

CULTURES TASTE TECHNOLOGY®
MADE IN GERMANY

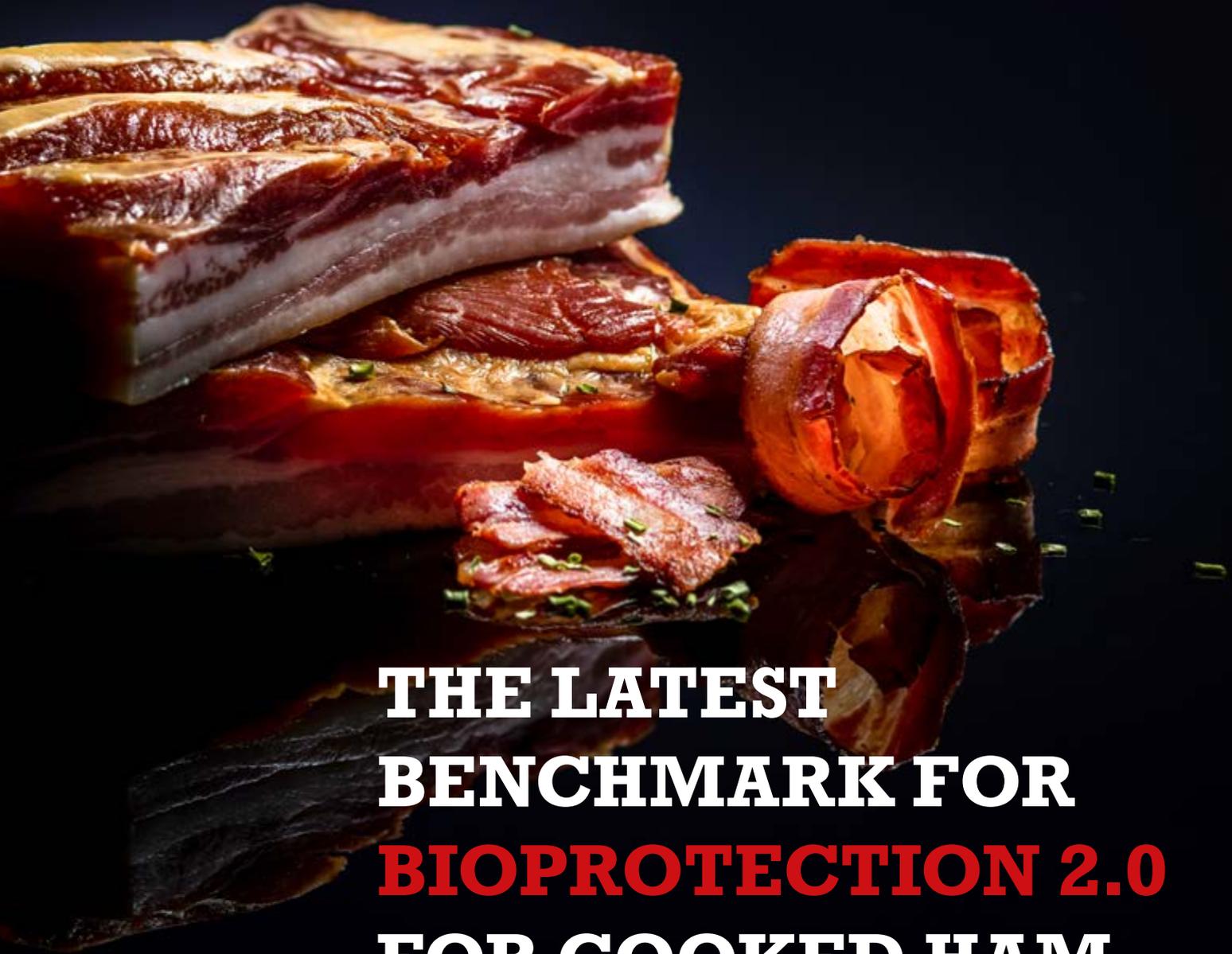


CULTURES FOR /Meat

**SOMETHING
NEW IS
HERE!**

We refine food.

CULTURES TASTE TECHNOLOGY®
MADE IN GERMANY



**THE LATEST
BENCHMARK FOR
BIOPROTECTION 2.0
FOR COOKED HAM
& BACON**

LEUCONOSTOC CARNOSUM

**M-CULTURE® SAFE
GDS® 3349®**

CONTENTS

1. How was it discovered4
2. What can this new think do
and what makes it so unique?.....8
3. How is it used?10
4. What proof is there? 11



1. RESEARCH & DEVELOPMENT

THE FACTS

COMPETITIVE EXCLUSION



There is a principle known as Competitive Exclusion:

Two species competing for the same resources cannot coexist with a constant population size! If one species has even the slightest advantage over the other, the one with the advantage will dominate in the long run.

We have taken advantage of the principle of competitive exclusion to establish a defined, controlled microflora on products:

- Protection from pathogens
- Exclusion of spoilage agents
- Stable product
- Extended shelf life



THE PRODUCT

COOKED HAM



Cooked ham is considered a habitat for bacteria. Both good bacteria and pathogenic bacteria that cause spoiling live there, competing for the available nutrients they need in order to grow.

THE VISION

HERO WANTED



The idea: We are looking for that one good germ that has the advantage over all the other bacteria and can successfully prevail over the others.

Good bacteria are defined as any that...

- have no effect on the sensory properties of the product, i.e. smell, taste and colour.
- are not harmful to humans (they meet QPS criteria).
- can grow at low temperatures, such as in the refrigerator.

