CHAPTER V
CONCLUSIONS

A new type of base heterogeneous catalyst was prepared by impregnation method. KOH/ZrO_2 and KOH/mordenite heterogeneous base catalyst was firstly used as a solid base catalyst for biodiesel production via transesterification reaction from palm oil. The optimum condition for KOH/ZrO_2 was reaction temperature of 65°C, 2 hours of reaction time, 20 wt.% loading amount of K with a molar ratio of methanol to oil of 15:1, 5 wt.% of the catalyst (base on weight of the vegetable oil), a stirrer speed of 300 rpm, and the size of KOH/ZrO_2 catalysts was 10-20 mesh. At the optimum conditions of KOH/ZrO_2 was obtained with methyl ester content of 99.69 wt.%. The optimum condition for KOH/mordenite was reaction temperature of 65°C, 3 hours of reaction time, 20 wt.% loading amount of K with a molar ratio of methanol to oil of 15:1, 4 wt.% of the catalyst (base on weight of the vegetable oil), a stirrer speed of 300 rpm and the catalyst without the calcination. At the optimum conditions of KOH/mordenite was obtained with methyl ester content of 98.40 wt.%.

The KOH/mordenite showed better activity than KOH/ZrO_2 catalyst for biodiesel production via transesterification because the KOH/mordenite catalyst could be recycled at least one time without pretreatment or activation. The methyl ester content in the second run of spent KOH/mordenite equal to 72.33 wt.%, which is higher than KOH/ZrO_2 catalyst. Moreover, the percent potassium leaching of KOH/mordenite was 10.63% and 7.87% at first and second run, respectively which was lower than KOH/ZrO_2 catalyst.