

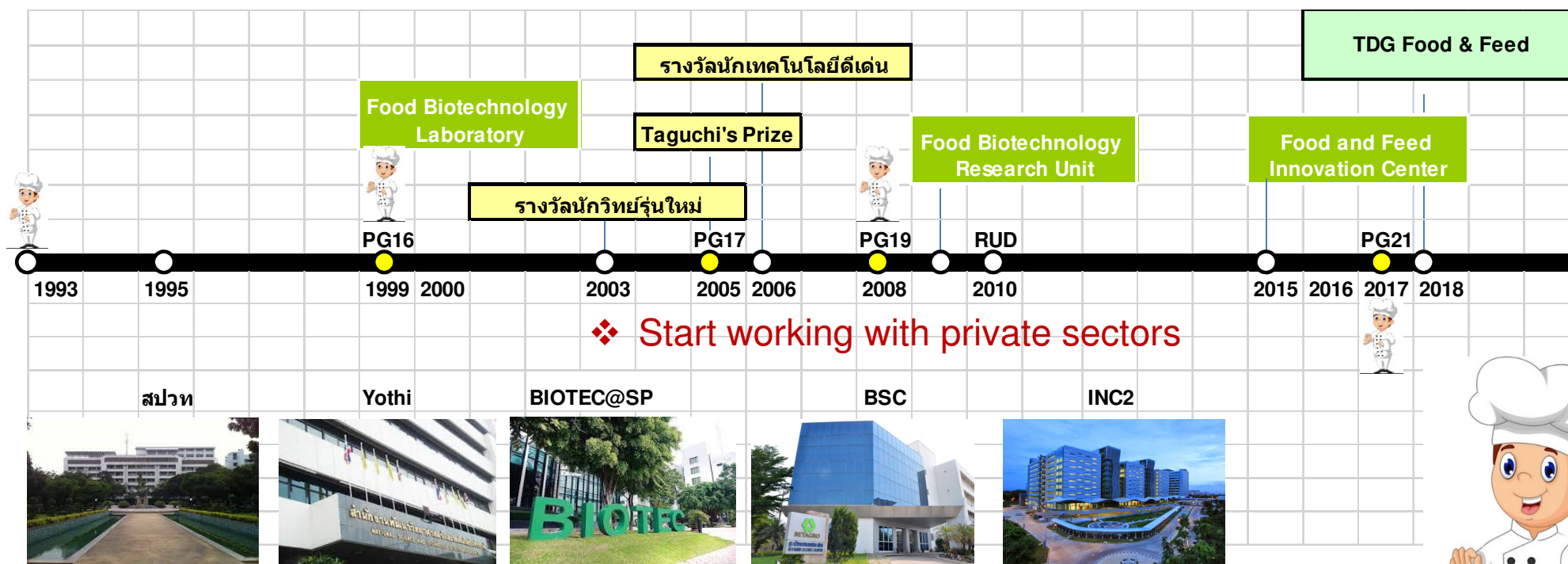
การทำงานวิจัยร่วมกับภาคเอกชนอย่างมืออาชีพ

วรรณพ วิเศษสงวน

*Food Biotechnology Research Team,
Functional Ingredients and Food Innovation Research Group,
National Center for genetic Engineering and Biotechnology
(BIOTEC), National Science and Technology Development Agency
(NSTDA)*

