CHAPTER V

DISCUSSION AND CONCLUSION

Discussion

5.1 Pig and poultry slaughter conditions, facilities and operations in selected slaughterhouses

In this study we found the pig and poultry slaughter conditions, facilities and operations in the selected slaughterhouses under the DLD Slaughterhouse and Butcher Shop Improvement Project mostly complying with the new regulation "Ministerial Notification B.E.2555" (2012); however, these slaughterhouses still must improve to satisfy all point of the regulation. The total score results of all studied slaughterhouse show their compliance to 80% of the requirements of new regulation. All slaughterhouses are located at appropriate areas and 90% fulfilled the lairage criteria, i.e. far from clean area, enough area, construction with roof and good ventilation etc.. If we define the regulation in criteria for location and construction part and criteria for slaughter and hygiene practice part then the studied slaughterhouses are complying with a higher percentage to criteria for location and construction part (87%) than criteria for slaughter and hygiene practice part (70%). Based on the DLD slaughterhouse survey for the whole country in 2004, (Suphaprapakarn, 2004) showed that only around 10% of the licensed slaughterhouses are in line with the Thai Domestic Slaughterhouse Standard.

The lowest scores were assigned to the personal hygiene practices which specify that a slaughterhouse owner must provide medical health checks for worker at least once a year; only the large slaughterhouses in this study complied with this criterion. Three out of these five slaughterhouses cannot support or control worker for proper clothing, hand washing and/or drinking or eating during work. Personal

hygiene is also related to construction of the building as it is specified that a slaughterhouse operator should provide adequate and durable hand wash basins with FDA approved liquid soup which are high enough and no hand fresh water or waste pipe is connected directly to the drainage. With all criteria about hand washing basins only one slaughterhouse complies. If operators provide sufficient hand washing basins with liquid soap at points easy to access, then operators can improve their hygiene in the process line which will be convenient for workers to wash their hands more frequency.

Furthermore, this new regulation added more criteria on animal welfare issues such as standards for the lairage area such as enough space for the number of expected animals to be slaughtered and sufficient space for animal resting, preventing animal escape, floors being not slippery or not too slope, providing water and nipples or other utensil for drinking water and this regulation also stated that operator should have procedures which cause animal unconsciousness before slaughter except religion slaughter. This study found that two of the pig slaughterhouses are not providing water for animal drinking and even two out of the five slaughterhouses studied (a pig slaughterhouse and a small chicken slaughterhouse) do not stun animals before slaughter. In the DLD survey in 2008 of 184 pig slaughterhouses from all provinces in Thailand (Suphaprapakarn, 2008) only 37% of them have a stunning machine or device.

None of them has prepared manuals and work instructions nor recall, traceability and record keeping systems are in place the as the regulation still allows to prepare for it until July 2014.

In this new regulation it is stated that lighting should be at least 220 lux. We measured by a lux meter and found that all 5 study slaughterhouses do not comply with this criterion.

The highest score of 96% reached the pig slaughterhouse coded SH P2 which is a new building having modern line construction with automatic scalding and

dehairing machine and cold chain facilities with chilled room, freezer room and cold storage. Pigs are stunned before slaughter by head-only electrical stunners. The pig carcasses hang on an overhead conveyor until the cutting process on the table starts.

The observed three chicken slaughterhouses did not score too differently scored with the highest score of 89% in SH C2. This is a small slaughterhouse with worker facilities and container cold storage, but no stunner, being an old building and separate clearly between dirty and clean area; the clean area room with the table, floor and wall is moderately clean. SH C2 does evisceration before sale.

The results for the five selected slaughterhouses under the DLD Slaughterhouse and Butcher Shop Improvement Project in the Livestock Regions 1 may differ by area due to the fact that the selected slaughterhouses volunteered to join this DLD pilot project in order to eventually improve their slaughterhouses. The study was carried out in the Livestock Region 1 which is the center area where there is high competition between local slaughterhouses except for large slaughterhouses for export with high capacities and quality. It means that these slaughterhouses are willing to improve and most of them want to expand their production in future. This may have had an indirect but positive impact on the mean high overall score of these slaughterhouses.

5.2 The hygienic status of the slaughterhouses studied based on the results of bacterial contamination testing of meat

The bacterial contamination of meat samples from the domestic slaughterhouses by testing for Aerobic Plate Count (APC), *Salmonella* spp. and *Staphylococcus aureus* was used as a hygiene monitor. The highest bacterial contamination of 84% was encountered in one small sized chicken slaughterhouse and the lowest contamination is the largest pig slaughterhouse (18%). Most of non-standard chicken meats are found 55% of *Salmonella* spp. whereas pork contaminated with *Salmonella* spp. is only 20%. In contrast with % of APC contamination higher than limit in chicken (17%) is lower than pig carcass (27%). Compared with the DLD

report of all livestock region in 2011 and 2012 (BLSC, 2012a; BLSC, 2013a), the % of meat samples that exceed bacterial contamination limit from 5 selected slaughter is lower than DLD report.

The large size pig slaughterhouse SH P2 had the highest score of 96% as it complies with the regulations. This correlates with the lowest percentage (18.2%) of bacterial contamination of their meat samples due to the new and good lay-out of the building construction and the implementation of `good practice´ operations though not covering the full system.

