

OVERVIEW ABOUT PRODUCTION AND MARKET OF SAUERKRAUT

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Vegetable and Potato Processing Industry

A vertical decorative strip on the left side of the slide featuring a stack of fresh vegetables: red cherry tomatoes at the top, green asparagus in the middle, and yellow potatoes at the bottom.

OUTLINE

- 1 The Market for Sauerkraut
- 2 The Manufacturing Process





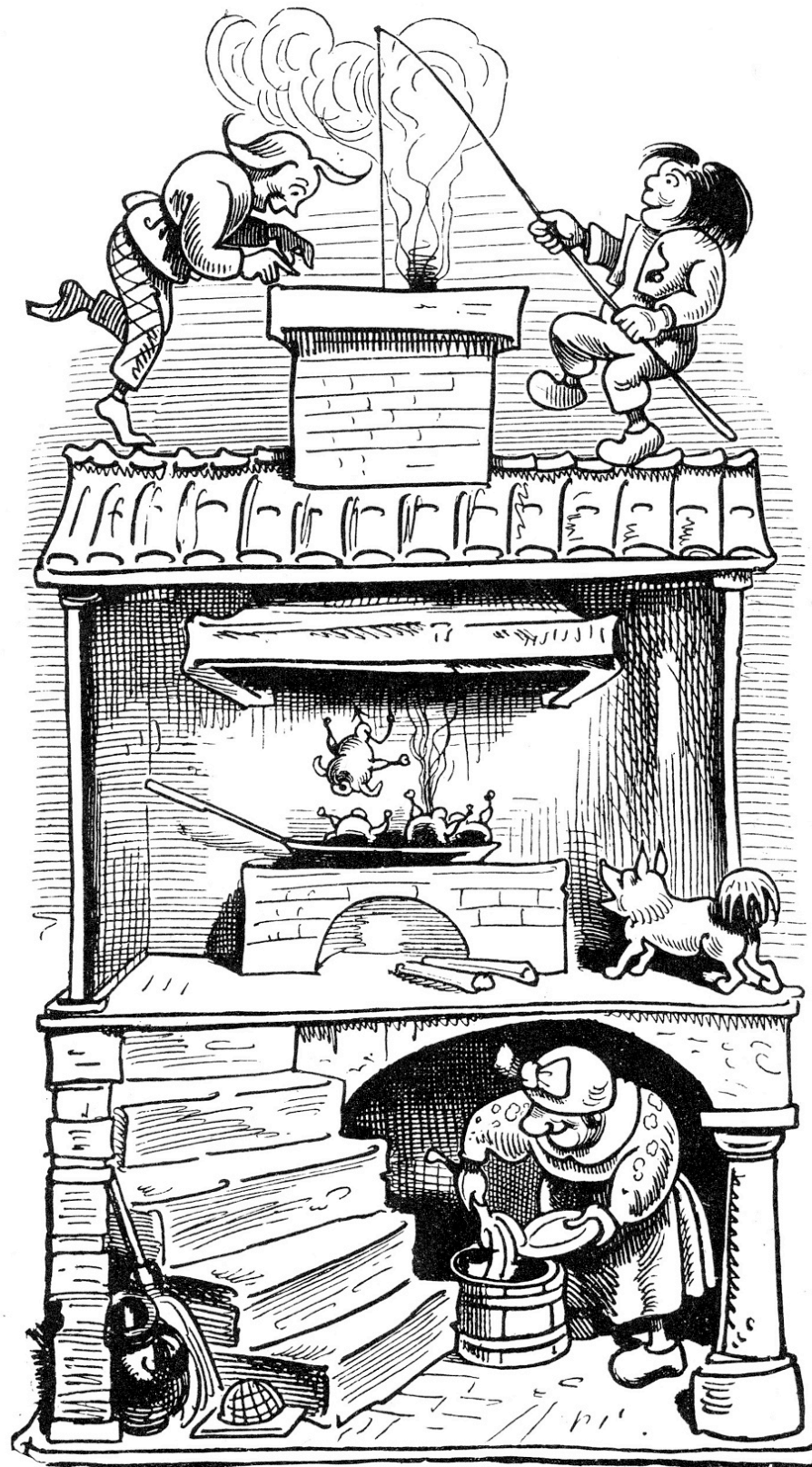


Food Law
Agricultural Policy
Market Monitoring
Export Promotion
Lobbying
Public Relations

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['zav.e.kvast]

SAUERKRAUT IN WORLD HISTORY



Chinese Wall 220 BC

Hippocrates 4th c. BC

Cato † 149 BC

Genghis Khan 13th c.

