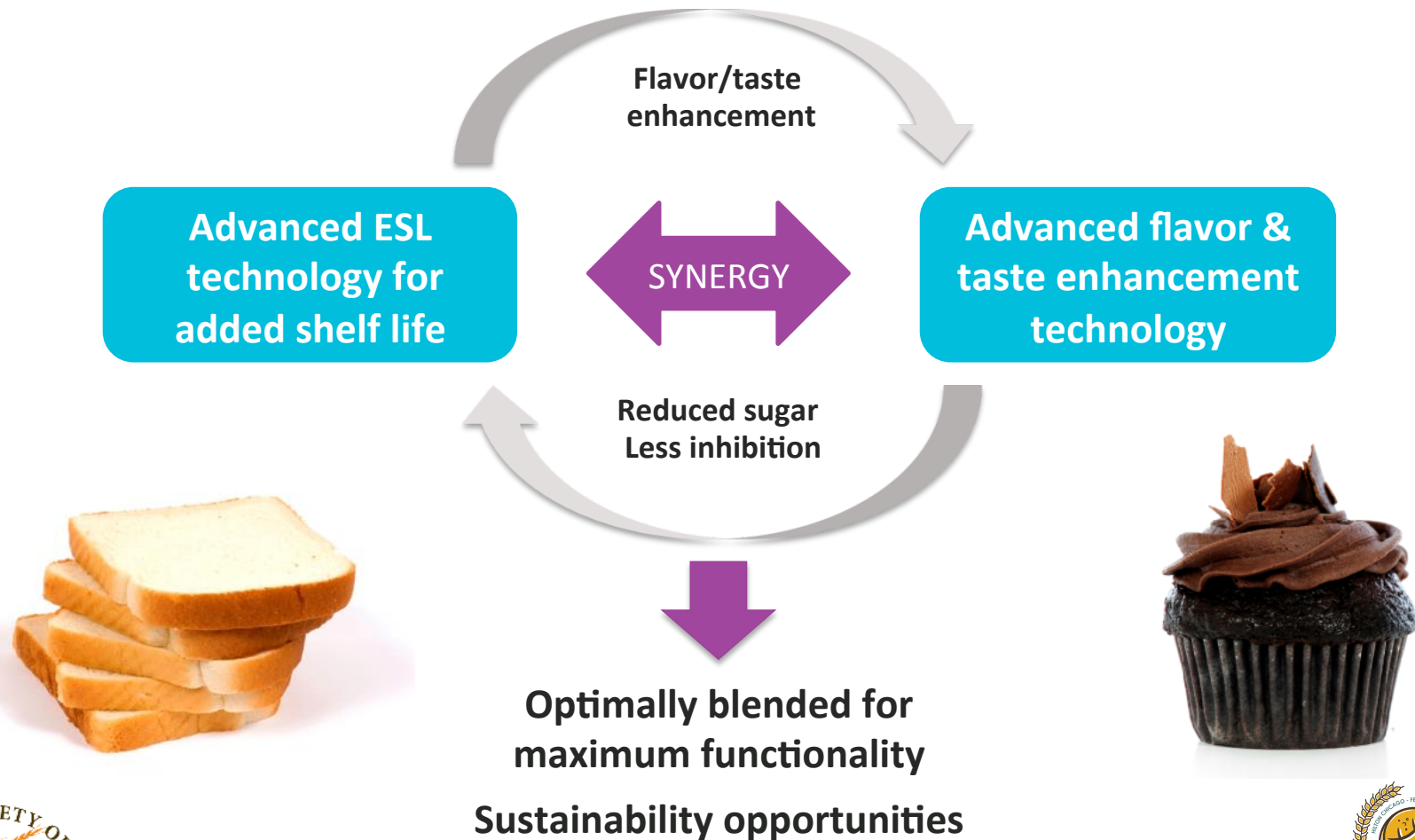
Dough Improvement

- Yeast Fermentation
- Dough Absorption
- Clean Label
- Dough Strength
- Process Tolerance
- Dough Extensibility
- Volume
- Crumb Structure
- Crust Color
- Crumb Whiteness