March 3, 2020

25 Years 8 Months 15 Days @ NSTDA



Facts & Figures

Publications: 246

Petty patent: 12

Projects with private sectors: 30

Licensing: 8

H index: 50

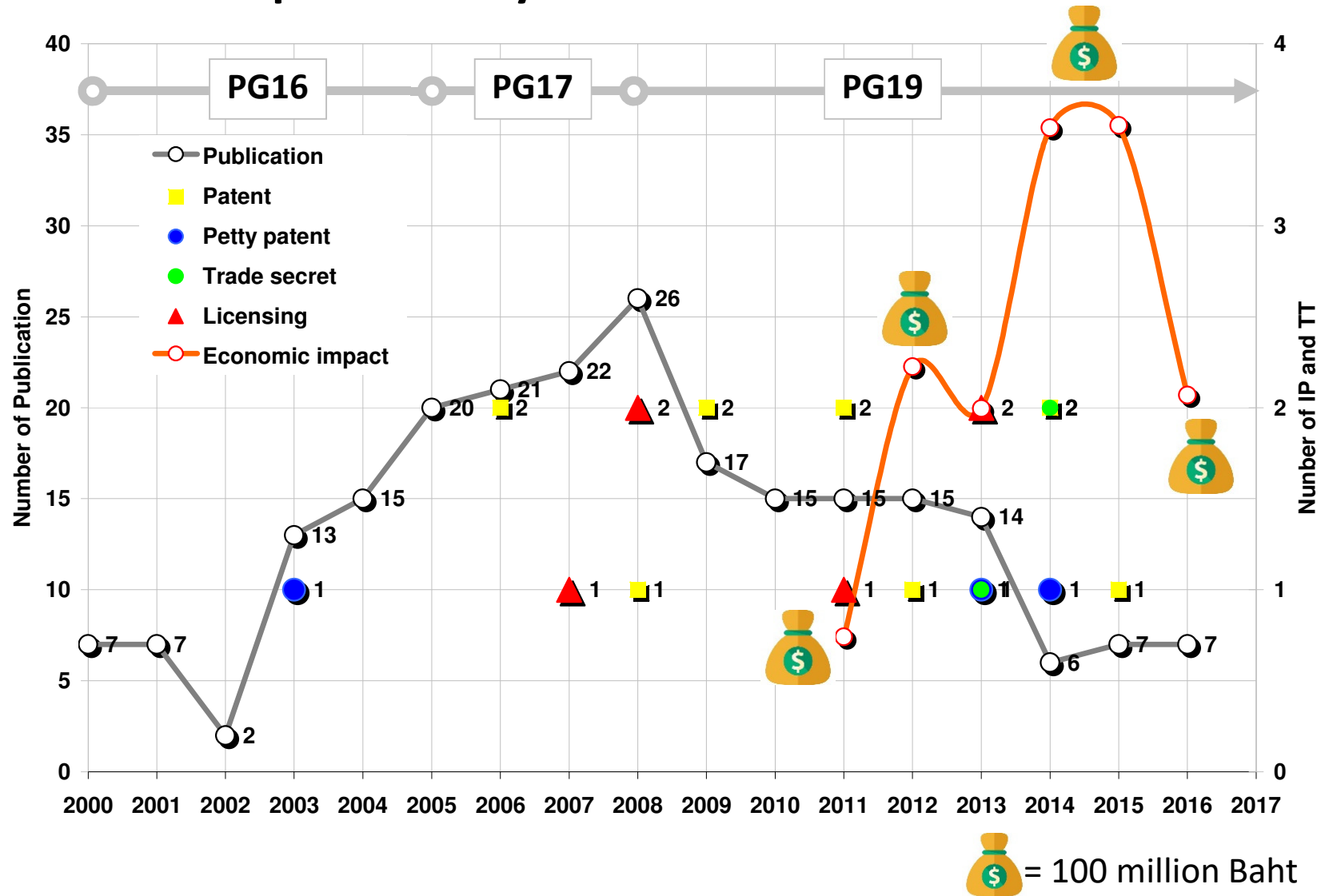
Patents: 14

Trade secret: 10

Economic impacts: 1500 million B



Research productivity 2000-2017



ชื่อผลงาน/เทคโนโลยีที่สร้างผลกระทบ		2562	รวม 2557 -2562
		ล้านบาท	ล้านบาท
อาหาร	การพัฒนากระบวนการเร่งหมักน้ำปลาโดยใช้เอนไซม์		14.88
	สูตรเชื้อจุลินทรีย์ในการผลิตต้นเชื้อเหวมและการใช้ต้นเชื้อจุลินทรีย์ในการหมักเหวม		76.47
	การหมักผักกาดเขียวปลีด้วยต้นเชื้อ <i>L. plantarum</i>		0.72
	การศึกษาสมบัติทางกายภาพและสมบัติทางเคมีของไข่	23.60	66.50
	การผลิตน้ำส้มสายชูหมักจากมันาคุด		0.68
	การพัฒนากระบวนการผลิตชีวมวลของเชื้อจุลินทรีย์โพรไบโอติก <i>Lactobacillus paracasei</i> SD1 ให้ได้ปริมาณสูง	0.09	0.09
อาหารสัตว์	เทคโนโลยีกระบวนการผลิตเอนไซม์เพนโตซานเนสจากเชื้อราสายพันธุ์ <i>Aspergillus</i> sp.BCC7178 เพื่อใช้ในอุตสาหกรรมอาหารสัตว์	25.43	284.77
	การอนุญาตให้สิทธิการใช้เชื้อแบคทีเรีย และการถ่ายทอดเทคโนโลยีการผลิตต้นเชื้ออาหารหมักสัตว์	138.76	843.79
	สารทดแทนไขมันต่อการย่อยของอาหารสัตว์และการดูดซึมกลูโคส	4.23	4.23
	รวม	168.51	1292.13



Recipe of success

- Technological capability and readiness
- Mindset & Responsibility
- Strategic thinking
- Trust
- Networking
- Timing
(*Speed ** quality and *** Ability to Deliver)
- Effective communication
- Teamwork



Excellence & Relevance & Visibility & Impact



2004

ELSEVIER
Meat Science 66 (2004) 579–588
www.elsevier.com/locate/meatsci

MEAT SCIENCE

Changes in composition and functional properties of proteins and their contributions to Nham characteristics

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Abstract

Changes in composition and functional properties of proteins during fermentation of Nham, a Thai-fermented sausage, were studied. An alkaline-soluble fraction constituted a major protein component of Nham. The amount of each protein fraction in Nham varied, depending on the fermentation time. As fermentation proceeded, the progressive decrease in sarcoplasmic and myofibrillar protein fractions was accompanied by an increase in the alkaline-soluble fraction and non-protein constituents ($P < 0.05$). Slow pH lowering to pH 4.6 during fermentation as a result of bacterial growth and accumulation of lactic acid affected the molecular conformation of the muscle proteins and resulted in changes in protein functional properties. The acid produced resulted in changes in solubility, water-binding capacity, textural properties, and color characteristics. Proteolysis of Nham proteins occurred during fermentation, resulting in increases in TCA-soluble peptides and free α -amino acids, which may contribute to the taste and aroma of Nham.

