International Cooperative Education and Career Development (ICECD) Program

Mie University, JAPAN

During June 18th – September 7th, 2012

By

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Acknowledgement

As I have come to participate International internship program at Food analysis laboratory, Graduate school of regional innovation studies, Mie University, Japan as well as earn credits from cooperative educational program from Suranaree University of Technology. During 16th June 2012 until 7th September 2012. This training program was success with the cooperation and help from people and a party from various institutes is following.

Professor Dr. Hiroshi EHARA	Vice President for International Affairs, Mie University
Asst.Prof. Boonchai WICHITSATHAIN	Director, The Center for Cooperative Education and Career Development, Suranaree University of Technology
Assoc.Prof. Takashi MISHIMA	Department of Graduate school regional innovation studies, Mie University
Ms. Mika DEGUCHI	Coordinator, International Relations office, Mie University
Dr. Alongod YAWAI	Coordinator, The center for cooperative and career development, Suranaree University of Technology
Ms. Buaboun PINJAREONPAN	Coordinator, The center for cooperative and career development, Suranaree University of Technology

And others, I would say thank you for all of people, who mentioned above that give me knowledge, coordination, recommendation and help me while I was staying in Japan. I really appreciate that.

(Miss Sasicha Chensom)
International internship student

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Personal information

My name is Saicha Chensom. I'm 5th year student in School of Food technology, Institute of Agricultural technology, Suranaree University of Technology, THAILAND. Japan is the country that was interested in various sides such as culture, language and technology. The reason that I participate ICECD program is, I want to improve my skills in study field and want to learn about laboratory techniques, which I can use in my future job, study or research and learning for Japanese culture.

Introduction of Graduate school of regional innovation studies

The purpose of traditional graduate schools is to provide students with expertise knowledge and skills in carrying out research and development (R&D) in a specific field. Nowadays the business field actually hopes that they possess ability of not only R&D but also executing projects themselves, which we call "project management". The scope of their work is to manage the project from beginning to end. This includes new products and/or business planning, marketing, and entry into a new market. Besides programs for acquiring advanced knowledge and skills in a specific research field, we provide students with programs that are required for project management. If you join us as a student, we will enable you to be active in the domestic and even global business world.

Food analysis Laboratory details

Staff	Assoc. Prof. Takashi MISHIMA	
Students	Master student:	3
	Under graduate student:	2

Working and learning

At first day, I learned Japanese language with MATSUOKA sensei, I learn about the conversation that can use in daily life. She's so kindness and friendly. Second day, I had a Japanese class with FUKUOKA sensei, I learnt about grammar and sentence. For working, I had been learning and practicing laboratory skills with MISHIMA sensei at food analysis laboratory. Mishima sensei would assign the laboratory skills for me and when the each experiment finished, the result was discussed. At laboratory I have a Japanese friends, OMURA san, YURI san, NAGATANI san, SAKAKURA san and ARITA san, All of them would help me when I found a problem in Japanese language, living and laboratory work.

Laboratory skills learning

1) Proximate Analysis (Protein, Lipid, Mineral and Water content)

Proximate analysis is an analysis method for macronutrients in food such as Crude protein, Crude lipid, Moisture contents and Minerals. These food components are important for Nutritional labeling, Quality control, Microbiological stability and Processing.

Results

Nutritional facts	Percentage
Crude Protein	22.25%
Total Fat	12.34%
Minerals content	7.53%
Water content	51.17%
Carbohydrate	6.71%

Table 1: Shown the nutritional values per 100 g of Miso paste

From **Table 1** the mainly composition of Miso paste is a water, which show highest content is 57.17%, and the contents of Crude protein, Total fat, Minerals and Carbohydrate were shown 22.25%, 12.34%, 7.53% and 6.71% respectively.

2) Study of carbohydrate

2.1) Study of hydrolysis ratio of native wheat starch and modified wheat starch by determination of reducing sugar in starch

Hydrolysis is a reaction, which rupture the chemical bonds by water additional. The hydrolysis of starch by using glucoamylase as enzyme. Glucoamylase will break off the α (1-6) glycosidic linkage, as well as α (1-4) glycosidic linkage from non-reducing end, yielding is Glucose which is reducing sugar.

The amount of reducing sugar was determined colorimetrically by oxidation of reducing sugar (Carbohydrate) by using modification of Ferricyanide procedure (Park-Johnson method). Ferricyanide was reduced to Ferrocyanide. And, when Ferrocyanide reacts with ferric ions will show the deep-blue color of ferric ferrocyanide that is measured at 715 nm.