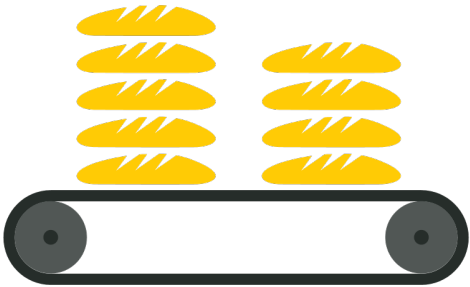
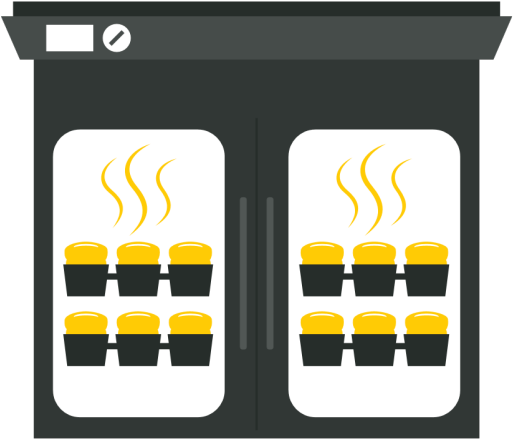
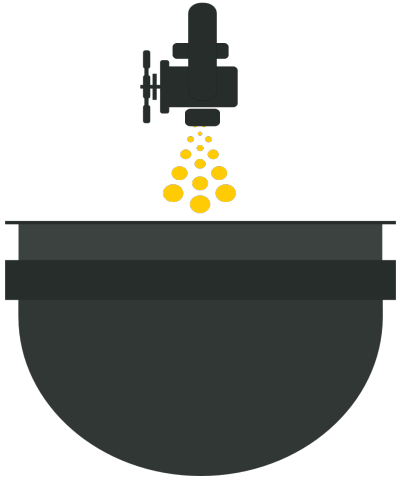
Freshness

- Reduce Staling
- Increase Shelf Life
- Texture

A synergistic bakery enzyme solution



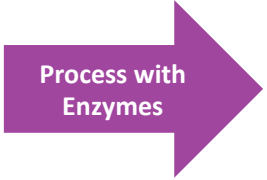
Baking Process



**Sugar +
Standard ESL**

Bread Production

**Finished Bread
Characteristics**



**~50% Less sugar +
Enzyme Solution**

**In Situ Sugar Production
During Baking**

**Improved Quality
Freshness Lifecycle**





Section 3

RESPONSIBLE SOURCING



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Enzymes are nature's helpers – inherently sustainable

Enzymes are found in every living organism

- Natural, sustainable and biodegradable **proteins** essential to life
- Efficient **biological catalysts** that speed up chemical reactions, **saving time and money**
- Allow processes to take place at less severe conditions, **saving energy**
- Increase the yield and efficiency of processes, **saving raw materials**
- By using enzymes, the industry can **do more with less**



Source: Novozymes - Bagsvaerd, Denmark



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Optimize formulations

Utilize local ingredients

- Formulate with US wheat and minimize off-shore sugar transportation
- Minimizing distribution emissions

Reduction of formula ingredients

- Please consumers with label-friendly alternatives
- Cost optimization



RESPONSIBLE OPERATIONS



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Increase production efficiency & plant capacity

Enzymatic function

- Aid in Yeast fermentation
- Reduce mixing time
- Soften dough and manage extensibility
- Control pan flow
- Process tolerance