James Cook † 1779

Widow Bolte 1865

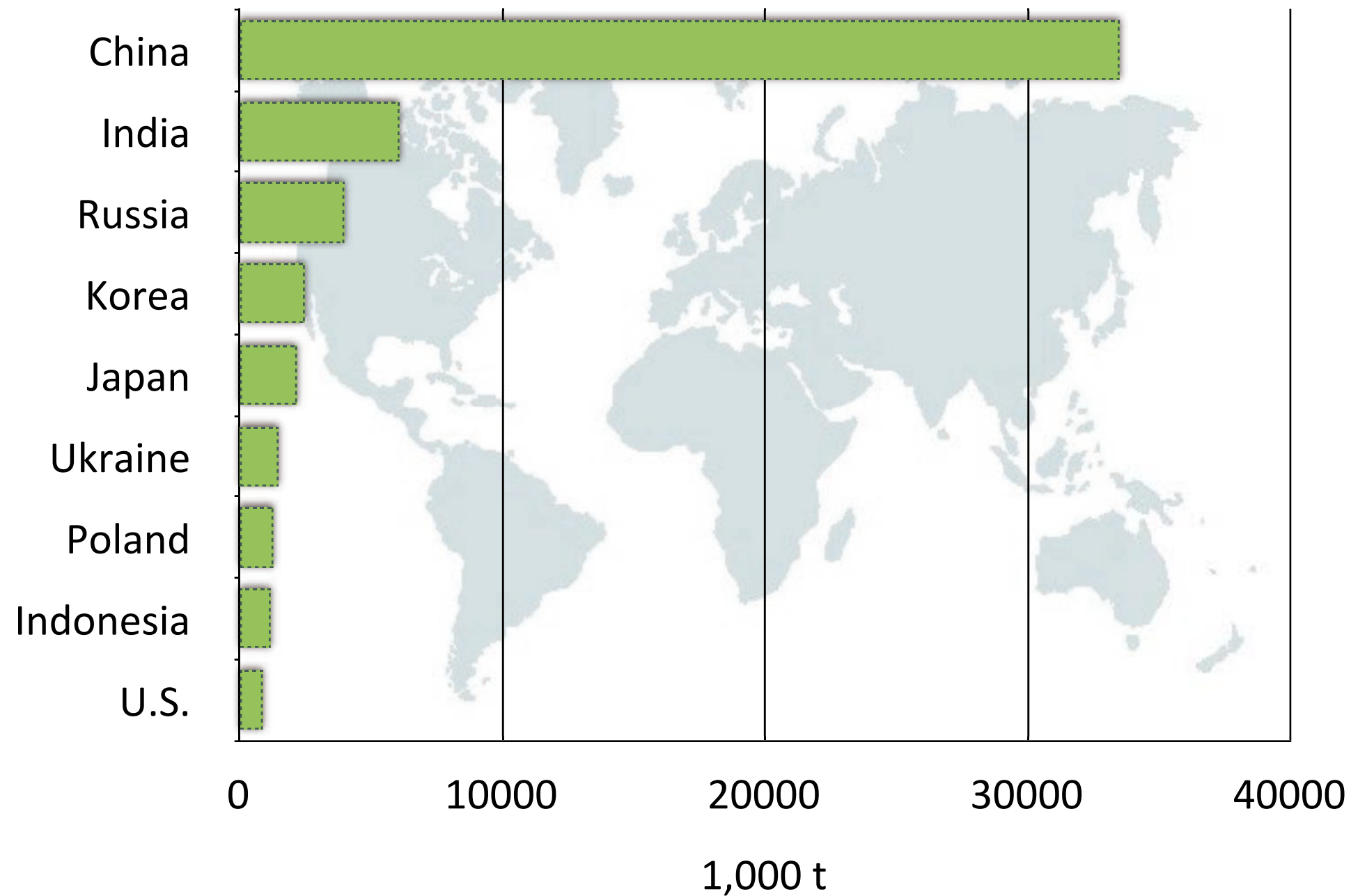


1

THE MARKET FOR SAUERKRAUT

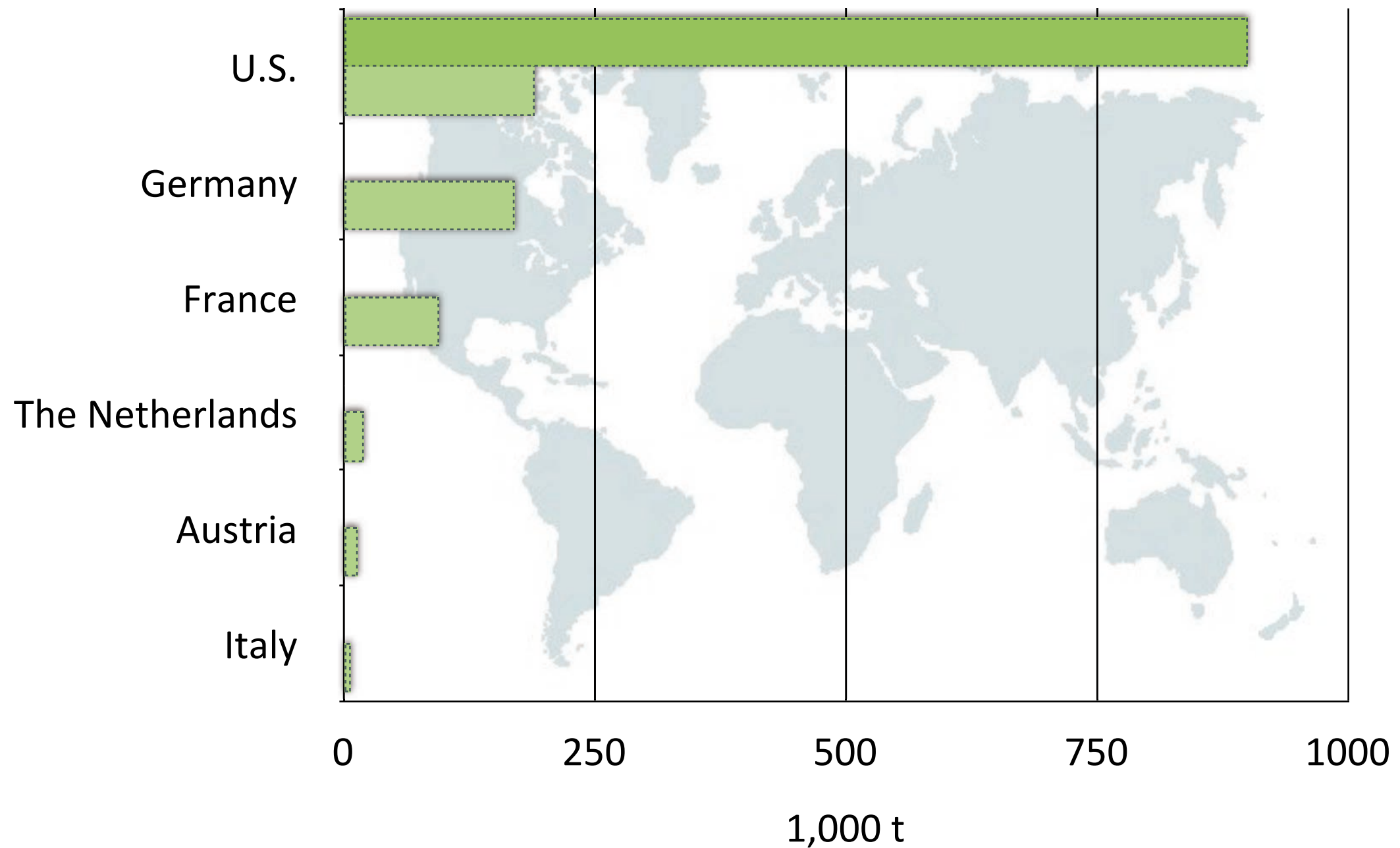
CABBAGE WORLDWIDE

Global Cabbage Production



SAUERKRAUT IN THE U. S. AND IN EUROPE

Raw Material for Sauerkraut Production



SAUERKRAUT MAKERS IN EUROPE