Surprisingly, in the chicken meat samples from SH C 2 the highest percentage of bacterial contamination of 82% and of 63% *Salmonella* spp. positives was found. Most of the small and local chicken slaughterhouse will not eviscerate; however, in our study only SH C1 eviscerated whereas the other two slaughterhouses sell mainly the whole chicken body without evisceration. Thus, the bacterial contamination may have been caused by other chicken carcasses, between evisceration with high numbers of bacteria in the abdominal cavity, intestine rupture, and/or contamination through worker hands, tables, knifes, and water tanks as well.

Domestic slaughterhouse facilities will have to pass the audit of a committee in each province before they are permitted to operate; the committee may add some criteria for post-mortem inspection to their checklist. This will help the meat inspectors to work more satisfactorily. Under these circumstances even post-mortem inspection though excluding meat unfit for human consumption cannot completely prevent major food borne diseases but reflects the animal disease and animal welfare situation. Then the government is in a better position to improve and support the animal health and management at the farm level and, thus promoting food safety

5.3 Facilities for meat inspection and to record post-mortem inspection findings

Our findings emphasize the necessity to improve certain facilities for meat inspection in slaughterhouses. The results show that all five selected slaughterhouses

have inadequate light for post-mortem meat inspection and not all poultry slaughterhouses inspect the whole chicken carcasses. Inspecting carcasses, viscera and heads at all times is not possible at all pig slaughterhouses. Overall, three out of five slaughterhouses have limited space, no tap/hose water for washing hands and are not conveniently equipped to perform post-mortem inspection satisfactorily.

Though the facilities for post-mortem meat inspection occupy only a small part of a slaughterhouse, we found that they are usually absent and, when present, are not suitable.

Even without additional financial investment, slaughterhouses could simply provide suitable areas of adequate height, light and water supply for hand washing thus facilitating inspection substantially. Hence, the government is expected to provide items such as flashlights for meat inspectors to support their efforts in food safety control and prevention of disease from food animals to man.

The post -mortem inspections in pigs show that the majority of lesions are lung lesions and pleuritis with 59.9%, followed by skin lesions with 14.6%, liver lesions with 14%, spleen lesions with 8.4%, of heart lesions at 7.5% and lymph nodes lesions at 7.3%. In a previous study surveying one Thai pig slaughterhouse with 75,065 slaughtered pigs during January 2002 to September 2003 lung lesions were found to be as high as 73% (Jongsatien, 2004). In Lithuania, lesions detected during 2007 to2009 were found in the respiratory tract with 78.98%, in the liver with 31.79%, the heart with 6.23% and the skin with 0.04% (Januškevičienė, 2010). A study in Austria during September 2007 to December 2010 in 264,039 slaughtered pigs found respiratory disorders such as pneumonia and pleuritis in 46.4% (Wanda, 2011). The lung lesions in pig may have been caused by disease or infection, farm ventilation management or even have resulted from the slaughter process.

Post-mortem inspection in chicken showed lesions of 3.6% bruises and fractures, 1.3% arthritis/joint lesions, 1.2% skin disease/lesions and 1.1% over-scalded. However, in Sweden the most frequent post-mortem findings though, at an

extremely low level, have been emaciation, discoloration, cellulitis (0.35%), ascites (0.27%), hepatitis (0.13%) and pericarditis in the flock (Löhren, 2012). It has to be mentioned here that a high percentage of bruises and fractures in chicken results in economic losses (FAO, 2001) from rejection or condemnation being mainly due to the handling of animals during the slaughter process not in line with animal welfare.

This study used the visual meat inspection method, only in suspected cases it was palpated and incised. These post-mortem findings were recorded applying the DLD domestic meat inspection form modified to account for our additional criteria developed.

The new regulation "Ministry of Agriculture and Cooperative's Regulation on Determination of Criteria, Procedures and Conditions for Establishing the Slaughterhouse, Lairage and Animal Slaughter B.E. 2555 (2012)" which came into force from 4 July 2012, states the criteria for animal lairage and mentioned also that adequate light for ante-mortem inspection as well as suitable space is to be available so that meat inspectors can perform ante-mortem inspection properly. Yet, this new regulation did not specify clearly enough the criteria for the post-mortem inspection facilities but mentioned that the slaughterhouse should delegate this to the officer.

Conclusion

The results of this study point to the conclusion that the slaughter conditions, facilities and operations at the five studied slaughterhouses have to be improved substantially for fully complying with all criteria of the new regulation. The bacterial contamination of meat is less in better constructed facilities with good hygiene practice. Thus, the Government should give sound advice to slaughterhouse operators to improve their slaughterhouses to meet the criteria of new regulation in all aspects.

The facilities for post-mortem inspection in the domestic slaughterhouses studied deserve substantial improvement. The post mortem inspection findings show that the majority of lesions in pigs are found in the lungs pointing to likely

management failures in the farm of origin whereas the fractures and bruises in chicken were apparently due to nonconformity with animal welfare during handling.

The cooperation between government agencies with regards to gathering data of meat inspection from domestic slaughterhouses throughout the country is to be enforced in order to take greater advantage for food safety, food animal disease prevention and improvement of animal health, public health, as well as animal welfare.