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Keywords: Fermented pork sausage; Acid-induced gelation; Functional property

1. Introduction

Fermentation is one of the oldest techniques in food preservation as it not only extends the shelf-life but also enhances the flavor and nutritional quality of the product. Nham is a Thai-style fermented pork sausage, which has gained popularity with an estimated production value of 20 million USD annually. Nham is normally made of minced pork, shredded cooked pork rind, 2–3% NaCl, cooked rice, garlic and 100–125 ppm of sodium nitrite, mixed well and wrapped tightly in banana leaves or plastic bags. Fermentation of Nham generally takes 3–5 days at room temperature ($\sim 30^\circ\text{C}$) without further ripening. Nham usually has a pH of 4.4–4.8 with titratable acidity values of 0.77–1.60% (Phitakholp, Varayanoand, Reunmaneeponit, & Wood, 1995).

Fermentation of Nham remains indigenous relying on adventitious microorganisms to initiate the fermentation. The initial flora of Nham derives mainly from the raw materials (Khieokhaee et al., 1997). Valyasvi, Jungsiwat, Smitonot, Praphailong, and Chowalittimittum (2001) suggested that fermentation of Nham involved successive growth of different microorganisms dominated by lactic acid bacteria (LAB). During the fermentation of Nham, lactobacilli (*L. plantarum*, *L. pentosus* and *L. sakei*) and pedococci (*P. acidilactici* and *P. pentosaceus*) have been shown to be the dominant microorganisms (Tanasupawat & Daengsubha, 1983; Tanasupawat et al., 1992; Valyasvi et al., 2001). LAB produce organic acids from carbohydrates and cause the pH drop which contribute to Nham formation and the inhibition of undesirable microorganisms. *Mercococcus* and *Staphylococcus* are capable of reducing nitrate to nitrite, which is important in producing the characteristic pigmentation. Also, as a source of lipolytic and proteolytic enzymes, they may contribute to flavor production.

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2008

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140 (2008) 125–138
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ANIMAL FEED SCIENCE AND TECHNOLOGY

Influence of crude xylanase from *Aspergillus niger* FAS128 on the *in vitro* digestibility and production performance of piglets

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Abstract

The influence of crude xylanase produced from *Aspergillus niger* FAS128 or FAS128 on the *in vitro* digestibility of pig diets and production performance of piglets was investigated in comparison with two commercial crude enzyme products, IE1 and IE2. The addition of FAS128 in all pig diets resulted in higher *in vitro* digestibility of dry matter (DM), crude fibre (CF), ether extract (EE), and ash than those supplemented with IE1 and IE2 ($P < 0.05$). In 6-week feeding trials, weaned piglets fed with diets supplemented with FAS128 had a significantly higher average daily gain (ADG) and lower feed conversion ratio (FCR) than those given diets with IE1 and IE2 ($P < 0.05$). The incidence of diarrhoea and concentration of blood urea nitrogen (BUN) of piglets at all growth period was also lowered. Based on the improved *in vitro* digestibility and production performance, crude xylanase produced from *A. niger* FAS128 has the potential to use as feed enzyme supplement.

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Keywords: Xylanase; *Aspergillus niger*; Digestibility; Production performance; Pig

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doi:10.1016/j.anifeeds.2007.02.001

2010

Enzyme and Microbial Technology 46 (2010) 92–99

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journal homepage: www.elsevier.com/locate/ent

Degradation of histamine by extremely halophilic archaea isolated from high salt-fermented fishery products

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Halophilic archaea
Histamine Dehydrogenase
Fermented foods

ABSTRACT

The presence of high level of histamine is detrimental to the quality and safety of fish sauce. Therefore, this study aimed to examine the ability of extremely halophilic archaea to reduce histamine under high salt condition and to study the enzyme activity potentially involved. Of 156 extremely halophilic archaea isolated from various salt-fermented fishery products, HD53-1 from an anchovy fish sauce sample fermented for 3 months, exhibited the highest histamine degradation activity when cultured in halophilic medium containing 5 mM histamine (free-base), followed by HD53-1, HDPC1-2, and HD540-3, respectively. HD53-1 was classified as *Natrialba* gari based on 16S rDNA gene sequence similarities and did not exhibit decarboxylase activity toward all tested amino acids. Based on *in vitro* cytotoxicity assay, the treatment with whole cell extract of HD53-1 to all cell lines tested resulted in dose-dependent inhibitions of the cell growth with the IC_{50} values higher than $250 \mu\text{g ml}^{-1}$. Histamine-degrading activity of HD53-1 was located on the intracellular fraction and required 1-methoxy-5-methylphenazinium methylsulfate (PMS) as an electron carrier. The optimal pH, salt concentrations, and temperature for histamine degradation were pH 6.5–8, 3.5–5 M NaCl, and 40–55 °C, respectively. The activity was fully retained at pH 6.5–9, in the presence of NaCl above 2.5 M, and at temperature lower than 50 °C. The results suggested that histamine-degrading activity of HD53-1 was most likely associated with salt-tolerant and thermo-neutrophilic histamine dehydrogenase.