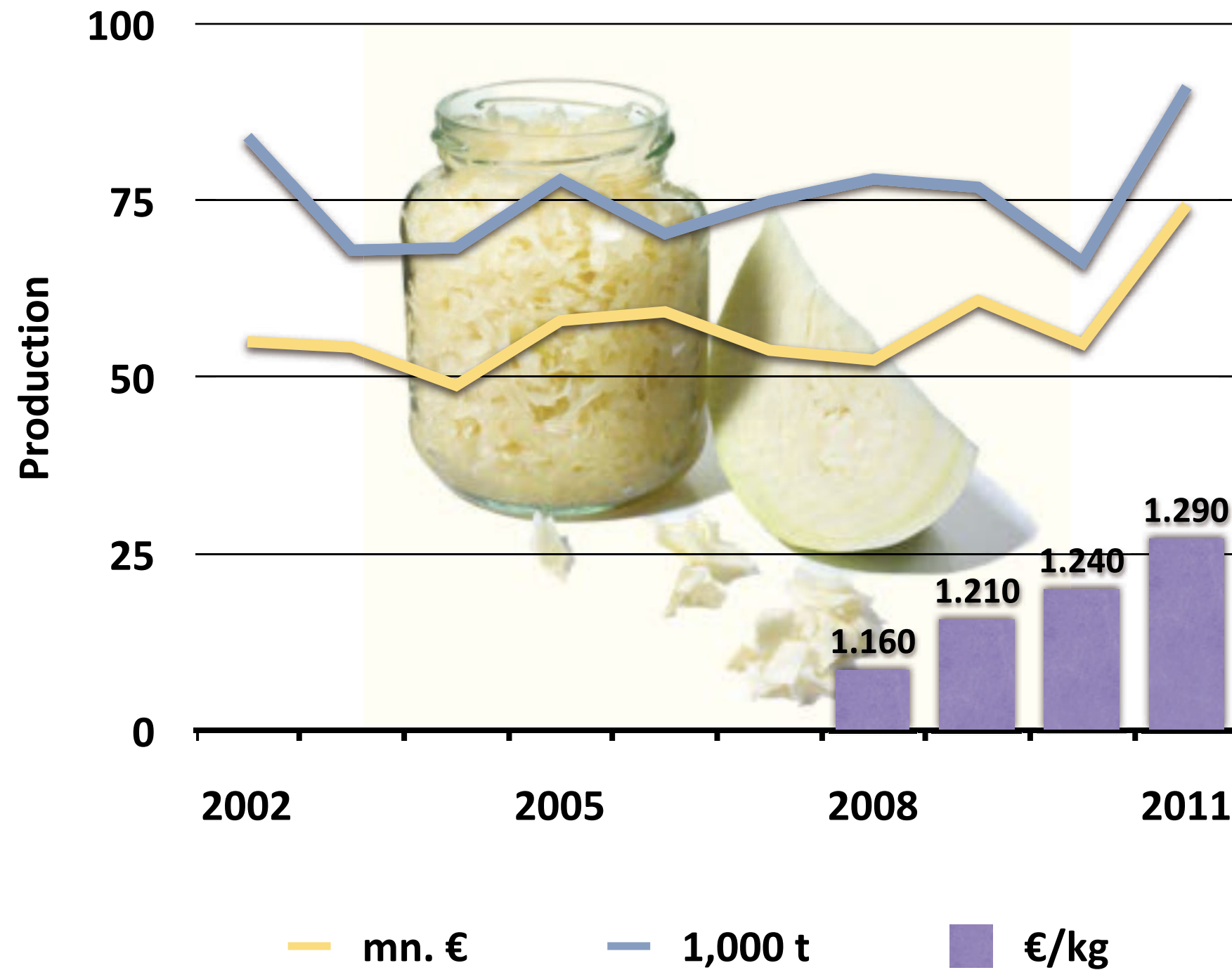
	Area (ha)	# Co.	Cabbage (t)	Sauerkraut (t) **
D*	6,560	18	170,000	91,100
F*	2,000	3	95,000	42,000
NL	2,700	1	20,000	16,320
PL	5,000	3	28,000	15,400
A*	1,500	1	28,000	15,300
I*	100	1	7,000	4,130
HR	3,000	1	4,200	2,000
Eastern Europe	18,100	8	?	?
Σ	> 38,960	> 37	> 352,200	> 162,000

