CHAPTER 5

CONCLUSIONS

Thai community biodiesel was extensively produced and used in many areas [3]. This community biodiesel fuel was aimed to supply for agricultural diesel engine even though sometimes there was found the uses in vehicular diesel engine or pick up. Hence, their exhaust emission was concern as diesel fuel combustion emissions. Especially, toxic and green house gases emission. Toxic and green house gases are well known and suspected toxic to human health. It usually found on exhaust pipe that produced during the combustion process [76]. The determination of toxic and green house gases in the exhaust pipe emission of each test was found that low concentration emissions in the exhaust of agricultural diesel engine. NO was predominantly found in the exhaust of almost CBF samples, whereas, the most abundant toxic and green house gases in the exhaust of CBF samples in the exhaust of high speed diesel engine combustion was increased exhaust pipe emissions and higher than agricultural diesel engine.

The comparisons of toxic and green house gases concentration of various CBFs and CDFs indicated that the use of community biodiesel in agricultural diesel engine could reduce exhaust pipe emissions. The similar pattern of their concentrations was observed in high speed diesel engine found increased emissions. This could be stated that the reduction of toxic and green house gases emissions might be attributed to the diminishing of characteristic engine and fuel properties.

Mean CO, CO_2, NO, NO_2 and NO_X concentration of 3 CBFs were varying from 26.1 to 56.8ppm, 2.1 to 3.7 %, 80.6 to 139.0ppm, 5.3 to 7.3ppm, 86.8 to 144.2ppm, respectively, while the CBDs were 37.1 to 49.0ppm, 3.0 to 3.6%, 124.0 to 145.4ppm, 5.9 to 6.8ppm, 130.7 to 151.3ppm, respectively tested with agricultural diesel engine. This exhibited more reduction from the uses of CBFs compared to CDFs. In the contrast, mean of CO, CO_2, NO, NO_2 and NO_X concentration of 3 CBFs were varying from 261.9 to 295.2ppm, 4.3 to 5.6%, 310 to 369.0ppm, 19.0 to 39.7ppm, 349.3 to 396.6ppm, respectively, while the CBDs were 249.0 to 318.6ppm, 3.7 to 4.4%, 255.5 to 355.6ppm, 6.9 to 24.8ppm, 279.7 to 362.3ppm, respectively tested with high speed diesel engine.

This exhibited less reduction from the uses of CBFs compared to CDFs. Exhaust of agricultural diesel engine was significant difference high speed diesel engine ($p<0.05$). The comparison of individual toxic and green house gases profile emissions of CBF and CDF was found that almost CBF were significant lower than those of CDF ($p<0.05$) for agricultural diesel engine but a little increased NO_2 . In the case of high speed diesel engine found significant difference in CO_2, NO_2 and NO_X higher than CDF, CO and NO were no significant difference. This result was shown community biodiesel fuel is unsuitable for high speed diesel engine when we concerned about the emission of the toxic and green house gases. Concerning to the reduction of polluted gases from uses of community biodiesels [33-38] and toxic and green house gases emissions in this study, there may reasonable to assume that toxic and green house gases, could be reduced or found the less amounts than emissions from conventional diesel. Therefore, it reflected that the substitution of community

biodiesel in agricultural diesel engine could reduce their toxicity effects and safely for human. But these founding, might be community biodiesel fuel is unsuitable for high speed diesel engine when we concerned about the emissions of toxic and green houses gases. CBF samples had higher in density, flash point, cloud point and pour point, but lower in gross heating value than CDF sample. However, these density and flash point of almost CBF samples are completely acceptable with Thai community biodiesel standards for methyl ester and agricultural diesel engine. The higher in density of these CBF could not influence to the level of toxic and green house gases emissions but may affect to the engine performance. In this case, the higher in fuel consumption was attributed to higher in density and lower heating value; consequently, decreasing of thermal efficiency.

In addition, it was observed that the CBF which was stored for more than 1 year was found quite higher in toxic and green house gases emissions than others. It should be noted that the use of community biodiesel positively influences the profile of toxic and green house gases concentration in the exhaust pipe, although it was found not much in fuel consumption rate of CBF. Moreover, Thai community biodiesel must be focusing on biodiesel fuel production process on the potential effects of biodiesel fuels on type of engines (low speed or high speed diesel engine). They should be awareness on the effects of biodiesel fuel on environmental friendly.