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1. Introduction

The presence of high levels of histamine is detrimental to the quality and safety of foods, particularly fish sauce and other fermented fishery products from scombroid species. Histamine in foods is mainly induced by histamine decarboxylase activity from several kinds of bacteria. The presence of histamine in fermented foods does not usually represent any health hazard to individuals unless large amounts are ingested. Typical symptoms may be observed in certain individuals, and include nausea, sweating, headache, and hyper- or hypotension [1]. The Food and Drug Administration (FDA) established an advisory level of 500 ppm to be toxic to human health [2]. Histamine is heat stable and is not detectable through organoleptic analysis by even trained panelists. Except for the gamma irradiation, no other food processing methods are available for histamine degradation [3]. Therefore histamine, if present, is difficult to destroy and poses a risk of food intoxication.

The presence of histamine-degrading enzymes either histamine oxidases or histamine dehydrogenases has been reported in various higher organisms [4–6] as well as in microorganisms [7–10]. Therefore, the application of starter strains possessing histamine-degrading activity might be a way for decreasing the amount of histamine produced *in situ* [5,7]. Nevertheless, the applications of these microorganisms and enzymes have been restricted by unfavorable physiological conditions for growth and enzyme activity such as low oxygen concentration, low pH value, undesirable temperature, and especially in the high salinity. The extremely halophilic archaea, in particular, are well adapted to saturated NaCl concentrations (grow optimally above 3.4–5.1 mol⁻¹ or 20–30% NaCl). They have a number of novel molecular characteristics, especially for their enzymes that function in high salt concentration (3–4 M NaCl), such as lipase [11], protease [12], and glucose dehydrogenase [13]. Therefore, in this present study, extremely

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2015



Two putatively novel bacteriocins active against Gram-negative food borne pathogens produced by *Weissella hellenica* BCC 7293

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 Bacteriocins
 Weissella hellenica
 Gram-negative bacteria

ABSTRACT

Weissella hellenica BCC 7293, isolated from Thai fermented pork sausage called Nham, produced two putatively novel bacteriocins, 7293A and 7293B. Both bacteriocins had broad antimicrobial spectra and exceptionally inhibited several important Gram-negative food-borne pathogens (*Pseudomonas aeruginosa*, *Aeromonas hydrophila*, *Salmonella Typhimurium* and *Escherichia coli*). The highest amount of bacteriocin was produced in MRS and APF media at 30 °C without agitation. Bacteriocin 7293A showed relatively higher antimicrobial activity than bacteriocin 7293B. However, pH and thermal stability of bacteriocin 7293A was lower. These bacteriocins were of proteinaceous nature, in which the complete inactivation of their antimicrobial activity after treatment by proteolytic enzymes, including trypsin, α-chymotrypsin, pepsin and pronase K was observed, while lipase and a-amylase exhibited no effect. Antimicrobial activity of both peptides was also not inactivated by organic solvents (ethanol, isopropanol, acetone, acetonitrile) and surfactants (Tween 20, Tween 80 and Triton X 100). Bacteriocin 7293A and B exhibited bactericidal effect against both Gram-positive and Gram-negative indicators without cell-lysis. According to SDS-PAGE analysis, the molecular masses of bacteriocins 7293A and B were determined to be 6249.302 and 6489.716 Da, respectively. Because their molecular masses were not similar to those of other known bacteriocins, both bacteriocins 7293A and B could be novel bacteriocins. Thus, both novel bacteriocins hold promise for applications in the prevention or treatment of pathogenic infections as food and feed additives to replace antibiotics for enhancing the productivity and sustainability of food animals.

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1. Introduction

One of the most important problems always found in food industry is the contamination of pathogenic bacteria (Marie et al., 2012). Among the techniques used to control the microbial contamination in food, the application of natural antimicrobial agents has received wide attention. The demand for natural, chemical preservative-free, minimally processed, and healthy products with microbial safety is increasing (Deegan, Cotter, Hill, & Ross, 2006; Papagiani & Anastasiadou, 2009). Bacteriocins or antimicrobial peptides produced by lactic acid bacteria (LAB) are

members of natural antimicrobial agents which have received great attention (Cleveland, Montville, Nes, & Chikindas, 2001; Cotter, Hill, & Ross, 2005; Zachar & Lovit, 2012). Although many bacteriocins widely used in food products (Zachar & Lovit, 2012), the inability to inhibit Gram-negative pathogens limits their applications (Cleveland et al., 2001; Deegan et al., 2006; Gilbr, Etzion, & Riley, 2008). Some bacteriocins from LAB could exhibit antimicrobial activity against Gram-negative bacteria when unmodified form was used (Benjedjoud, Font, Strocker, & Sadoun, 2012; De Kwaadsteniet, Todon, Knetzer, & Dicks, 2005; Gong, Meng, & Wang, 2010; Jena, Trivedi, Chaudhary, Soboo, & Seshadri, 2012; Liu, Tai, Lin, Torr, & Thai, 2008; Marie et al., 2012; Ravi, Prabhu, & Subramanyam, 2011) or they were used together with chelating agent such as EDTA (Cutter & Siragusa, 1995; Lappe,