BUT WHERE?



Nature is always so creative. For this reason, we were most likely to find a germ like this in its natural habitat. In this case, in cooked ham, where it is found as a part of the natural microflora.

THE MISSION

THE HUNT BEGINS

THE PLAN



Since that one perfect germ is part of the natural microflora of cooked ham, we searched for products that smelled and tasted good after the 'best before' date had elapsed, in which no slime or gas had developed inside the packaging, but which still contained a very high number of micro-organisms. **We took a closer look at the products that met all these criteria**, examining the micro-organisms of these products. Many of them were discarded immediately because we knew they were not one of the good germs.



NARROWING THE RANKS

A total of 50 lactic acid bacteria strains were left over.

More information had to be gathered about these still completely unknown germs. In addition to testing for safety (do they meet the EFSA's QPS criteria and are they safe for humans at high concentrations?), the effects of the individual strains on the sensory characteristics of the products were studied.

Just 5 germs remained standing.

900

tests in

5

European countries

73%

of the tests

showed organoleptic differences or had a germ density that was too low.

27%

of the tests

met the criteria and had no conspicuous organoleptic issues.

550

germs

that dominated among the bacterial flora after the 'best before' date had passed were isolated.

THE FINALISTS



The selected 5 were thoroughly examined again: a metagenomic analysis followed. The 5 finalists were added to cooked ham- their natural habitat- in quantities that were high enough (CFU 1×10^5 /g) to give them an advantage in access to the available nutrient resources. The finalists had a period of 14 days of competition at a pleasant 4–7 °C to demonstrate their dominant performance.

They did this by reproducing and, as a result, driving out other bacteria (i.e., through competitive exclusion).

The race started out neck and neck, but one finalist managed to gain a growing lead over its competitors, clearly winning the battle for the cooked ham with decisive dominance of ca. 98–99 % (ca. 5×10^9 /g).

50

strains

were then chosen and comprehensively tested for suitability as a protective culture

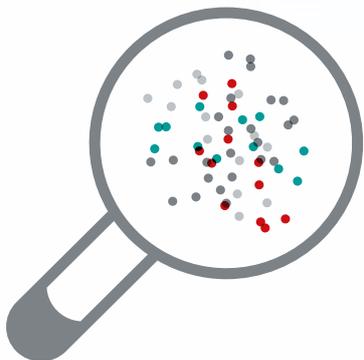
5

strains

were thoroughly examined again with metagenomic analysis.

**AND THE WINNER IS
LEUCONOSTOC CARNOSUM**

**M-CULTURE[®]
SAFE GDS[®] 3349[®]**





2. WHAT CAN IT DO AND WHY IS IT SO UNIQUE?

LEUCONOSTOC CARNOSUM

M-CULTURE[®] SAFE GDS[®] 3349[®]



...is a global innovation

The protective cultures found on the market are mainly used in fermented food products.



...is proven not to form bacteriocins



...represents "BioProtection 2.0"

The "BioProtection 2.0" concept aims to make it possible to protect non-fermented foods from undesirable micro-organisms too.



...dominates

the microflora in the product through competitive inhibition



...is classified as a food ingredient

rather than an additive: It can be labelled as a "lactic acid bacterium", "Leuconostoc carnosum" or a "protective culture".



...is substrate-specific



...is perfect for cooked ham and bacon



...ensures stable pH levels



...enhances sensory properties



...does not change product colour



...is organic



...protects against listeria

Prompts a "log reduction" in listeria in cooked ham & bacon



...is suitable for Clean Labelling



...has a persuasively attractive price

LEUCONOSTOC CARNOSUM

M-CULTURE® SAFE GDS® 3349®

...is gram-positive

...is a lactic acid bacterium

(heterofermentative lactic acid fermentation)

...produces diplococci

or short chains

3. HOW IS IT USED?

PRODUCTION & USE

THE GDS® 3349® SPRAY SOLUTION



1 packet of **M-CULTURE® Safe GDS® 3349® 50** is dissolved in **50 litres of water**.

The water temperature should be from **10-25 °C**.
Stir well.

A quantity of **0.5 ml of spray solution per 100 g package** is recommended for surface spraying.

A fine spray pattern is created with **up to 3 bar pressure**.



...likes temperatures
between 2 and 30 °C

...has been isolated for the first time
from meat products in cold storage

...is aerotolerant
it grows under anaerobic conditions

4. WHAT PROOF IS THERE?



ISI test report - cooked ham

Challenge study involving listeria monocytogenes in cooked ham cold cuts packed in a modified atmosphere

Dr. Dieter Elsser-Gravesen, ISI FOOD PROTECTION ApS, Aarhus, Denmark

ISI test report - bacon

Challenge study involving listeria monocytogenes in bacon, smoked cuts packed in a modified atmosphere

Dr. Dieter Elsser-Gravesen, ISI FOOD PROTECTION ApS, Aarhus, Denmark

Assessment of M-CULTURE® Safe GDS® 3349®

Summary of findings from the research series: Application of M-CULTURE® Safe GDS® 3349® on cooked ham and bacon

Institut Bilacon, Rheda Wiedenbrück, Germany

Memo on description/declaration

Executive summary of the main audit results of our evaluation of the food law governing the application of *Leuconostoc carnosum* GDS®3349® on foodstuffs.

cibus Rechtsanwälte, Gummersbach, Germany

Would you like to read them yourself?

We would be happy
to send you all or
some of the references.

CULTURES TASTE TECHNOLOGY®
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M-ProTec®
Protect your food



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