Acetins Production via Transesterification of Ethyl Acetate with Glycerol Using Heterogeneous Acid Catalysts.

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INTRODUCTION

Acetins are raw-material widely utilized in chemical, pharmaceutical and cosmetic industries. Traditionally, acetins are produced by glycerol esterification with excess of acetic acid and/or acetic anhydride but this process has drawbacks as high cost and use of corrosive and toxic reagents.[1]

We wish to report a new and efficient route to produce acetins[2] via an acid catalyzed transesterification reaction of glycerol with ethyl acetate in heterogeneous media (Figure 1) using dry amberlyst A-15 (**A**) and wet amberlyst A-16 (**B**) as catalysts.

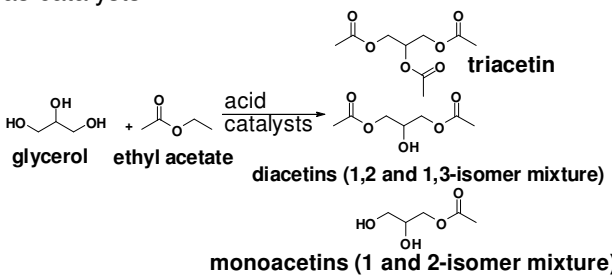

Figure 1: Acetins production acid catalyzed via transesterification of ethyl acetate with glycerol.

RESULTS AND DISCUSSION

We started the study using 10 eq. of ethyl acetate using 10% mol of the catalyst at room temperature and at 90ºC. Next, aiming a better production of triacetin we increased to 30 eq. ratio of ethyl acetate. The results are summarized in table 1.

With 10 eq. of ethyl acetate at room temperature a large amount of glycerol remained not reacted, in these cases the monoacetin is the major product, entries 1 and 2. At 90ºC almost all glycerol was consumed, the diacetin is the major product entries 3 and 4. When a 30 eq. ratio of ethyl acetate was used at 90ºC all glycerol was consumed and a larger amount of diacetin was produced. Dry Amberlyst A-15 (**A**) showed to be e better catalyst than Amberlyst A-16 (**B**). The kinetic of glycerol transformation and products distribution in the equilibrium to the best catalyst, (entry 5) was measured, Figure 2.

.Table 1. Reactions conditions:

Entry	Cat.	Temp.	Glycerol	Mono.	Dia.	Tri.
1	A	R.T.	23,1	51,0	25,9	0,0
2	B	R.T	38,0	54,3	7,7	0,0
3	A	90ºC	7,3	26,0	70,0	5,4
4	B	90ºC	9,2	30,0	61,9	2,9
5	A	90ºC	0,0	9,3	77,4	13,3
6	B	90ºC	0,0	9,2	84,5	6,3

*All reactions accomplished in 24h.

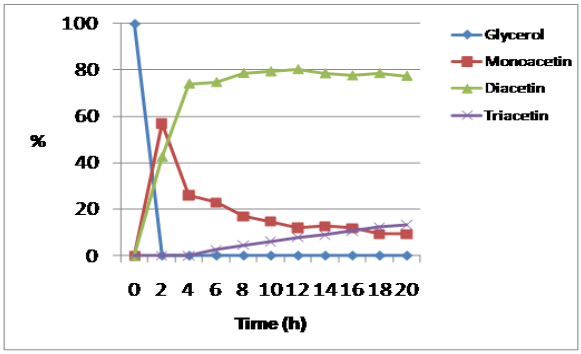

Figure 2: Kinetic for glycerol transformation using 30 equiv. EtOAc, dry Amberlyst A-15 (0.1 equiv.) at 90ºC.

CONCLUSION

A more environmental benign route than the traditional glycerol esterification process to acetins was developed. In this process diacetins are the major product obtained. The wastes of the process are ethanol and solid catalyst which can be reused three times without loss of activity.

ACKNOWLEDGEMENTS

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REFERENCES

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[2] Meireles, B. A.; Pereira, V. L. P. **PI 1002386-0-B**