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By-product formation in respect of operating conditions on conversion of glycerol to propylene glycol

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The conversion reaction of glycerol to propylene glycol (PG) results in the yield of different products namely acetol, water, PG and it has also shown little selectivity toward ethylene glycol and other unknown by-products. These unidentified compounds are consequently called “unknowns”. In order to maximize the production of propylene glycol these unknown by-products have to be reduced. To properly assess the unknowns, Gas Chromatograph (GC) testing is done on the finish product in order to create new methods to eradicate the unknowns. PG and seven of the most prominent unknowns were chosen to carry out the study where the trends are studied in relation to propylene glycol and reaction conditions. The seven unknowns are named as the retention time shown in the gas chromatogram 8.74, 8.78, 9.11 (Ethylene Glycol), 9.15, 9.28, 9.32, and 9.405. The impact of two independent reaction parameters were investigated—referred to as Parameter A (PA) and Parameter B (PB). At higher PA less unknown are produced during the reaction. The value of PB applied in this reaction is very critical as the higher values result in the production of more unknowns and less PG in the end product. Based on this analysis, the reaction should be conducted at higher value of PA and low PB.