* Pasteurized Sauerkraut, ** 2011

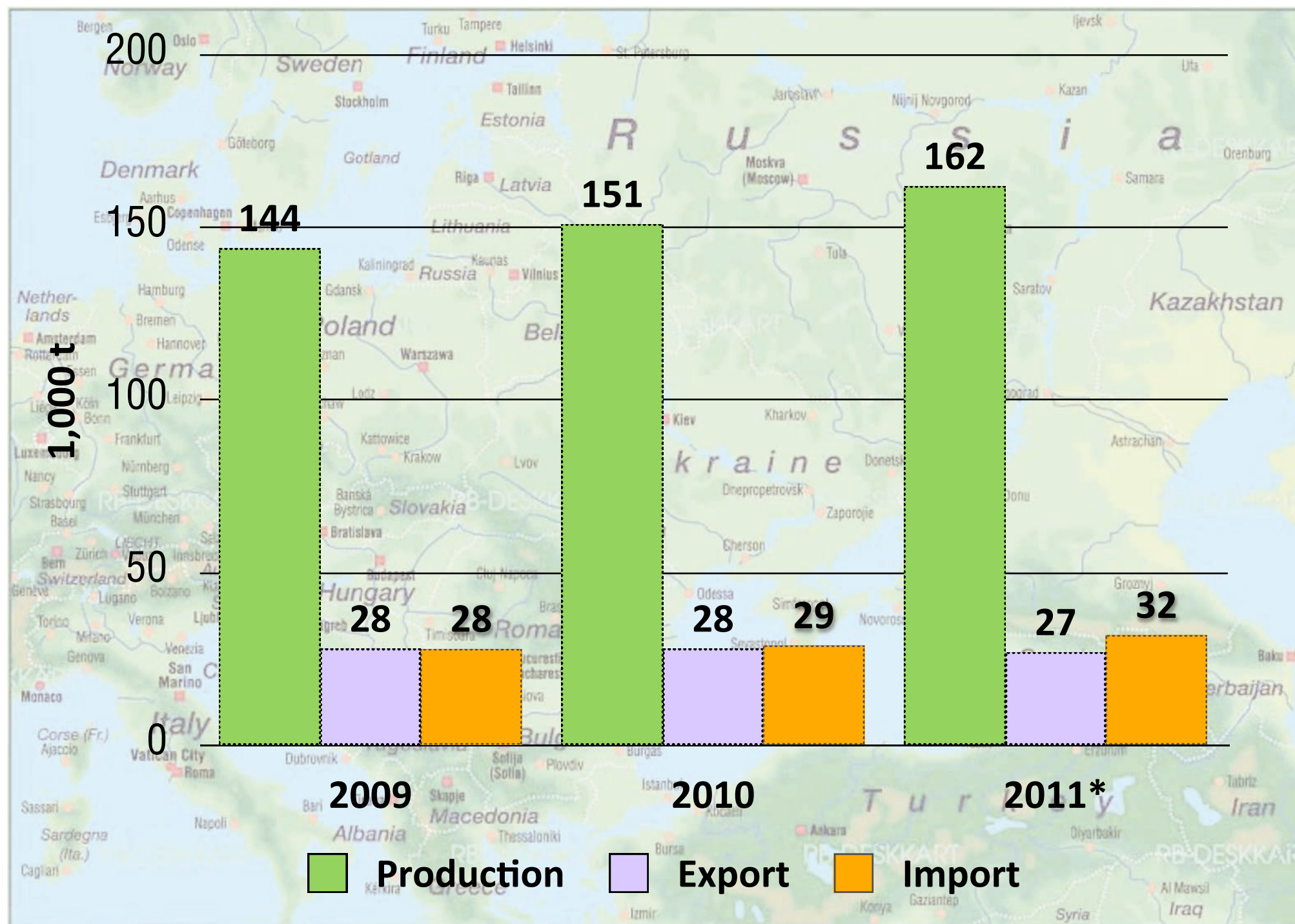
SAUERKRAUT BRANDS IN GERMANY



GERMAN SAUERKRAUT PRODUCTION

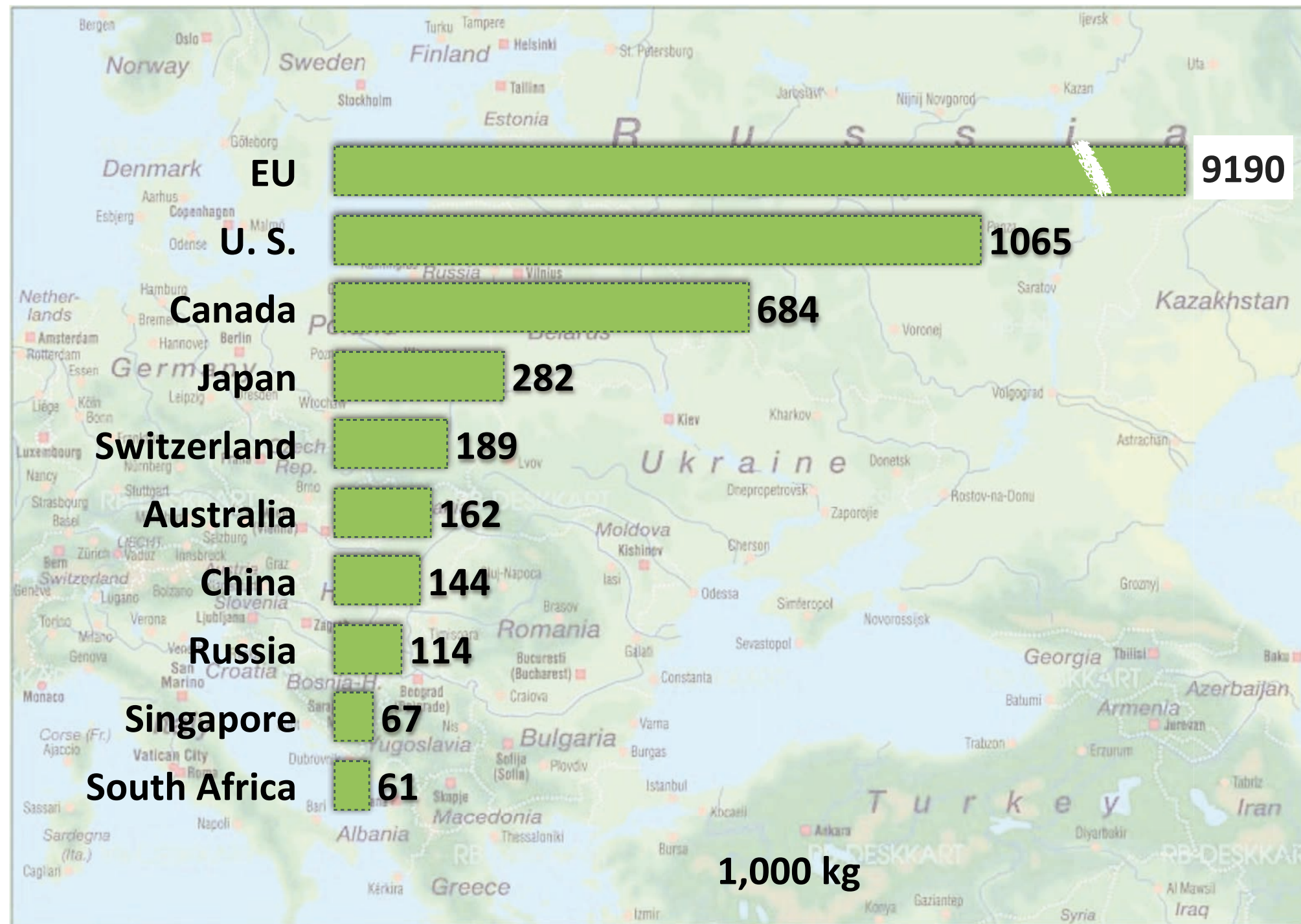


EU PRODUCTION AND TRADE



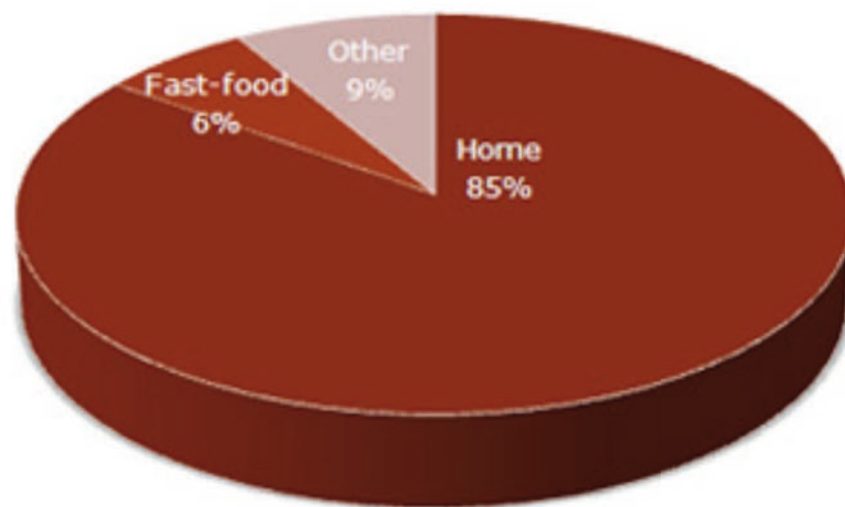
* BOGK estimates

GERMAN SAUERKRAUT EXPORTS 2010

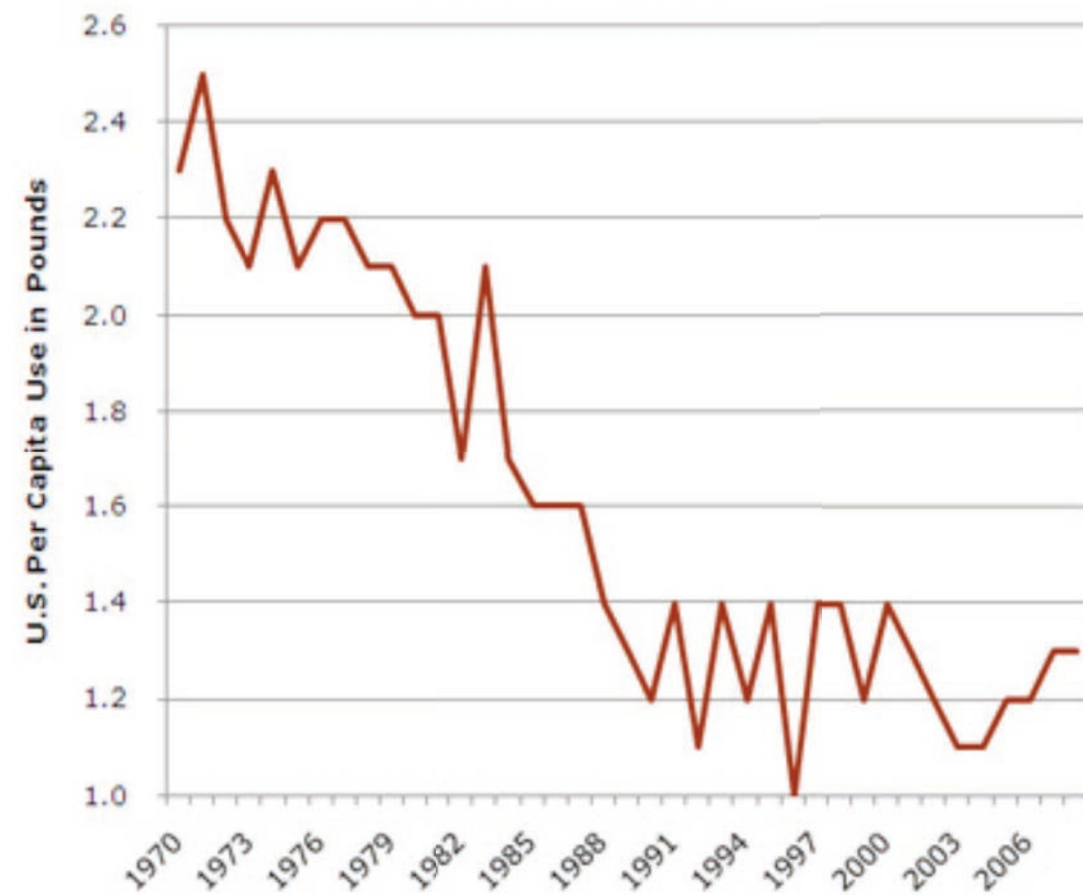


