with the cobalt catalyst are then hydroformylated in a reactor at elevated pressure and elevated temperature (olefin hydroformylation).

The reaction output is customarily withdrawn at the top of the reactor, in particular when a vertical tubular reactor is used. Particularly with higher olefins having 8 carbon atoms or more, the aqueous phase supplied to the reaction zone and necessary to achieve a sufficient catalyst concentration in the reaction zone is not entirely discharged in dissolved or suspended form with the reaction mixture removed from the top. Therefore, reaction output is preferably removed not only at the top, but also from the bottom space.

The uncontrolled or insufficiently controlled withdrawal of aqueous phase from the bottom space leads to operational disruption. An excess of aqueous phase can lead to a decrease in conversion. A deficiency of aqueous phase can lead to local temperature spikes which cause decomposition of the cobalt catalyst.

In the prior art, the amount of reaction output withdrawn from the bottom space is determined in accordance with the level of the aqueous bottom phase in the reactor.

EP 1 204 624 B1 discloses a continuous process for hydroformylation of olefins having 6 to 20 carbon atoms wherein a cobalt catalyst-containing aqueous phase is brought into intimate contact with olefins, hydrogen and carbon monoxide in at least one reaction zone (e.g. in a vertical tubular reactor). Reaction output can be withdrawn not only at the top of the reactor but also from the bottom space of the reactor. The withdrawal of reaction output from the bottom space of the reactor is preferably phase regulated.

EP 1 279 658 B1 discloses a process for hydroformylation of olefins having 5 to 24 carbon atoms to produce the corresponding aldehydes and/or alcohols having 6 to 25 carbon atoms in the presence of unmodified cobalt catalysts in a single-step process wherein the aqueous bottom phase is thoroughly mixed in the reactor with the organic phase, the concentration of cobalt compounds in the aqueous bottom phase is in the range from 0.4 to 1.7% by weight and the level of the aqueous bottom phase is kept constant at a steady state.

EP 3 071 542 B1~~EP 3 071 524 B1~~ discloses a process for hydroformylation of olefins having 6 to 20 carbon atoms to produce the corresponding hydroformylation products in the presence of a cobalt catalyst in the presence of an aqueous phase with thorough mixing in the reactor wherein an aqueous phase-containing stream is withdrawn from the bottom of the reactor and wherein the flow rate of this aqueous phase-containing stream is controlled in accordance with the