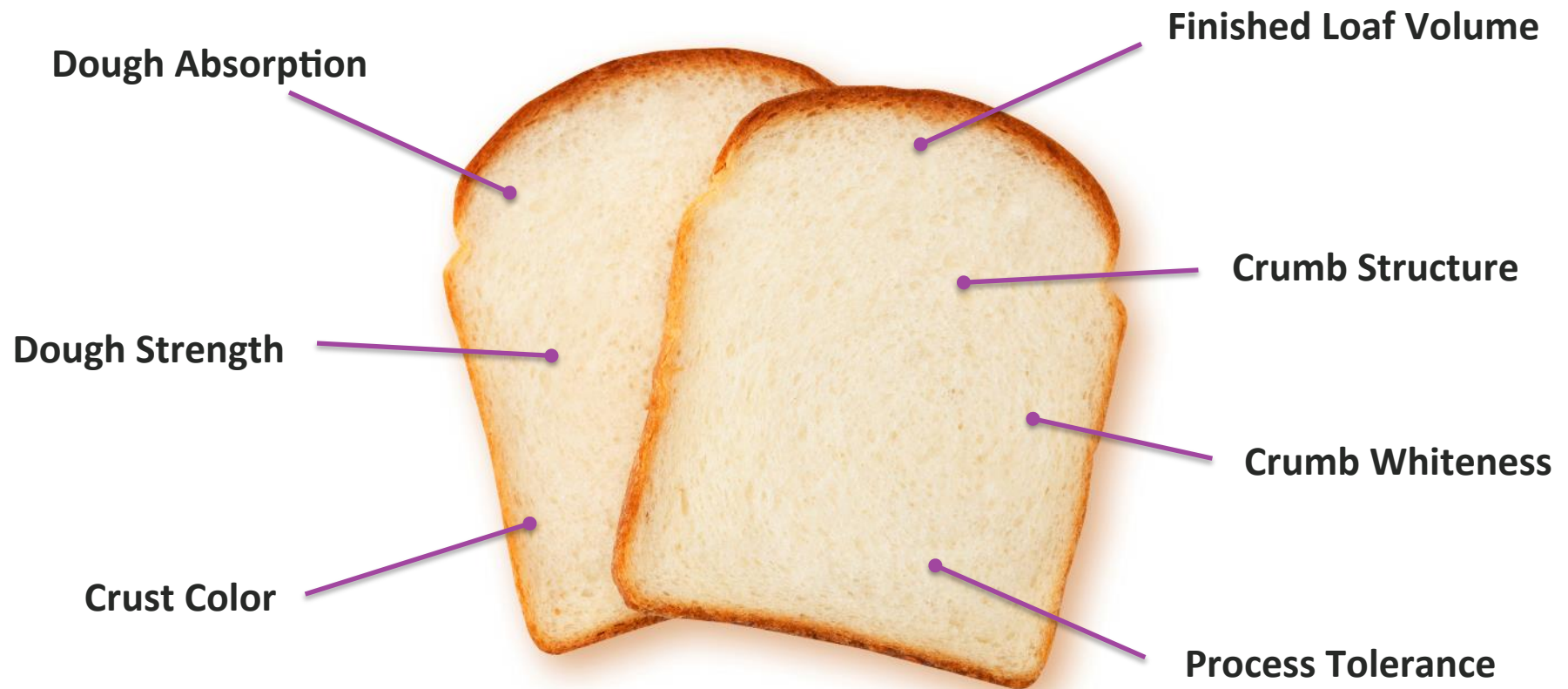
Output

- Allow for longer, more efficient production runs
- Reduce product changeovers

Result

- Reduce energy consumption
- Reduce bakery emissions
- Reduce water consumption

Reduce Manufacturing Waste





Avoid feeding the landfill



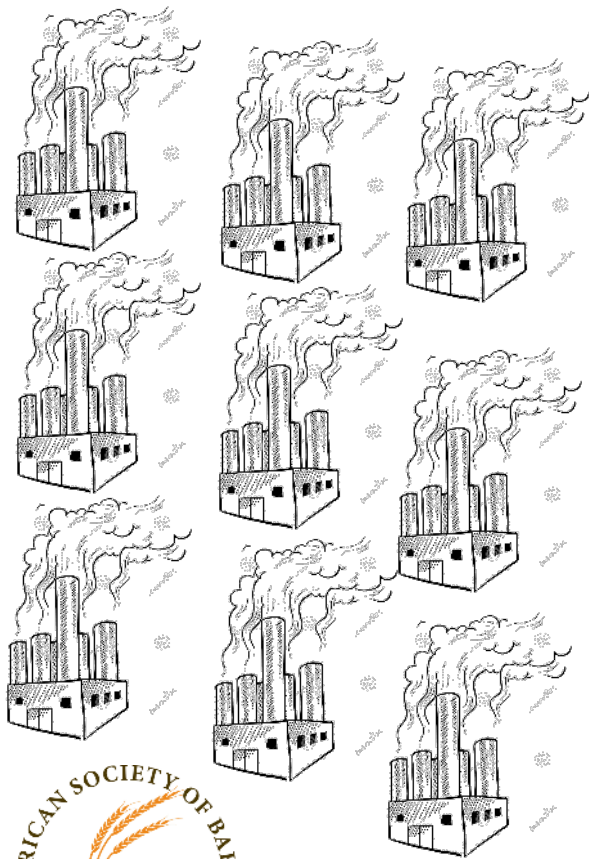


Reduce equipment stress



Direct Store Distribution

Multiple production
sights running at low
utilization



Complex and expensive
delivery

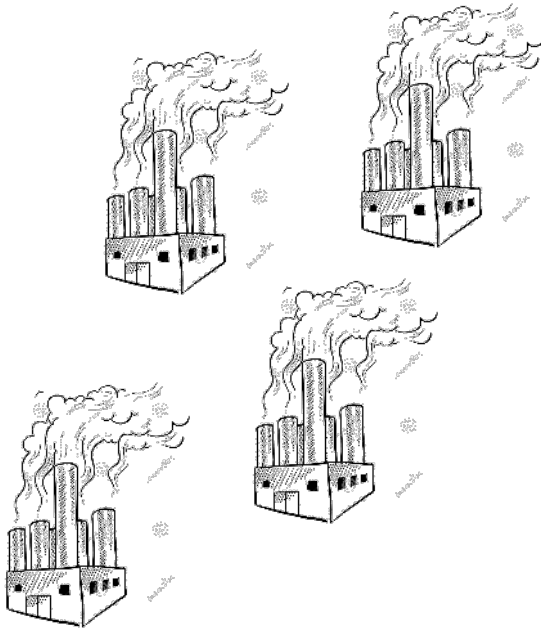


