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## Liquefaction of humins from C6-sugar conversions using heterogeneous catalysts

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batch tijd) op de omzetting van humins naar humine oliën in IPA met Pt/C als katalysator. De experimenten zijn uitgevoerd volgens een “central composite design” (19 experimenten). De hoogste humine conversie was 72%. De belangrijkste reactie producten waren aromaten, alkylfenolen en alifatische koolwaterstoffen. De hoogst behaalde opbrengst aan alkylfenolen was 14% op GC detecteerbare componenten. IPA fungeerde als oplosmiddel en als bron voor waterstofgas.

Onderzoek naar het reactief oplossen van humines in mierenzuur/IPA mengsels met Ru katalysatoren wordt gerapporteerd in Hoofdstuk 5. De resultaten laten zien dit mogelijk is met zowel mierenzuur (FA) als moleculaire waterstof als waterstofdonor. IPA is ook niet inert onder de gekozen reactie-omstandigheden en kan fungeren als een extra bron van waterstof. De beste resultaten werden verkregen met Ru/C en humine conversies tot 69% werden behaald met FA/IPA als waterstofdonor. De product olie bestaat uit zowel monomere als oligomere verbindingen (GPC). Belangrijkste GC detecteerbare verbindingen afkomstig uit de humines zijn gesubstitueerde alkylfenolen, naftalenen en cyclische alkanen (GC-MS-FID, GC×GC).

De resultaten laten zien dat de recalcitrante structuur van humines (deels) gekraakt kan worden tot een vloeibaar product dat mogelijk kan dienen als brandstof en/of als bron voor interessante bulkchemicaliën (aromaten, alkylfenolen) na fractionering. Dit opent nieuwe mogelijkheden voor de ontwikkeling van waardevolle producten uit humines, naast het gebruik als een vaste brandstof. Deze ontwikkelingen zullen een positief effect hebben op de techno-economische haalbaarheid van bioraffinage processen voor de omzetting van C6 suikers naar biobased chemicaliën zoals levulinezuur en HMF.

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Yuehu Wang.