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2016



Bacteriocins from lactic acid bacteria and their applications in meat and meat products

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 Bacteriocins
 Natural antimicrobials
 Meat
 Meat products

1. Introduction: the need for natural antimicrobials in meat application

Microbial contamination causes serious safety and quality problems in meat industry. Meat and meat products, particularly fresh meat, contain adequate amount of water and abundance of proteins and essential nutrients with favorable pH for supporting microbial growth. The microorganisms present on meat and its products are in broad spectrum, ranging from bacteria to yeasts, molds and viruses, depending on type of the products. By far, microbial issues in meat industry have arisen mostly due to bacteria (Hui, 2012). As reviewed by Jayaraman and Jo (2015), the main spoilage bacteria in meat include *Pseudomonas*, *Acinetobacter*, *Brodiaeria thermophila*, *Moraxella*, *Enterobacter*, *Lactobacillus*, *Leuconostoc*, and *Proteus*. Upon a substantial growth of these spoilage organisms, protein and lipids of meat and meat products undergo degradation, adversely changing appearance, texture and flavor of the products (Borch, Kant-Muermans, & Blixt, 1996). Normally, spoilage microbes do not harmfully affect health but they can stimulate gastrointestinal disturbances when consumed in high concentrations (Jaysena & Jo, 2013).

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2016

Differences in textural properties of cooked caponized and broiler chicken breast meat

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ABSTRACT This study was aimed at evaluating textural properties of cooked chicken breast meats obtained from 3 production systems (conventional raising, food modification, and caponization) and determining the relationship between instrumental parameters and sensory attributes associated with the texture of capon meat. Texture of cooked breast meats was determined using 3 instrumental methods: Warner-Bratzler Shear (WBS), texture profile analysis (TPA), and uniaxial compression (UC), and sensory analysis by trained panelists. The results indicated that cooked caponized meat showed the lowest values of WBS force, shear energy, hardness, Young's modulus of UC, and the 2 sensory attributes (firmness and number of chews) ($P < 0.05$). In contrast, springiness and juiciness were the highest in the caponized meat ($P < 0.05$), suggesting that capon meat was more tender and juicier than the others. Food-modified chicken samples showed intermediate textural characteristics between the samples of capon and conventionally raised broiler. Pearson's correlation revealed that WBS force, shear energy, Young's modulus of UC, gumminess, and springiness were strongly

correlated with 3 sensory attributes (firmness, number of chews, and juiciness). Partial least squares regression (PLSR) demonstrated that 72% of all sensory attributes for the first 2 PLSR components were explained by 36% of the instrumental parameters and the production systems. Loading and score plot illustrated that conventional raising contributed to a high degree of firmness and number of chews, and positively correlated with shear energy, WBS force, gumminess, hardness, and Young's modulus. Contrarily, caponization was negatively correlated with those sensory attributes. The univariate analysis indicated that firmness and number of chews were positively correlated with all instrumental parameters, except springiness. Juiciness was positively correlated with springiness but negatively correlated with the others. The study suggested that the cooked meat of capons could be differentiated from those of broilers raised conventionally and with food-modified diets based on textural properties. Based on the optimized simulating equation, texture of caponized breast could be explained by WBS force, shear energy, Young's modulus, and gumminess.

Key words: capon meat, instrumental, texture, sensory attributes, partial least squares regression

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INTRODUCTION

Broilers have been a predominant poultry consumed globally as they are an inexpensive, good source of high-quality protein. Nonetheless, a number of consumers also demand different varieties of poultry and their products. In this aspect, the caponized chicken or capon, a male chicken with testes artificially removed, has gained more popularity due to its unique textural

characteristics. Capon meat is not only tender and juicy, but it also provides stickiness and gumminess characteristics to some extent. Initially, caponization applies a surgical operation or implantation of a synthetic hormone (hormoxolon) to manifest sexual maturation of male chickens, resulting in tremendous changes in physical characteristics and fat accumulation in the birds (Tor et al., 2002; Miguel et al., 2008; Sirri et al., 2009). The increased fat, including abdominal, subcutaneous, and intramuscular fat, enhances flavor, juiciness, and tenderness of the meat (Mast et al., 1981; Chen et al., 2003; Sirri et al., 2009). However, testes removal via surgical operation has raised some ethical concern. Furthermore, hormone implantation has

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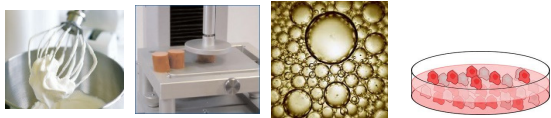
Core capability & Technology platform: Protein & Peptide Technology

