Hydrogenation and hydroformylation of C_4 unsaturated alcohols with an [Rh(acac)(CO)$_2$] / PNS catalyst in water solution (PNS = $Ph_2PCH_2CH_2CONHC(CH_3)_2CH_2SO_3Li$).

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A catalytic system containing [Rh(acac)$(CO)_2$] and water soluble phosphine PNS ($PNSPh_2PCH_2CH_2CONHC(CH_3)_2CH_2SO_3Li$) was used for the hydrogenation and hydroformylation of C_4 unsaturated alcohols: 1-buten-3-ol (CH_2=$CHCH(CH_3)OH$) **(1)**, 2-methyl-2-propen-1-ol ($CH_2C(CH_3)CH_2OH$) **(2)** and 2-buten-1-ol ($CH_3CHCHCH_2OH$) **(3)** in water. The most reactive substrate, **(1)**, with a terminal double bond, is hydrogenated at 313 K and 0.1 MPa of H_2 pressure giving 92% of 2-methyl-propanol after 4 h. The hydrogenation of **(2)** and **(3)** with, respectively, 74% and 65% yields was performed at 353 K and 0.5 MPa of H_2 pressure. The main products of the hydroformylation of **(1)**, **(2)** and **(3)** alcohols are 2-hydroxytetrahydrofuran derivatives formed by hydroxyaldehyde cyclization. The hydroformylation of **(1)** gave 81–95% of 2-hydroxy-5-methyl-tetrahydrofuran at 323–353 K and 1 MPa CO/H_2 regardless of the PNS concentration. In the hydroformylation of **(2)** and **(3)** the highest yield of products, respectively 92 and 77%, was achieved at 353 K, 1 MPa and [PNS]: [Rh]=3. During the reaction a pH decrease was noted.

Słowa kluczowe

Hydrogenation, Hydroformylation, Unsaturated alcohols

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