APPENDIX A

The principle of molybdenum blue method

The principle of this method is the phosphate reacts with ammonium molybdate in acid conditions produce a phosphomolybdic acid and was reduced by reducing agent obtain the product of phosphomolybdenum blue. The absorbance from this product was determined spectrophotomertry at 880nm.

$$PO_4^{3-} + 12MoO_4^{2-} + 27H^+ \rightarrow H_3PO_4(MoO_3)_{12} + 12H_2O$$

$$H_3PO_4(MoO_3)_{12} + \text{reducing agent} \rightarrow \text{phosphomolybdenum blue}$$

APPENDIX B

Single standard method

Phosphate standard solution (1000 µg/mL PO_4^{3-}, AAS grade) (Merck, Germany) was used as stock solution to prepare a standard for calibration by appropriate dilution and a standard of 50 µg/mL PO_4^{3-} was normally used for a single standard calibration.

The combined reagent for the molybdenum blue procedure (adapted from that reported in ref 10 and 11) was a mixture (100 mL) of ammonium molybdate (0.03 mol/L), sulfuric acid (2.5 mol/L), ascorbic acid (0.1 mol/L) and potassium antimonyl tartrate ($8.2x10^{-3}$ mol/L).

A single standard solution calibration was done by (50 µg/mL PO_4^{3-}) by taking different volumes of the standard solution (50 µg/mL PO_4^{3-}) into a series of 25 ml volumetric flasks before adding the reagent mixture (0.8 mL) and adjusting to the mark with water.

After standing for 10 min, absorbance at 800 nm of each flask was measured. A plot as a calibration was constructed for the measured absorbance) vs. µgPO_4^{3-}. The amount, µgPO_4^{3-} was calculated from the concentration (50 µg/mL PO_4^{3-}) and the volume (µL) of the standard taken.

Procedure for Real Samples

A sample taken from a market was weighed before putting into water (1L) in a beaker. It was mechanically stirred for 30 min before being filtered through a funnel with filter paper (Whatman No1). An aliquot of filtrate (V µL), which would contain dissolved phosphate, was taken into a 25 mL volumetric flask. And it was treated similarly to the standard, i.e., with adding the combined color reagent (0.8 mL) and with adjusting the volume to the mark with water. After standing for 10 min, it was measured for absorbance. The amount of phosphate in the solution could be known from the

calibration graph, and this would lead to the calculation for phosphate content in the sample.

APPENDIX C

Table C.1the process and time while determination of phosphate on-site

Processes	Steps of take a photo	Times
1. Both a sample at the market	Take a photo of the market, location and sample with tag of date and location name.	2.53 - 2.54 PM (1 min)
2. Weight the sample without packaging	Take a photo	3.04 - 3.05 PM (1 min)
3. Blend the sample	Take a photo before and after blend the sample.	3.05 - 3.07 PM (3 min)
4. 10.XX g of the homogenous sample was weight into the plastic glasses about 3 time.	Take a photo	3.07 - 3.15 PM (9 min)
5. Add 100 ml of the milli-Q into the sample.	Take a photo	3.15 - 3.19 PM (5 min)
6. Whisk to beat the sample solution for 2 minutes.	Take a photo	3.19 - 3.26 PM (8 min)
7. Transfer 10 ml of the sample solution into 15 ml of centrifuge tube then centrifuge for 10 min.	Take a photo	3.26 - 3.41 PM (16 min)
8. Pipet 5 ml of the supernatant solutions into the small plastic cup prepare for determination of phosphate.	Take a photo	3.41 - 3.44 PM (4 min)

Processes	Step of take a photos	Times
9. Immerse the reaction zone of the test strip in the sample extract solution for 1 second.	Take a photo	1 sec *(x 4)
10. Drop the reagent and place on the reaction zone and allow to react for 15 second. Allow excess liquid to run off via the strip onto an absorbent paper towel.	Take a photo	15 sec *(x 4)
11. Leave to develop color for 1 min	Take a photo	1 min *(x 4)
12. Read the color by compare with standard chart	Take a photo	1 min
13. Take the test strip into the control light box leave to develop color for 1 min and take a photo by using an iphone4S.	Take a photo	0 sec
14. Evaluate the data by using application from an iphone4S	Take a photo the table of the result.	15 min
15. Copy the photo from an iphone4S to computer and upload to picasa.	-	5 min
16. Link with google map		15 min
Total		1.29.04 hour

*Repeart 4 time

APPENDIX D

Upload the data

The samples of sea food and frozen food were determinate on-site and the amount of phosphate was upload real time. The photo was taken start from bough the samples at the market, take a photo of sample and capture the location together as show in the fig.C2.