Regional delivery



Efficiency in Distribution

Optimized manufacturing footprint running at high capacity



Full truck shipments into and out of distribution



Longer shelf life is essential



Expanded deliver reach





Section 4

SUSTAINABLE INGREDIENT SOLUTIONS

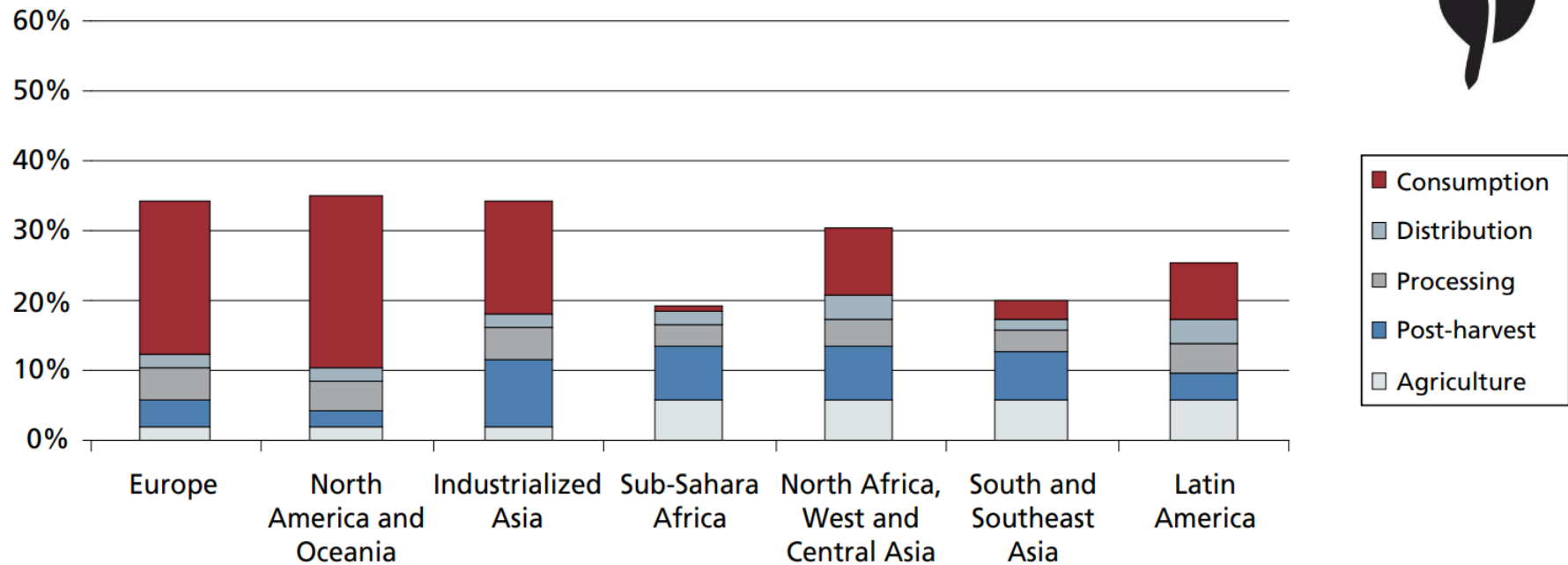


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Reduce Consumption Waste



Food losses - Cereals



Source: Global food losses and food waste, SIK / FAO, 2011



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Freshness Expectations – Today and the Future

Commercial Bread

Majority of consumers (70%) expect commercial bread to remain fresh for 5-7 days after purchase

In-Store Bakery Bread

A substantial portion of consumers (36%) expect ISB bread to remain fresh for 3 days after purchase

Freshness Opportunity

- Commercial
 - 43% of consumers desire bread to last up to 14 days longer
- In-Store Bakery
 - 41% of consumers desire bread to last up to 5 days longer



