

Pure industrial chemicals by gasifying lignocellulosic biomass

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VTT has demonstrated that lignocellulosic biomass can be successfully converted into pure BTX chemicals: benzene, toluene and xylene. The aim of this research is to enable the use of wood-based chemicals to replace crude oil in, for example, plastics, fuels, medicine and paints.

Demand has grown rapidly for chemicals generated from [renewable sources](#), creating a need for alternative, environmentally friendly production routes. Particularly sought-after chemicals include pure aromatics, such as the BTX chemicals benzene, toluene and [xylene](#).

VTT Technical Research Centre of Finland Ltd has developed a method of manufacturing BTX chemicals by combining the [gasification](#) of [lignocellulosic biomass](#), the Fischer-Tropsch synthesis and aromatisation. Over 85% of the separated benzene exceeded 90% purity and around 50% of the separated toluene was over 70% purity.

The process can be applied to the production of bio-based chemicals. However, both benzene and toluene can also be used in the manufacture of more sophisticated compounds, such as paracetamol, a painkiller that VTT used as an example compound in its tests. Since the compound's synthetic route requires pure source materials, VTT's research proves the high quality of aromatics produced through gasification.

VTT has calculated that the estimated price of pure BTX fractions is EUR 1.40 per litre. This price is higher than the current price of raw material derived from [crude oil](#), but significantly more competitive than

the price of other bio-based routes.

VTT is continuing larger-scale development work in its Bioruukki piloting centre in Espoo, Finland. The aim is to demonstrate the industrial viability of the entire process - from biomass to aromatics to end products - by producing several kilos of material. VTT will further develop the synthetic route in order to improve the technical and economic feasibility of the process as a step towards commercial viability.

Provided by VTT Technical Research Centre of Finland

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