(a) (b) (c)

Figure C1 the pictures of a) Market, b) Location and c) sample

Prepare a sample and take a photo step by step then determination of phosphate concentration by using the test strips, take a photo and read the R intensity by applications of an iphone4S. The data was evaluated and the result was uploading to the website with the photo of Sample preparation together as show in the fig.C1.

Figure C2 the steps of taking a photo and upload the data to the website real-time

APPENDIX E

Traceability of sample preparation on-site

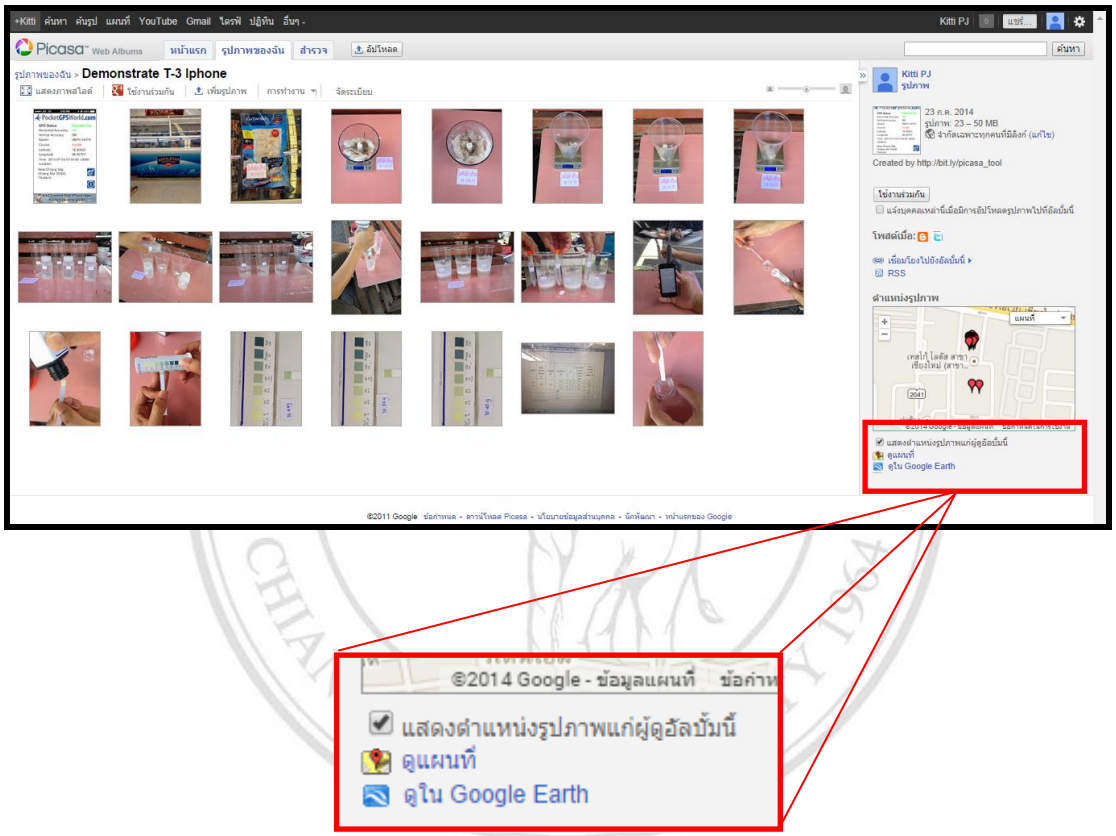
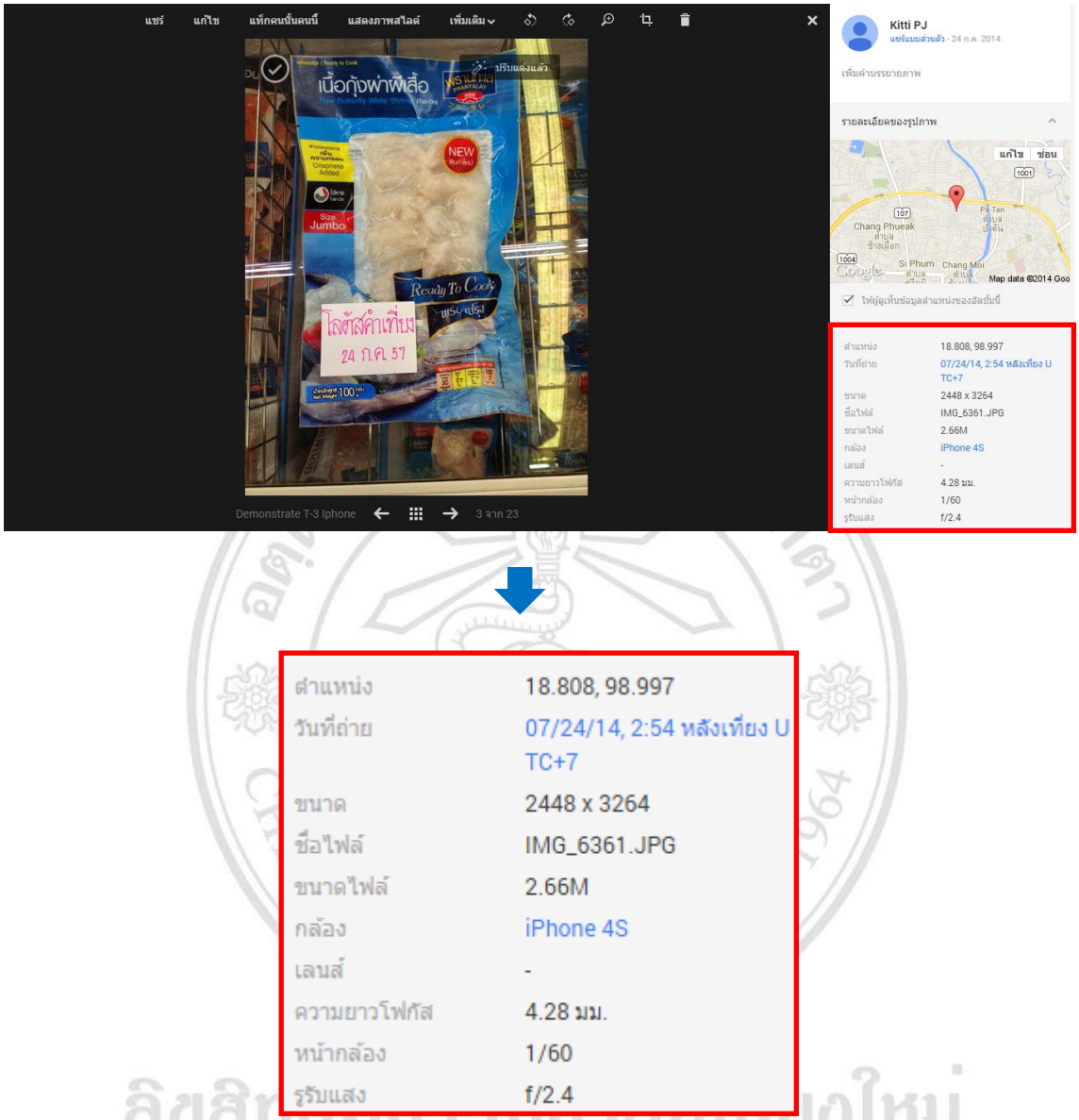


Figure D1 the photo of picaza website when all of the photos were uploading to website. It can be link with google map.



