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The carbonylation of acetaldehyde (AA), in contrast to formaldehyde, has not been studied extensively. Bhattacharyya et al. [1] have described the carbonylation of AA under vigorous conditions at 230°C and 350 atm in the presence of  $\text{NiI}_2$ ,  $\text{CoI}_2$  and  $\text{FeI}_2$  on  $\text{SiO}_2$  as catalysts. This reaction has also been reported in the presence of hydrofluoric acid at 10–50°C and 95–110 atm [2–4]. The major products are lactic acid and its esters.

We are the first to report the carbonylation of AA with the preparation of propionic and lactic acids on unmodified Lewatits-100 ion-exchange resin manufactured in West Germany [1] and Zerolit-225 manufactured in Great Britain (2). The experiments were carried out in an autoclave with a glass insert at 60–90 atm at 60°C in acetic acid. The acetic acid:AA mole ratio was 2:1 and the AA:Cat ratio was 8 mmoles/g. The yield relative to propionic acid was 30–40%. Lactic acid is formed in addition to propionic acid (Table 1).

The products were analyzed on an LKhM-8MD chromatograph using a glass column packed with Polisorb-1 with temperature programming from 90° to 190°C at 6 deg/min.

TABLE 1

Catalyst	p, atm	Acid yield, mole % relative to starting AA	
		propionic	lactic
1	60	34.4	1.2
1	80	35.1	1.8
1	90	37.8	2.2
2	75	31.1	1.4
2	90	32.4	1.7

## LITERATURE CITED

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