Industrial interest

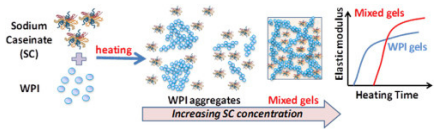
Core capability

Collaboration & network

Protein/Peptide Functionality



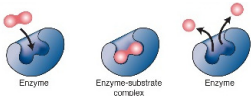
Food Matrix Interaction



Alternative Protein Sources



Enzyme-aided food processing



Physical & Protein Functionality Analysis

- Texture analysis
- Viscosity
- Gelling, foaming & emulsifying properties
- Solubility
- Food structure

Chemical Analysis

- Total protein
- Amino acid profile
- Enzyme activity
- Degree of hydrolysis
- Peptide analysis
- Enzymatic screening

Bioaccessibility & Bioavailability & Biological Activity

- Dynamic *in vitro* gastrointestinal model (TinyTIM®)
- Cell-based Assay

Food Processing & Protein Purification

- Protein purification
- Protein modification
- Thermal process



Core Capability & Technology Platform: Starter Technology

Industrial interest

Fermented Foods and seasoning

- Process control & reliability
- Consistent quality
- Safety
- Value-added products

Fermented Feed

- Shelf-life extension
- high-quality feed



Core capability

Screening technology of potential microbes

Lactic acid bacteria	Acetic acid bacteria	Bacillus
<i>L. plantarum</i>		<i>Bacillus spp.</i>

Culture optimization



Scale up

Collaboration & network

เอแอนด์พี ออร์ชาร์ด (A&P Orchard)



สหกรณ์โคนม



Platform Technology for Probiotics

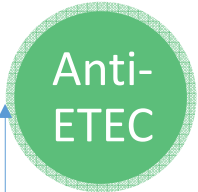
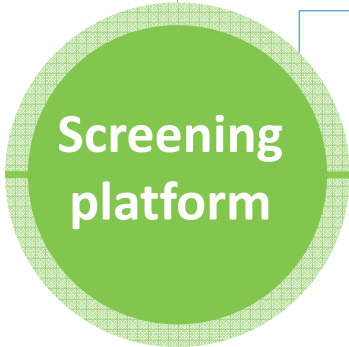


Collaboration network

- Food industry
- Feed industry
- Dairy industry

Industrial interest

- Probiotic specification



In vitro

- 10 strains for porcine ETEC
- 3 strains for human ETEC



Cell line model

- monocyte
- macrophage

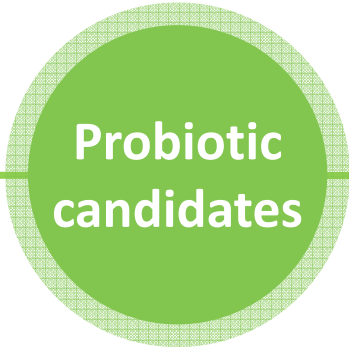
7 strains for porcine ETEC
3 strains for human ETEC



- *Bifidobacterium thermophilum* IFBT1159
- *Lactobacillus reuteri* IFBT1687

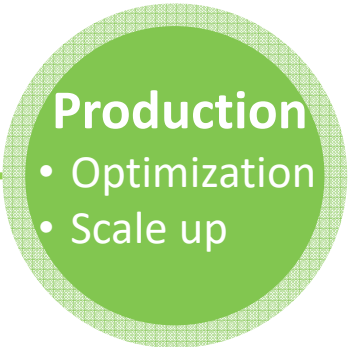
Limitation

- Animal trials

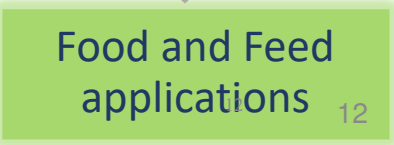
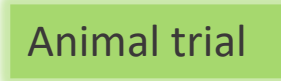


Safety evaluation

- (WGS analysis)
- *Lactobacillus plantarum*
 - *Bacillus velezensis*
 - *Bifidobacterium animalis*



- Optimization
- Scale up



Core capability & Technology platform: Meat Science & Food Innovation

Industrial interest

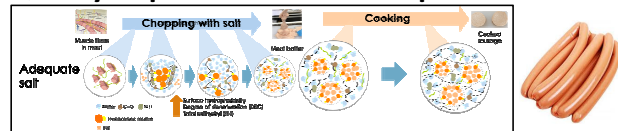
Core capability

Collaboration & Network

Meat Defects: White striping (WS) & wooden breast (WB) myopathies



Quality improvement of meat products



Value-added food products



Plant-based meat/Foods for special needs



Gene Expression Analysis

- Real-time PCR and digital droplet PCR techniques
- Gene expression analysis in muscle tissue

Physicochemical Analysis

- Meat texture and color analysis
- Chemical & biochemical analysis in muscle meat
- Muscle structure and composition
- Muscle & meat quality
- Meat defect characterization

Meat Product Processing and Formulation

- Conversion of muscle to meat
- Meat product processing (ea. tumbling, emulsifying, and retorting)
- Meat-food ingredient interactions (ea. salt and fat reduction)



Mindset and Strategy

- **Researcher ... Solution Provider**
- **Laboratory scale ...^M Commercial scale**
- **Customer ... Team and Strategic Partner**





