

# From fish by-products to commercial products FHF conference 2019

Zymetech ehf.

Ásgeir Ásgeirsson, General Manager

# we will talk about

- the company Zymetech ehf. in Iceland
- our enzymes
- our products
- the value
- challenges and critical milestones



Zymetech ehf ...

... is an Icelandic biotech company building its foundation on the unique properties of enzymes from North Atlantic cod, and the use of the enzymes in cosmetics and medical devices.

# Zymetech today

- established in 1999 employing 8 people in Iceland
- focus on marine enzyme R&D, clinical research and regulatory work
- production of enzyme intermediate called Penzyme<sup>®</sup>
  - production, sales and distribution of own products **PENZIM**<sup>®</sup> and **PreCold**<sup>®</sup> in Iceland
  - OEM cosmetic formulations for selected partners
- fully owned by Enzymatica AB in Sweden since 2016



enzymatica



**ZYMETECH**



# Our Enzymes

Extracted from deep sea Atlantic cod, captured off the coast of Iceland.

# enzymes

## What are enzymes?

Enzymes are proteins that exist in life forms and are essential in breaking down food.

The class of enzymes that break down proteins is called proteases. Trypsins are a form of proteases that need water to cleave proteins. Zymetech extracts and purifies trypsins from deep sea cod and utilizes in its products. Zymetech holds a patent covering broad use of cod trypsins in cosmetics, medical devices and pharmaceuticals.

## Why cod?

Trypsins from cod have unique properties that are derived from the wide spectrum of food the cod consumes in its habitat and the low temperature it digests its food. When cod trypsins are released at human body temperature they become very active for a short time and much more active than comparable enzymes in mammals. Only small amounts of cod trypsins bring out the desired efficacy at body temperature.

## The Penzyme® technology

Cod trypsins are by nature unstable and attack and destroy themselves if their activity is unbound. A lot of research lies behind the technology to limit the activity of the cod trypsins in products that are stored at room temperature and then release them when the product is applied on human skin at body temperature. Zymetech developed a technology called Penzyme® that gives the enzymes this ability.

# Penzyme<sup>®</sup>

protective enzymes

a world without the common cold



# Our Products



# PENZIM® skin-care



- Does not contain any preservatives or perfumes
  - Deeply moisturizing for daily skin care
- Suitable on sensitive skin and after shaving
- Effective against skin irritation and dryness
  - Calming for insect bites and sunburn



a world without the common cold

# cosmetic formulations



a world without the common cold

# ColdZyme® against the common cold

- mechanical barrier on the mucosa
- reduces viral load by 99%
- alleviates sore throat
- can reduce number of sick days by 1/2



ColdZyme is a Class-I MD

a world without the common cold

# ColdZyme® family across Europe



Iceland



UK and Scandinavia



Spain



Germany

a world without the common cold



# Research & Development

# research and development

## Dermatology



Derma-cosmetics and medical devices for dermatological conditions

## Wound healing



Medical devices for treatment of wounds at various stages

## Infectious diseases



Bacterial and viral URT infections related to the common cold

# Virology: Research & Reviews

## A medical device forming a protective barrier that deactivates four major common cold viruses

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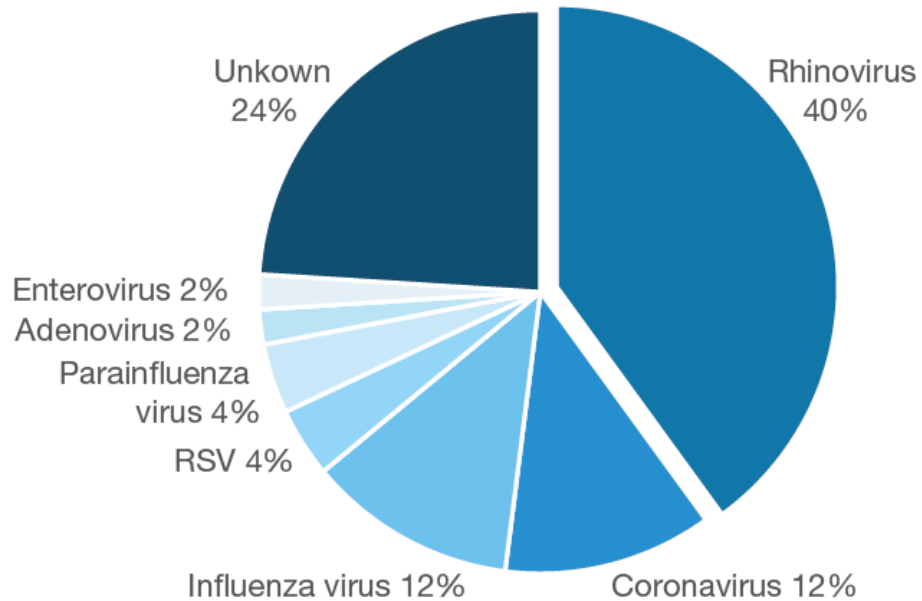
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### Abstract

