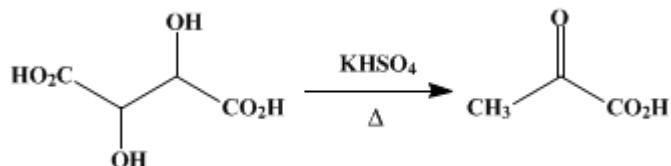


PYRUVIC ACID



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1. Procedure

An intimate mixture of 600 g. (4.4 moles) of finely powdered, freshly *fused* potassium acid sulfate and 400 g. (2.7 moles) of powdered **tartaric acid**, prepared by grinding them together in a mortar, is placed in a 3-l. round-bottomed Pyrex flask connected with a condenser which is filled with water but does not have any water flowing through it. The mixture is heated by means of an oil bath maintained at a temperature between 210 and 220° until liquid no longer distils over. Some foaming takes place (*Note 1*), but, if fused potassium acid sulfate is used and the temperature of the bath does not rise above 220°, it is not difficult to control. The distillate is then fractionated under reduced pressure. **Pyruvic acid** passes over at 75–80°/25 mm. and the yield is 117–128 g. (50–55 per cent of the theoretical amount) (*Note 2*).

2. Notes

1. If the mixture foams badly, it may be kept from frothing over by heating the upper part of the flask with a free flame.
2. The cake left in the reaction flask may be removed readily by inverting over a steam jet.

3. Discussion

Pyruvic acid can be prepared by the hydrolysis of *α,α*-dichloropropionic acid,¹ ² *α,α*-dibromopropionic acid,² acetyl cyanide,³ and oxal-acetic ester;³ and by the distillation of **tartaric acid** or **glyceric acid**.⁴ Better results are obtained, however, by the distillation of **tartaric acid** in the presence of a dehydrating agent such as **potassium bisulfate**,⁵ and the procedure described was adopted after a study of a variety of dehydrating agents and various experimental conditions. The ethyl ester can be prepared by the catalytic oxidation of **ethyl lactate**,⁶ and the acid has been obtained by the oxidation of **methylglyoxal bisulfite**.⁷

This preparation is referenced from:

- Org. Syn. Coll. Vol. 3, 610

References and Notes

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6. Häussler, U. S. pat. 1,164,195 [C. A. **21**, 746 (1927)].
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Appendix Chemical Abstracts Nomenclature (Collective Index Number); (Registry Number)

ethyl ester

potassium acid sulfate

oxal-acetic ester

[potassium bisulfate](#) (7646-93-7)

[tartaric acid](#) (87-69-4)

[Pyruvic acid](#) (127-17-3)

[α,α-dichloropropionic acid](#) (75-99-0)

α,α-dibromopropionic acid

[acetyl cyanide](#) (631-57-2)

[glyceric acid](#) (600-19-1)

[ethyl lactate](#) (687-47-8)

[methylglyoxal bisulfite](#)