1 Pentosanase production from a local microorganism

Economic and Social Impact in 2007-2018 = 635 million baht

- Profit to licensee
- Import substitution
- Investment
- Benefit to farm operators (better meat yield and healthier animals)



2 Starter culture and fermentation process for producing animal feed

Economic and Social Impact in 2010 - 2018 = 734 million baht

- Profit to licensee
- Import substitution
- Investment
- Benefit to farm operators (better meat yield and healthier animals)



3 Acceleration of fish sauce fermentation with enzymes

Economic and Social Impact in 2012 and 2014 = 67 million baht

- Profit to licensee
- Reduction from 18 months to 11 months
- The company produced new product in April 2009

Pentosanase production from a local microorganism



The technology, which includes the pentosanase-producing microorganism, *Aspergillus* sp., carefully screened from BIOTEC Culture Collection and the production process to achieve product in a powder form, was licensed to Asia Star Animal Health Co., Ltd. (ASAH) to manufacture and distribute pentosanase as feed additives.

Multi-enzyme preparation for swine and poultry

- Containing multi-enzyme activities such as amylase, cellulases, hemicellulases and acid protease that aids the nutrient utilisation in animal
- Improve energy utilization and protein digestibility in animal
- Increased average daily gain (ADG)
- Efficient nutrient utilization/ less pollution/ reduced production cost

Economic and Social Impact in 2007-2018 = 635 million baht

- Profit to licensee
- Import substitution
- Investment
- Benefit to farm operators (better meat yield and healthier animals)

Starter culture and fermentation process for producing animal feed

DS-1 Feed Additive (*Bacillus* cells and enzymes)

Commencing in 2006, BIOTEC has collaborated with SPM Feed Co. Ltd. on a project to develop the fermentation process for *Bacillus* spp. and subsequently licensed this technology to Micro Innovate to produce Bacillus-fermented product, called DS-1 as a feed additive used in the SPM Group's pig farms. The use of DS-1 has increased the profit of the company, saving them from importing feed additives.



Economic and Social Impact in

2010 - 2018 = 734 million baht

- Profit to licensee
- Import substitution
- Investment
- Benefit to farm operators (better meat yield and healthier animals)

Acceleration of fish sauce fermentation with enzymes

Research

BIOTEC has collaborated with Thai Fish sauce Factory (Squid Brand) Co., Ltd on a project to develop the fermentation process.

Technology transfer

The company produced new product in April 2009

3



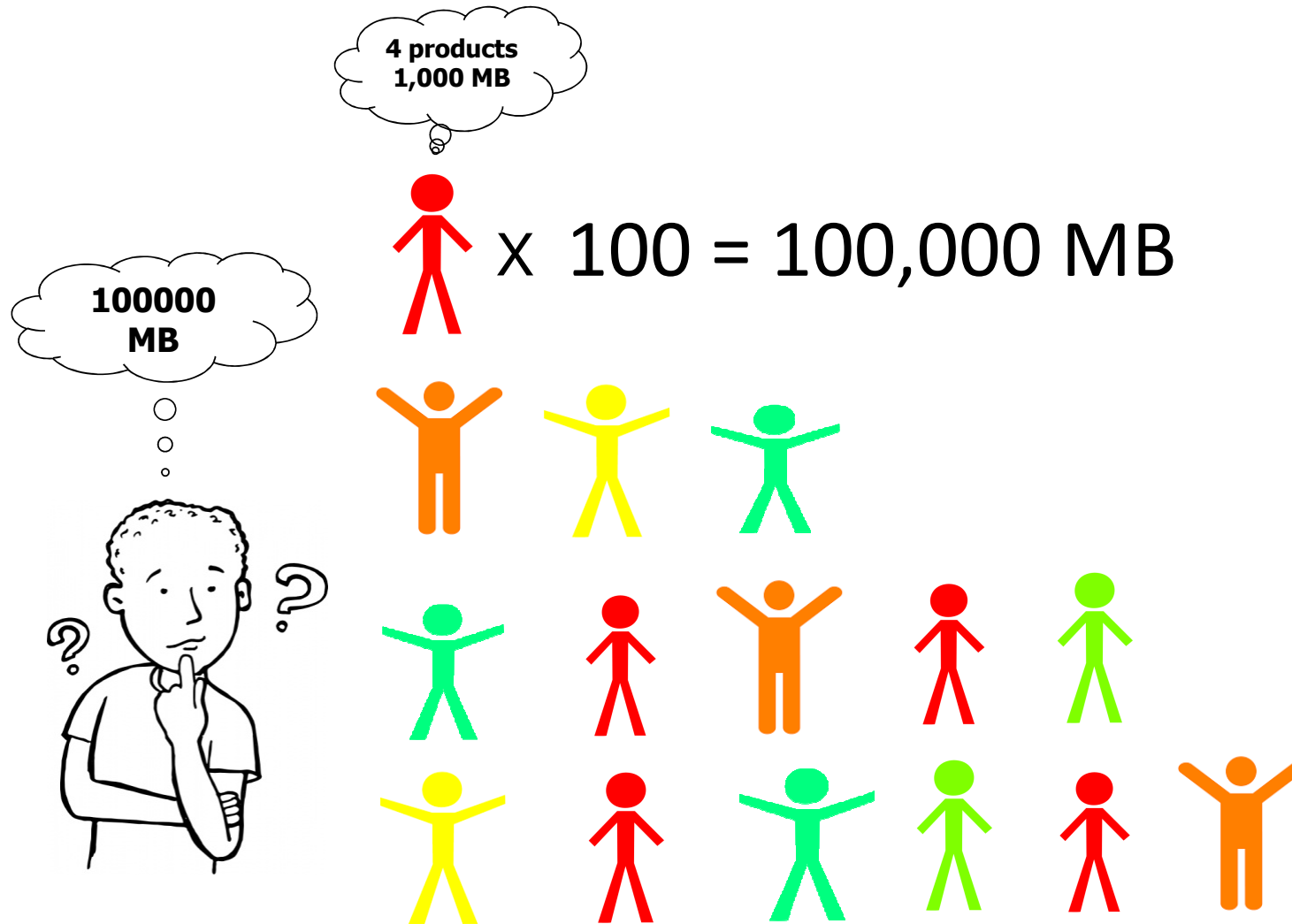
To reduce from 18 months to 11 months.