Results

The hydrolysis reaction of wheat starch was studied at 1, 3, 5, 7 and 24 hr. of incubation time. From the **Fig 1.** at all of studied incubation time wheat starch that modified at 200°C for 1 hr. exhibit the highest hydrolysis ratio and the hydrolysis ratio of 200°C, 2 hr modified wheat starch, 200°C, 30 min modified wheat starch and Native wheat starch was decreased respectively

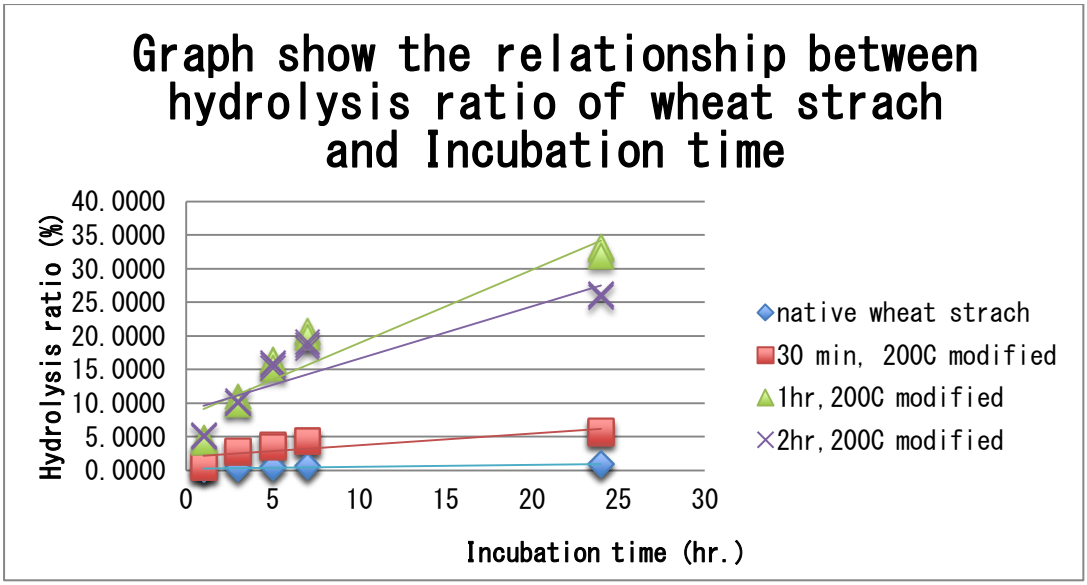

Fig 1. Graph shows the relationship between hydrolysis ratio of wheat strach and Incubation time

2.2) Study of Paste properties of Rapid Visco Analyser (RVA)

Viscosity is the one of physical properties of starch, which is different by the types of starch. The viscosity of starch can determine by following the pasting characteristics of starch by Rapid Viscoanalyser (RVA).

In the presence of water and heat, Starch granule can absorb water. Starch granules heating will swell and viscous due to hydrogen bond broke down. The temperature that starch swell and the viscosity increase rapidly is pasting temperature. The viscosity of starch will increase to the viscosity peak, which is the point that starch mostly swell. In continually heating and shearing, Starch granules will break and viscosity is decreased. In cooling down state of paste. Amylose will re-structure (Retrogradation) and the paste viscous increasing, called Final viscosity.

3) Morphology study by Scanning Electron Microscope

Scanning Electron Microscope (SEM) is an instrument that uses to study external morphology (texture) of specimen by scanning of electron beam.

The specimen was scanned by electron beam, which, produce from electron gun (electron source) that fitted with Tungsten filament cathode. Electron was condensed by one or two condense lenses for spot to beam. Specimen interacted with electron beam and was absorbed by specimen. The energy exchange between electron beam and specimen emission the electromagnetic radiation, which can be, detect by specialized detector and image was created.

4) Study of food content by High performance liquid chromatography

High performance liquid chromatography (HPLC) is an analytical tool, which has ability to separate, identify and quantify the components that dissolve in a liquid sample.

HPLC is a technique that uses high pressure (6000 psi, 400 bar) to generate the flow required for liquid chromatography in pack column.

HPLC system consist of two phase, First called mobile phase is hold in the reservoir, which carried the sample into the HPLC column. Second, Packing materials in the column called stationary phase. Mobile phase was generated a flow by high-pressure pump. Injector is able to inject the sample into continuously mobile phase. And, detector will detect the separated components that dissolve in the sample (Fig.1). The data was recorded by electric signal and generate to chromatogram, which can identify and quantify the components in sample.