The medical device ColdZyme is a mouth spray that forms a barrier in the throat against common cold viruses. The barrier solution of the device is composed of glycerol and Atlantic cod trypsin. The aim of this study was to evaluate the virus deactivating ability of ColdZyme against four major common cold viruses. A virucidal efficacy suspension test was conducted using ColdZyme against each of the challenge viruses in suspension. ColdZyme deactivated rhinovirus type 1A by 91.7% (1.08 log<sub>10</sub>), rhinovirus type 42 by 92.8% (1.14 log<sub>10</sub>), human influenza A virus H3N2 by 96.9% (1.51 log<sub>10</sub>), respiratory syncytial virus (RSV) by 99.9% (2.94 log<sub>10</sub>) and adenovirus type 2 by 64.5% (0.45 log<sub>10</sub>). Based on the results, ColdZyme showed an effective broad-spectrum impact against common cold viruses. Thus, ColdZyme might represent a device with clinical benefits in prevention and treatment of respiratory viral infections by deactivating viruses within the respiratory tract.

# ColdZyme deactivates cold viruses (in vitro)

## The viral cause of the common cold



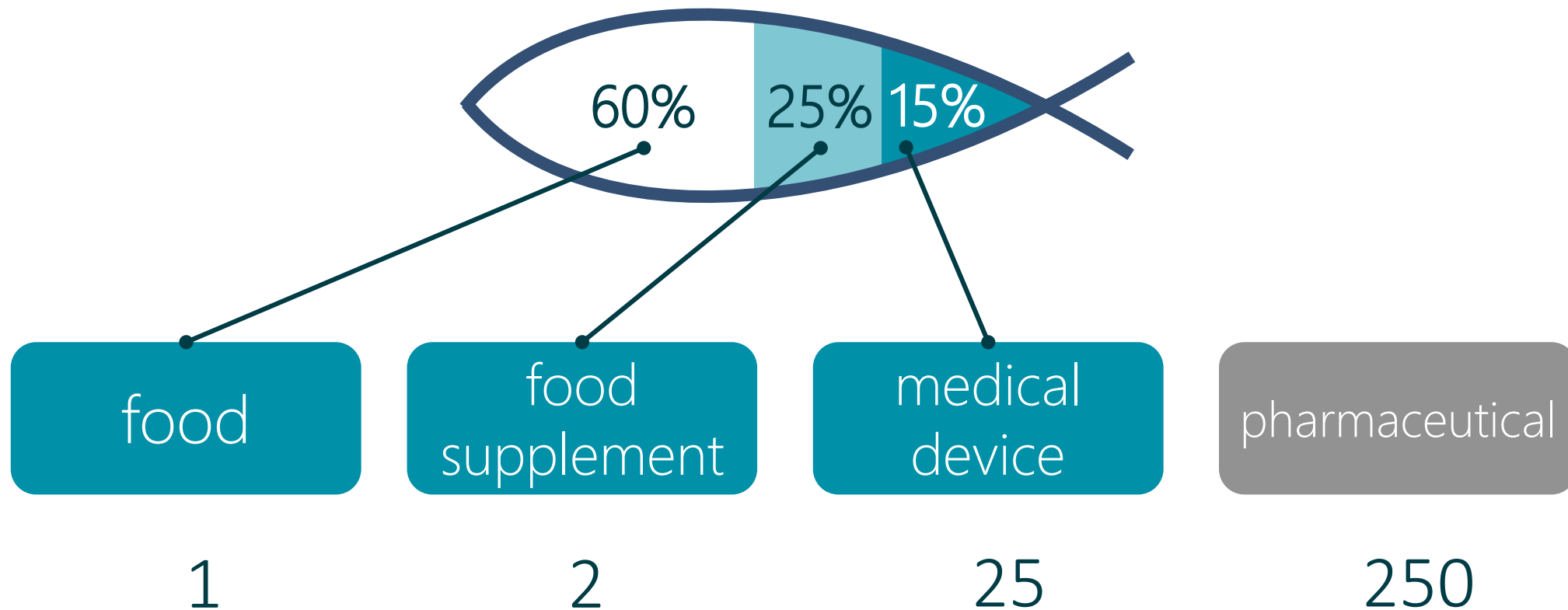
VIRUS	LOG10 REDUCTION (MEAN)	PERCENT DEACTIVATION
Rhinovirus type IA	1.08 log <sub>10</sub>	91.7%
Rhinovirus type 42	1.14 log <sub>10</sub>	92.8%
Human influenza A virus	1.51 log <sub>10</sub>	96.9%
RSV	2.94 log <sub>10</sub>	99.9%
Adenovirus type 2	0.45 log <sub>10</sub>	64.5%
Human coronavirus	2.88 log <sub>10</sub>	99.9%



The image is a composite of two photographs. The top photograph shows a row of test tubes in a rack, with a white hexagonal grid pattern overlaid on the left side. The bottom photograph shows two Erlenmeyer flasks on a white surface, with a white hexagonal grid pattern overlaid on the left side. The flask on the right is labeled 'FORTUNA' and 'DIN 10'.