ตำแหน่ง 18.808, 98.997
วันที่ถ่าย 07/24/14, 2:54 หลังเที่ยง U TC+7
ขนาด 2448 x 3264
ชื่อไฟล์ IMG_6361.JPG
ขนาดไฟล์ 2.66M
กล้อง iPhone 4S
เลนส์ -
ความยาวโฟกัส 4.28 มม.
หน้ากล้อง 1/60
รูรับแสง f/2.4

Figure D2 show the detail of photo from taken by camera of an iphone4S.

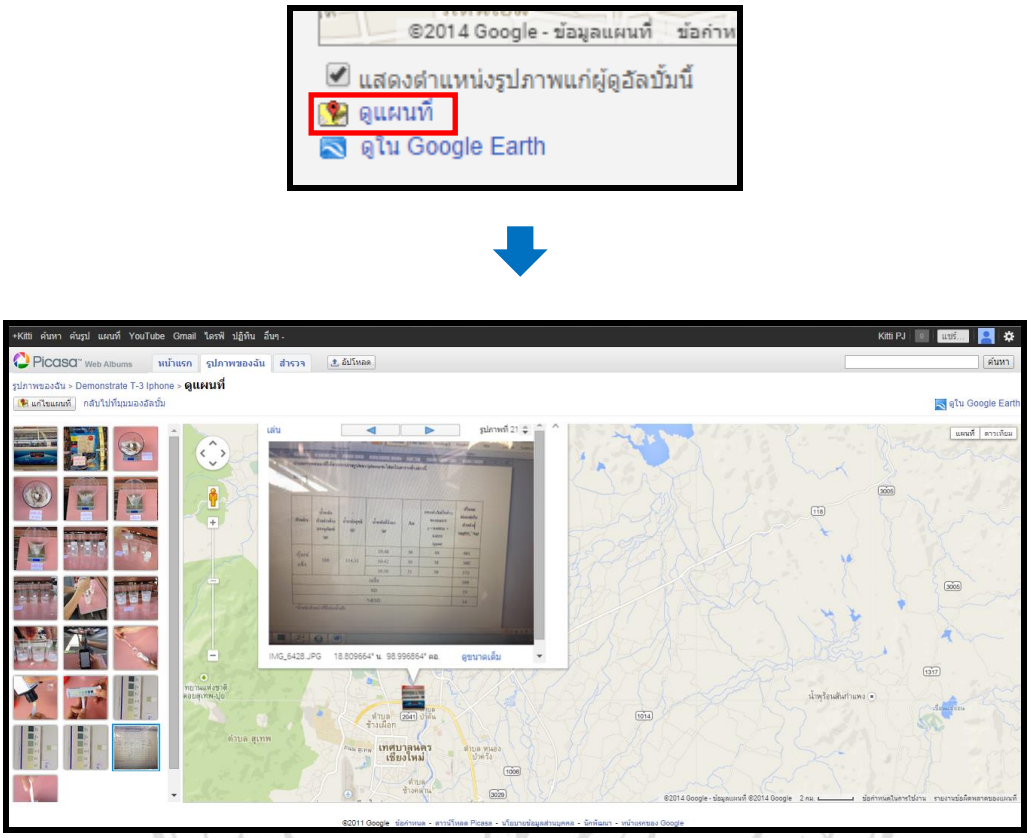


Figure D3 show the photo of google map after click at google map menu all of the photos were appear with location that determine sample on-site.

Curriculum vitae

Name Miss Atittaya Charumram

Date of birth 5 March 1989

Education

2007-2011 B.Sc. (Chemistry) Rajamangala University of Technology Thanyaburi, Pathum Thani, Thailand

2012-2014 M.S. (Chemistry, Analytical Chemistry), Chiang Mai University, Chiang Mai, Thailand

Activities

2013 Being an assistant staff for "the Upper GMS Youth Camp" at Haripunchai Lamphun Campus, Chiang Mai, Thailand on 6-8 June 2013

2014 Being an assistant staff for "the Upper GMS Youth Camp for The Experience Exchange in Local Wisdom in Connection with Science and Technology" at Mae Hia Agricultural Research Station and Training Center, Chiang Mai, Thailand on 19-21 September 2014