Source: Corbion Proprietary Sensory Test November, 2011

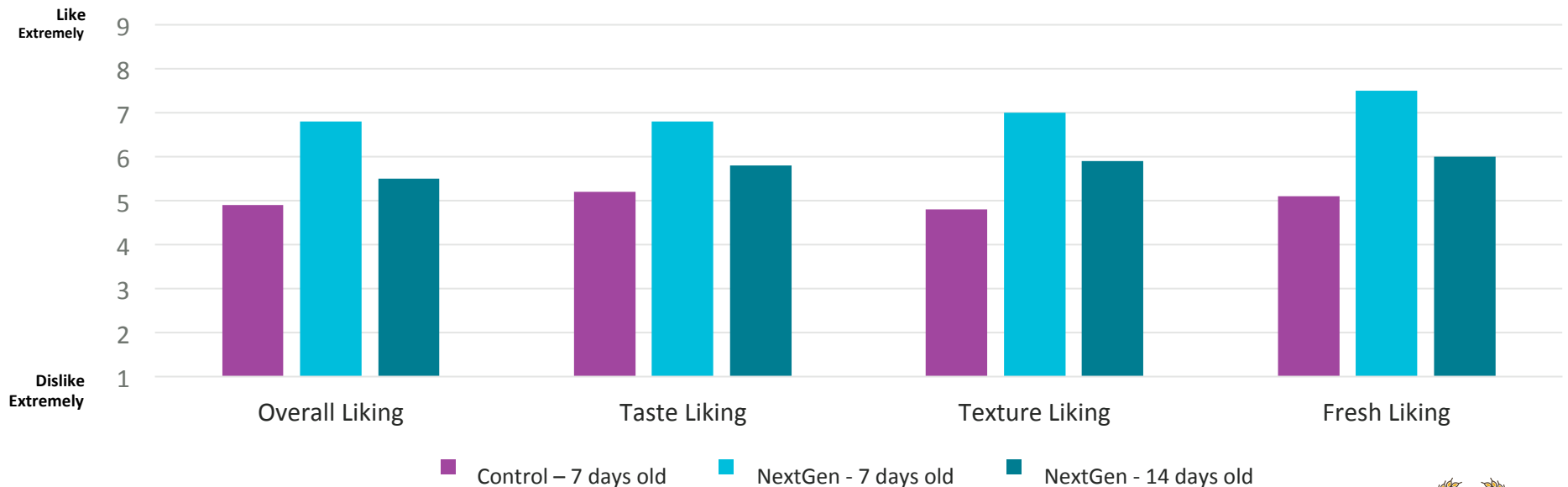


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Further benefits with enzymes: quality and taste

Consumers speak up: Bread with next generation enzymes ranks highest in all consumer liking categories: taste, texture, freshness & overall liking

Consumers rank quality over time



Source: Corbion Proprietary Sensory Test – November 2011



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Quantifying the environmental and economic benefits of bread shelf life extension

ECO-EFFICIENCY IN THE FOOD SECTOR





Life Cycle Assessment

Enzyme usage in breads delivers environmental benefits in terms of global warming potential, cumulative energy demand and land use that have been quantified under a generic model.

Environmental & Economical Benefits:

Reduction in bread waste → Less bread produced

Bread production:
Less change-overs

Bread distribution:
Less trips and higher loads

Reduction of sugar, HFCS and yeast





Food production

Total food supply 430M loaves/year

Food waste

	Standard	Extended SL	
Bread waste %	17.4	5.6	%
Waste reduction		36,700	tons/year
		72	%



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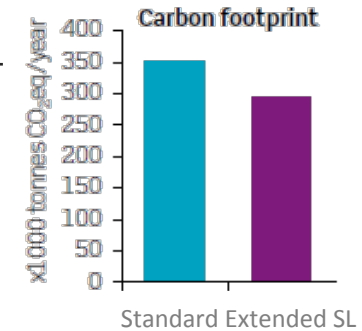
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Carbon footprint

	Standard	Extended SL	
CO ₂ emissions	355,000	293,000	tonCO ₂ eq/year
savings		62,000	tonCO ₂ eq/year
		17	%

= 3.7 American citizens/year
 = 8.5 Car trips around the world/year



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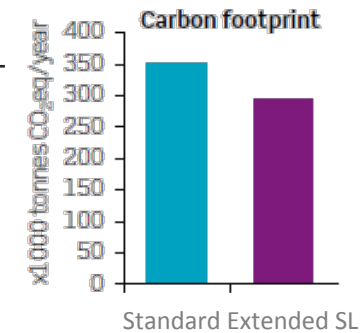
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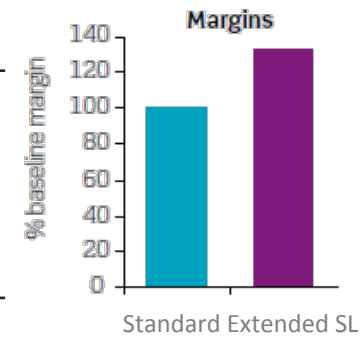
Bakery performance