Economic and Social Impact in 2012 and 2014 = 67 million baht

- Profit to licensee
- Reduction from 18 months to 11 months
- The company produced new product in April 2009





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Team + Students+ Collaborators + Funding Sources



Thank you

A Driving Force for National
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HOW TO BE A BETTER CHEF



**INDISPENSABLE ADVICE &
TIPS FROM 500 UK CHEFS**

THE TOP 8 FACTORS OF BEING A GREAT CHEF
(According to Chefs)

Infographic brought to you by Nisbets Next Day Catering Equipment

Sources:

<http://www.slideshare.net/karenfewell/how-do-chefs-use-social-media-mars-foodservice-social-chef-report>

<https://nationalcareersservice.direct.gov.uk/advice/planning/jobprofiles/Pages/chef.aspx>

<http://www.eatwell101.com/essential-kitchen-knives-you-must-own>

Words From The Wise Survey: September 2014



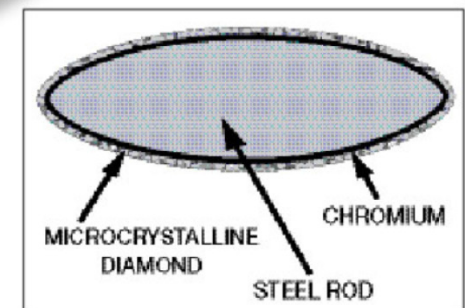
2. Equipment & Knives

A DULL KNIFE IS DISRESPECTFUL TO INGREDIENTS

“ Get a decent set of knives that are comfortable for you and they will last a career. ”
Robert White



HONING & KNIFE SHARPENING YOUR KNIVES



1. Learning

**NO MATTER YOUR LEVEL OF EXPERIENCE,
THERE'S ALWAYS MORE TO LEARN**



“ Remember you never stop learning as a chef, there is always someone with a new technique, a new flavour, a new product, what an exciting industry to come into. ”

SARAH FAWCETT

“ This is when the real training takes place. Watch, learn and be inspired. ”

JOE JOHNSON

»»»»»»»»»» 3. Food & recipes ««««««««««

{ **ALWAYS TRUST YOUR TASTE BUDS** }

“ Taste everything. Repeatedly. Taste ingredients. Taste how they combine. Understand how flavours combine. ”
JENNY LONG

“ Think with your Tastebuds ”
VIV ALLMAN-NEAL



4. Motivation

PASSION REQUIRED!

“ No matter what the day throws at you, remember why you're doing this! You love cooking! ”
RYAN VAN-GELDER

“ Be your best, push yourself to your limits, you can only aim higher! ”
RICHARD TYLER

“ Never give up! ”
JAZMYN STANDEN



5. Dealing with Stress

“ Breathe, relax have fun and enjoy what you do as it shows in the food you present to your guests and they will relax and enjoy their experience as well. ”

GARY HORNER

“ Stay calm. If you get flustered that's when mistakes can happen. ”

LISA AUGER



6. Safety



“ Watch your fingers! ”

MARC CHIVERS

“ Take care of your fingers, you need them. ”

PATRICIA LESLIE

“ Mind your fingers! ”

KRISTY BROWN

“ A sharp knife is a safe knife ”

PHIL DARLING

7. Chef Life

“ Work Hard, Play Hard ”
HAZEL MARKLAND

“ Don't cut corners - your reputation
is your most important asset ”
DEBBIE MULLOY

“ On your way up, be nice to everyone,
earn their respect and give respect.
Remember, you are only as
good as your crew ”
SUSAN GRAY



8. Prep

“ Prepare, prepare, prepare! ”
ROBERT DITTRICH

“ Preparation is key ”
TRACEY BELCHER



**KEEP YOUR HEAD DOWN, YOUR KNIVES SHARP
AND MOST IMPORTANTLY OF ALL! KEEP COOKING!**

Mathew Dines