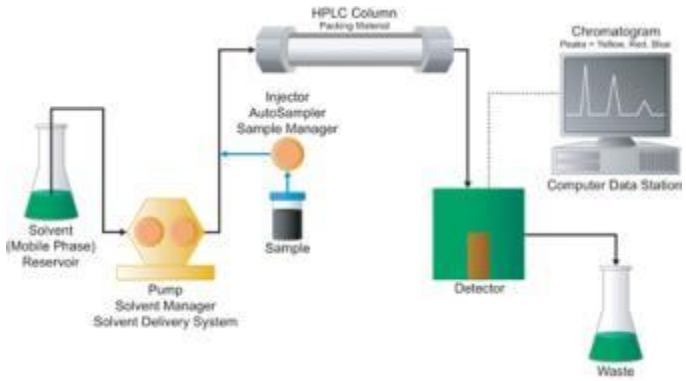

Fig 2: High performance liquid chromatography system
From: http://www.waters.com/webassets/cms/category/media/other_images/primer_e_lcsystem.jpg

Chromatogram shows the peak at retention time, which is, indicate with separated component therefore each separated component will be have different retention time. And, peak areas indicate to concentration of separated component.

Conclusion

Food analysis is the important field for study of food because of food analysis is a main sector that use in food industry and food research and development. Food analysis is the major for food components analysis, which has benefits for research and development, quality control and etc. In the analysis, food characterization (food components and properties of food) was determined by chemical method, physical method, and biological method or applied.

In skills training, Techniques for food determination were studied. In side of nutritional analysis, Protein, lipid, carbohydrate, moisture and mineral, which are main components of food, were studied by chemical method that mentioned above.

Physical method was used in starch morphology study by Scanning electron microscope (SEM) and study of paste properties by Rapid Visco Analyser (RVA).

Macromolecules (amino acid, sugar and organic acid) in food were studied by high performance liquid chromatography, which instrument for identification type of macromolecules in sample.

Living In Japan

First day, I arrived to Japan. Thai friend pick me at the airport and bring me to Mie University foreign 's house that is my accommodation in Japan. I found many international students here such as Indonesian, Vietnamese and Chinese. Everybody, they help me in everything that they can do, give recommendation and discuss how to living in Japan. We are good friends.

Third day that I arrived to Japan I got the bicycle for use as vehicle from Center of International education and research (CIER), bicycle is very important for me. If I don't have bicycle, It will be difficult to go to everywhere that you want to go because of Bus fee is too expensive.

My daily life in Japan, on weekday I would go to laboratory for practice laboratory skills in various field, which was assigned by MISHIMA sensei when I finished for each experiment, report was sent to discuss and when I found the problem, Japanese students and sensei will help me for this. On weekend and holidays Thai friends, and I we would go to city or prefecture, which was locate, beside Mie prefecture for traveling.

AEON department store, COSMOS and MaxValu supermarket is a place for buying raw materials and ingredients for cooking (when we go to shopping at supermarket we must bring the bag for contain everything that we sold by ourselves if you do not bring that by yourself you can buy it at cashier counter, 5 yen for 1 plastic bag). All of International students, we always cook food by ourselves because in restaurants food is too expensive. But sometimes, I will go to dinner at restaurant, popular restaurant is Sushi roll because it's delicious and cheapest.

My days in Japan, was happy and excellence. Living at here I can gain my life experience more than I was. An important thing I have a many friends such as Thai, Japanese, Chinese, Turkmen, Indonesian, Vietnamese, German, Burmese and Malaysian. We have a good relationship and they are good friends. And last, my English skill was improved and I know a little bit of Japanese language.

Traveling

NAGASHIMA SPALAND, Kuwana, Mie Prefecture


Nagashima Spaland is water Park, amusement park, onsen and hotel that famous in Japan located in Mie prefecture. Roller coaster at here has longest way in Japan.

NAGOYA, Achi Prefecture, Japan


Nagoya is a capital of Achi prefecture. It's a third largest economic center of Japan. JR central building is a landmark of Nagoya.

Osu Kannon temple: Osu temple is a popular temple in central Nagoya that has beautiful facilities and has a shire for worship.

ISE, Mie prefecture

ISE Jingu (伊勢神宮**)**: It's a Shinto shire that was famous and most sacred in Japan. It has beautiful native Japanese facilities and natural.

Okage Yokocho Traditional Street: Traditional Street is a street of souvenir shop and famous food in Mie prefecture. At here, this is a first time that I was eating for MATSUSAKA meat it's very delicious. The famous food of ISE is U-don, Seafood and Green tea ice dessert.

ISE, Mie prefecture

MEOTO IWA (夫婦岩): MEOTO IWA was located in Futami, Couple rock is a sign at here. In the past is a place for worship and praying for sunrise from afar.

TOBA: Toba is a place for Pearl shop. Pearl from Ise was famous in Japan.

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