A CHALLENGE

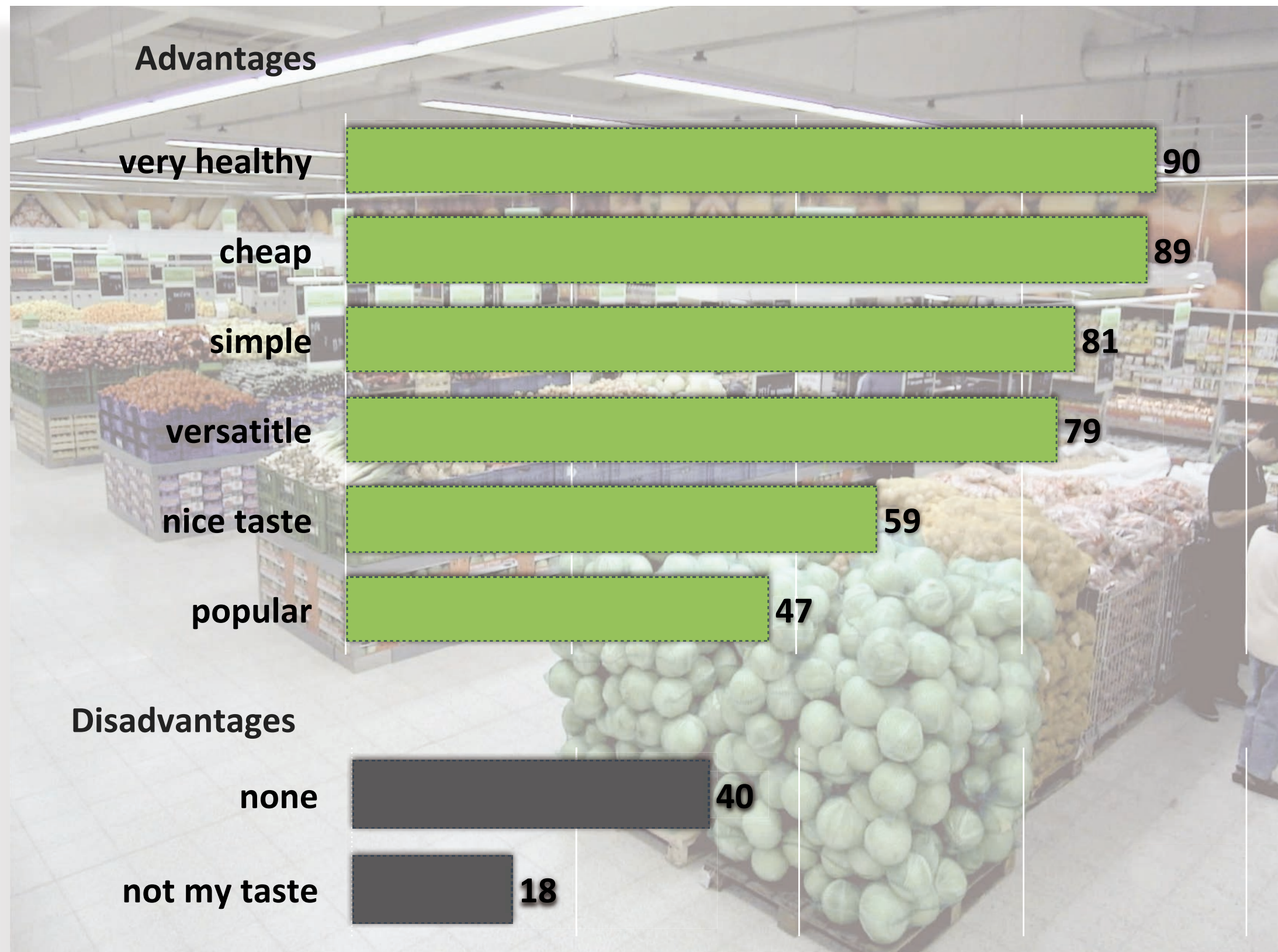
Sauerkraut Consumption



Sauerkraut



CONSUMERS' TAKE





2 MANUFACTURING PROCESS

THE PRODUCTION PROCESS (1)

HARVESTING





THE PRODUCTION PROCESS (1)

HARVESTING

Harvest Period

Plant Protection

Quality Specifications

Machine Harvesting

QUALITY SPECIFICATIONS

- ▶ Specific minimum leaf thickness and width
- ▶ green/yellow
- ▶ size and loose composition



Questions

- ▶ High percentage of cut areas?
- ▶ Thin leaves for fine sauerkraut?
- ▶ Vitamin C > 200 mg in final product?
- ▶ Early white color?
- ▶ Yield? High conversion factor?
- ▶ “Soft core”?
- ▶ Harvesting and storage times?