	Standard	Extended SL	
Production	21.0M	21.6M	loaves/yr/plant
increase		600,00	loaves/yr/plant

3 %

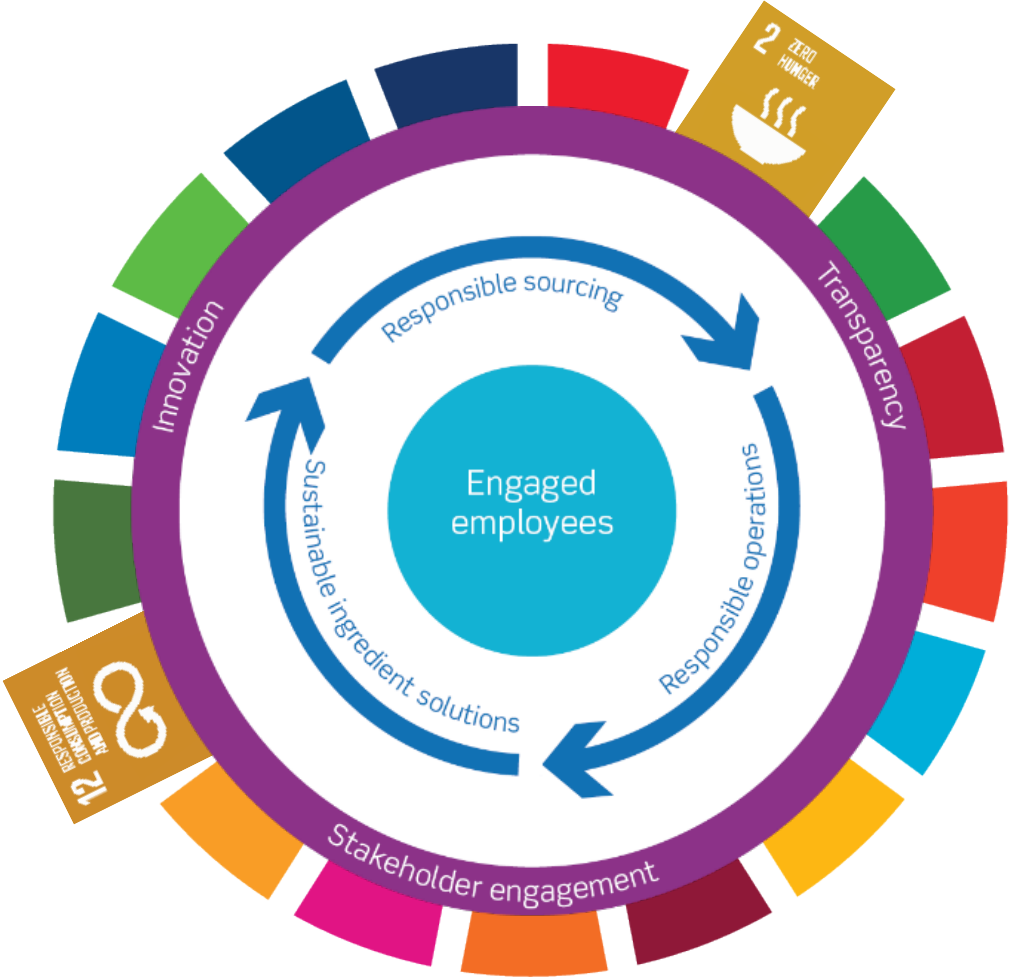
Economic performance

Margin	increase	32	%
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Enzymes are a Sustainable Ingredient Solution





References

- Corbion Proprietary Sensory Test November, 2011
- Food and Agriculture Organization of the United Nations 2011
- Global food losses and food waste, SIK / FAO, 2011
- Novozymes - Bagsvaerd, Denmark
- Spunk Bear, NPR, *The Carbon Footprint of ... one Sandwich*; <https://youtu.be/jRQEI-C5GDg>





Thank You!

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