Creating value from underutilized raw materials

# creating value





from *catch* to *by-product* to *cosmetic* to  
*medical device* to ...

challenges and milestones

# where do you want to swim?



- red ocean vs blue ocean
- being unique

a world without the common cold

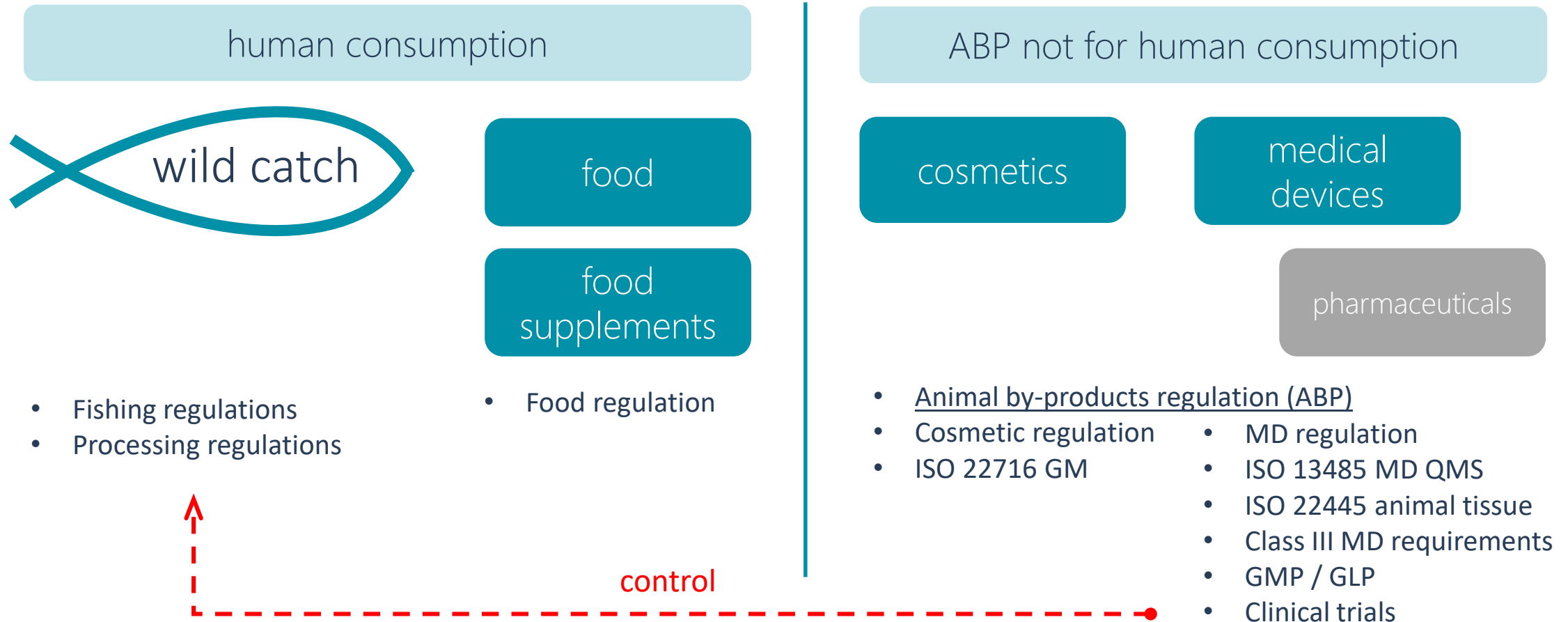
# medical devices are an opportunity

- a medical device is any instrument or material used alone or in combination for diagnostic and/or therapeutic purposes
- intended for: diagnosis, prevention, monitoring, treatment, or alleviation of disease
- medical devices are grouped into 4 classes: Class I, Class IIa and IIb and Class III.
- medical devices are not pharmaceuticals
- need to fulfil strict regulatory requirements
- clinical proof of claims required

## medical device examples



# the regulatory challenge



# the future of viscera

- underutilized today
- increased focus on full processing at sea
- large fishing companies are exploring full utilization
- less is coming through fish-markets
- needs handling as “for human consumption”
- may need more controlled special handling in future

# Enzymatica and Zymetech, perfect fit



- R&D focused
- dependent on R&D grants
- strong patents
- access to raw-material



- business/market focused
- access to investors / Nasdaq - FN
  - dependent on Zymetech
- need access to enzyme supplier



# group certifications, compliance and awards



ICELANDIC  
INNOVATION AWARD

# takk fyrir · thank you · tack



## ABOUT ZYMETECH

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Zymetech ehf. is an Icelandic biotechnology company and a global leader in the research, purification and therapeutic application of enzymes extracted from deep sea Atlantic cod. Zymetech is fully owned by Enzymatica AB in Sweden.

## CONTACT INFORMATION

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