TRADITIONAL HARVESTING

HARVESTING



MACHINE HARVESTING

HARVESTING



THE U.S. FRESH CUT SYSTEM

HARVESTING



THE PRODUCTION PROCESS (2)

HARVESTING

DELIVERY



THE PRODUCTION PROCESS (3)

HARVESTING

DELIVERY

CLEANING



THE PRODUCTION PROCESS (4)

HARVESTING

DELIVERY

CLEANING

DRILLING



THE PRODUCTION PROCESS (5)

CUTTING



THE PRODUCTION PROCESS (5)

CUTTING



THE PRODUCTION PROCESS (6)

CUTTING

SALTING



THE PRODUCTION PROCESS (7)

CUTTING

SALTING

BUNKER



THE PRODUCTION PROCESS (8)

CUTTING

SALTING

BUNKER

FERMENTATION



THE PRODUCTION PROCESS (8)

CUTTING

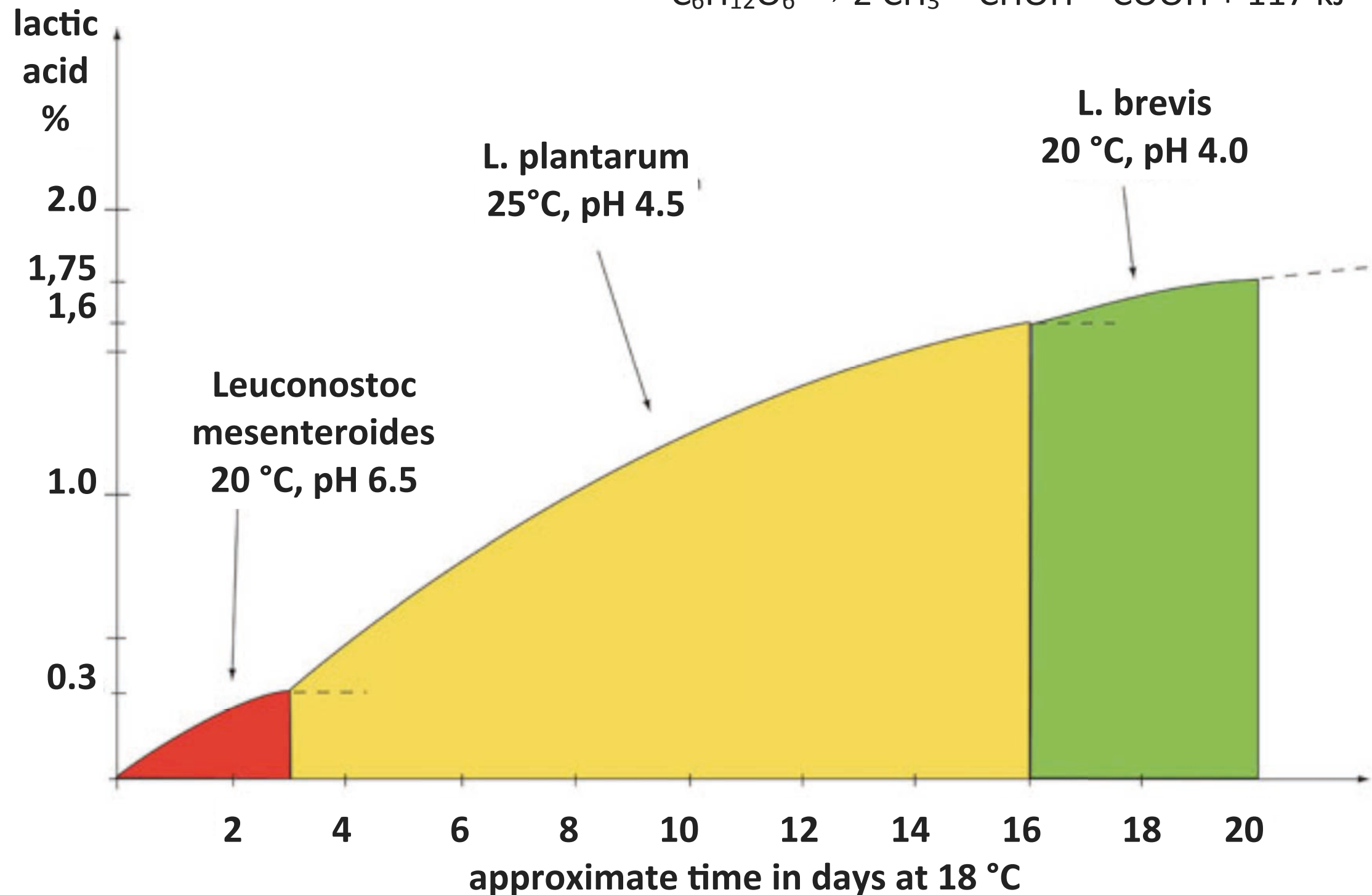
SALTING

BUNKER

FERMENTATION



3 STAGES OF FERMENTATION



PHYSIOLOGICAL CHANGES

	100 g cabbage	100 g sauerkraut
protein	1,3 g	1,5 g
glucose	2,040 mg	420 mg
fructose	1,760 mg	210 mg
saccharose	310 mg	140 mg
calorific value	22 kcal	17 kcal
potassium	208 mg	288 mg
zinc	210 µm	320 µg
vitamin C		20 mg



THE PRODUCTION PROCESS (9)



FERMENTATION

BLANCHING

THE PRODUCTION PROCESS (9)

FERMENTATION

BLANCHING

FRESH PACKING



THE PRODUCTION PROCESS (9)



THE PRODUCTION PROCESS (10)

BLANCHING

CANNING

SEASONING



THE PRODUCTION PROCESS (11)

