Production of pyrolyzed oil from crude glycerol using a microwave heating technique

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Crude glycerol, a by-product of biodiesel production created via transesterification was pyrolyzed using a microwave heating technique in an oxygen-deficient environment. Coconut shell-based activated carbon was used as a catalyst to assist in the heat transfer and the cracking of glycerol into gaseous and liquid products. Investigation into the product yield was conducted by varying the pyrolysis temperature between 300°C and 800°C. The result revealed that liquid and gaseous pyrolysis products yield fell in the range of 15?42% and 55?82% by mass, respectively. An analysis of the liquid product using gas chromatography mass spectrometry (GC-MS) shows that glycerin (C3H8O3), methanamine (CH5N), and cyclotrisiloxane (C6H18O3Si3) were among the highest derived compounds in the pyrolyzed liquid yield. The derived pyrolysis products can potentially be used as alternative fuels in combustion systems.