

the electrolyte chosen must be non-poisonous. Lead acetate or basic lead acetate will precipitate pectin, but the precipitation is an irreversible one, and the amount of lead absorbed or combined may be poisonous. For these reasons ammonium sulfate was chosen. Bigelow, Gore and Howard<sup>2</sup> in their review of the literature on pectin mention that in 1898 Bourquellot & Herissey used ammonium sulfate as a precipitant for pectin obtained from gentian root. Other than this no further use has been made of this precipitant for pectin.

#### METHOD

60 grams of dried apple pomace were boiled three successive times with 200 c.c. of water, filtering after each boiling. To each of the 100 c.c. of filtrate 25 grams of ammonium sulfate were added<sup>3</sup> and then heated to 70° C., whereupon the pectin was precipitated as a grayish white flocculent precipitate. The precipitate was separated from the mother liquor by filtering. (The mother liquor can be evaporated and the residue used again or the residue can be used as a fertilizer.) The precipitate was dissolved in hot water and again precipitated with ammonium sulfate. Again it was filtered and the precipitate was removed from filter paper and dried at 60–70° C. and when dry was washed several times with cold water to remove adhering ammonium sulfate. The precipitate was dried again and its gelatinizing power was tested by adding to a 1 per cent. solution of the pectin 0.5 per cent. solution of citric acid and 65 gm. of sugar. This solution was boiled for 10–20 minutes and upon cooling a nice stiff jelly was produced. The taste did not indicate the presence of ammonium sulfate and upon dissolving the jelly in hot water only a slight milkiness was produced when tested for sulfates.

In order to determine whether the yield of

<sup>2</sup> Bul. 94 U. S. Dept. Agr. Bur. Chem.

<sup>3</sup> If wet pomace is used it will require a somewhat larger amount of ammonium sulfate. First add 25 grams per 100 c.c. and if precipitation does not occur, add successive portions of 5 grams until precipitation occurs. The pectin may also be precipitated by saturating the solution in the cold with ammonium sulfate.

pectin by the above method was equal to the yield produced by the alcohol precipitation method, two samples of apple pomace from the same lot were treated exactly alike, except that ammonium sulfate was used in one case and alcohol in the other as the precipitating medium. The pectin was dissolved and reprecipitated in each case, then filtered and the precipitate was removed from filter paper and dried. The ammonium sulfate was removed from the one by washing with cold water, again dried and weighed. The amount of pectin recovered by each method is recorded in table below.

Precipitant	Pectin, Per Cent.
Ammonium sulfate .....	6.33
Alcohol .....	6.91

The amount of ammonium sulfate used can be reduced by concentrating the extract, either by evaporating on a steam bath, in a partial vacuum or by freezing.<sup>4</sup> The quality of the pectin is not impaired in either case.

#### SUMMARY

Pectin can be prepared by adding ammonium sulfate to the hot water extract of fruit, and heating to 70° C. The amount of pectin recovered is practically equivalent to that recovered by the alcohol precipitation method.

Concentrating the pectin extract below the boiling point did not impair the quality of the pectin.

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<sup>4</sup> J. S. Caldwell, Bul. 147, Wash. Agr. Exp. Sta.

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