BLANCHING

CANNING

SEASONING

PASTEURIZATION



THE PRODUCTION PROCESS (12)

LABELLING

STORAGE

DELIVERY



Product Characteristics

- ▶ cut and sliced white cabbage
- ▶ sufficiently fermented
- ▶ pasteurized or not
- ▶ firm, light
- ▶ typical savoury taste and smell

Ingredients

- ▶ salt
- ▶ herbs and spices, natural flavors
- ▶ sugar, sweeteners
- ▶ vitamin C
- ▶ wine, champagne
- ▶ oils and fats
- ▶ bacon



Analytically

- ▶ ≥ 90 % solid substance
- ▶ ≥ 4.4 °Brix (refractive index)
- ▶ $\text{pH} < 4.1$
- ▶ lactic acid content 0.75 g/100 ml
- ▶ sodium: $0.5 < \text{Na} < 3$ g/100 ml
- ▶ net drained weight: 90 g/100 ml

FINAL PRODUCT



THE PRODUCTION PROCESS (13)

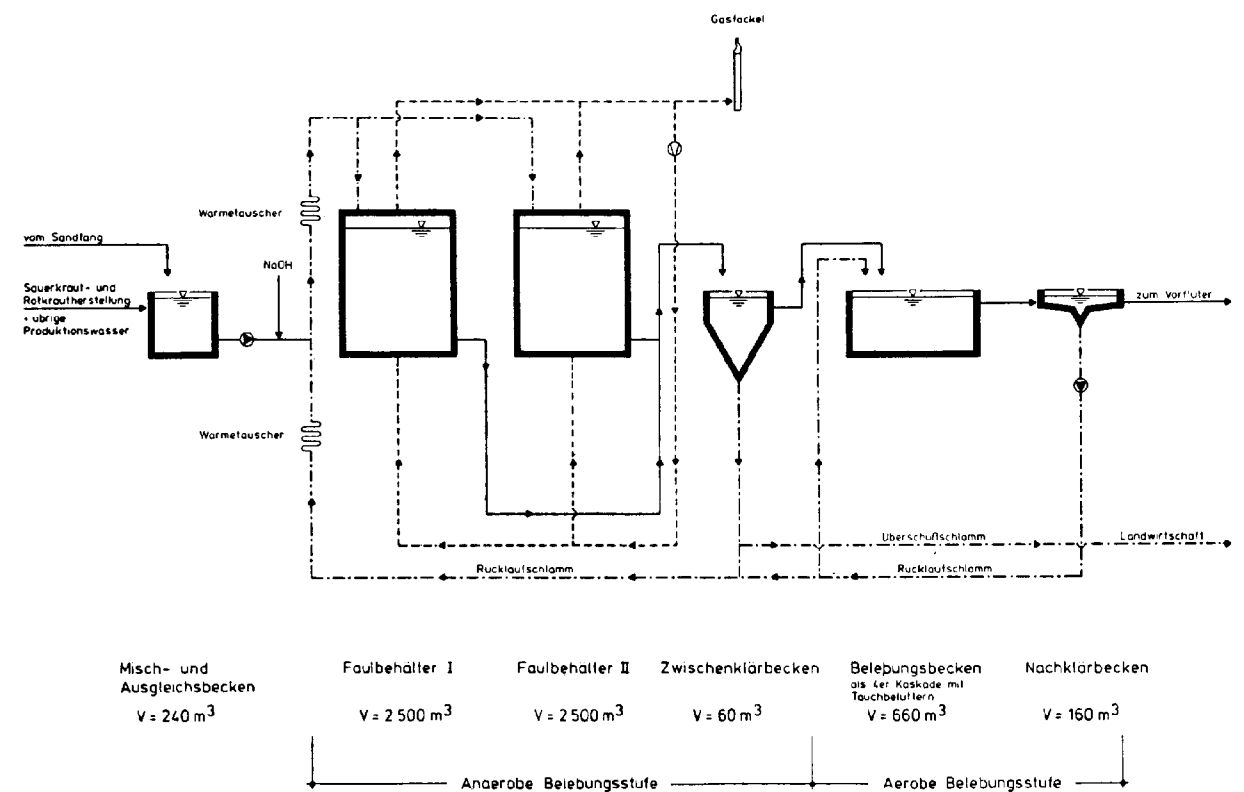
PACKING

STORAGE

DELIVERY

WASTE WATER

Fresh brine
Fermentation brine
Blanching brine



BRINE / WASTE WATER

brine:		fresh	fermentation	blanching
BOD ₅	g/l	10-30	17-50	40-55
COD	g/l	15-40	25-75	65-85
KMnO ₄	g/l	30-60	30-90	60-90
pH	-	6-6.2	3.8-4.2	3.8-4.0
Chloride	g/l	12-20	5-15	
Amount	kg/t	100	150	20-80
BOD ₅ load	kg/t	1.0-3.0	2.5-7.5	1.0-4.5

Source: Schmitdt/Kühne (1981)



ACKNOWLEDGEMENTS

- ▶ Prof. Dr. Dietmar Breithaupt
Rich. Hengstenberg GmbH & Co. KG
- ▶ Prof. Dr.-Ing. Dr. Iryna Smetanska
Technical University, Berlin
University of Weihenstephan-Triesdorf
- ▶ Joachim Küppers
Leuchtenberg Sauerkrautfabrik GmbH
- ▶ GfK, Germany
- ▶ Simon Landes
Landes Feinsaure Delikatessen oHG

A decorative vertical strip on the left side of the slide, featuring a stack of fresh vegetables: red cherry tomatoes at the top, followed by green asparagus, yellow potatoes, and green zucchini at the bottom.

► Thank you!

► Contact me:
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