COMMUNICATION TO THE EDITOR

Preparation of Aluminum Lactate

DEAR SIR:

Aluminum lactate-lactic acid buffers have been used extensively in recent studies of wheat gluten proteins (1–10,12–15). At times aluminum lactate has been unavailable commercially. The cost of the commercial product is high (e.g., $95 for 5 lb.). Because of a number of inquiries, we are giving the details for our method of preparing aluminum lactate based on an earlier one of preparing buffers containing aluminum salts (7).

Pure aluminum does not dissolve in lactic acid. Amalgamated aluminum, however, reacts rapidly with the acid to form aluminum

lactate and hydrogen. Enough amalgamation to produce the desired activation can be obtained by dipping the aluminum into a mercuric chloride solution (11).

Wash 13.2 g. of aluminum foil with acetone to remove grease. Dip the dried foil into a 0.01*M* solution of mercuric chloride. Quickly shake off excess solution and submerge foil in 1 liter of water containing 140 ml. of 85% lactic acid (10% excess of acid). Allow to dissolve. Be prepared to cool the mixture rapidly if the exothermic reaction becomes too violent. If the aluminum does not react quickly, heat the mixture very cautiously on a steam bath. (A vigorous reaction should begin before the temperature reaches 65°C.) About 1 hr. is required to dissolve all the foil.

After aluminum has dissolved, mix with 45 g. of Darco G-60[1] activated carbon and filter through more carbon. Take the solution to dryness in a rotary evaporator under vacuum (water bath 60°–70°C.).

Dissolve the product in a minimum amount of hot absolute ethanol. Cool. Add with vigorous stirring to diethyl ether. Decant ether and wash with ether until a powder is obtained. Filter and air-dry. Yield is 134 g.

The laboratory preparation was compared with a commercial product as it was received from the manufacturer and after it had been washed with diethyl ether. Aluminum lactate (0.4905 g.) was weighed into a 100-ml. volumetric flask and made to volume with distilled water to give a solution nominally of 0.1 ionic strength (assuming complete ionization to Al^{+++} and $lactate^{-}$). Specific conductivity and pH of the solutions were measured. Lactic acid (0.26 ml.) was added to 50 ml. of each solution to give the aluminum lactate-lactic acid buffer used in electrophoresis. Conductivity and pH of the solutions were measured. Results were as follows:

	Aluminum Lactate Solution		
	Commercial	*Commercial Ether-Washed*	*Laboratory*
	pH 3.78	*pH 3.78*	*pH 3.95*
Specific conductivity, micromhos, 25°C.	597	596	531
Specific conductivity, micromhos, 1°C.	357	356	310

	Aluminum Lactate-Lactic Acid Buffer		
	pH 3.10	*pH 3.12*	*pH 3.15*
Specific conductivity, micromhos, 25°C.	1050	1040	1060
Specific conductivity, micromhos, 1°C.	614	610	626

[1]Mention of firm or trade products does not imply that they are endorsed or recommended by the U.S. Department of Agriculture over other firms or similar products not mentioned.

April 10, 1963

R. W. JONES
J. E. CLUSKEY
Northern Regional Research Laboratory
Agricultural Research Service
U.S. Department of Agriculture
Peoria, Illinois

Literature Cited

1. CLUSKEY, J. E., TAYLOR, N. W., CHARLEY, HELEN, and SENTI, F. R. Electrophoretic composition and intrinsic viscosity of glutens from different varieties of wheat. Cereal Chem. **38:** 325–335 (1961).
2. COULSON, C. B., and SIM, A. K. Starch-gel electrophoresis of isolated wheat gluten. Biochem. J. **80:** 46 P (1961).
3. ELTON, G. A. H., and EWART, J. A. D. Starch-gel electrophoresis of wheat gluten. Nature **187:** 600–601 (1960).
4. ELTON, G. A. H., and EWART, J. A. D. Starch-gel electrophoresis of cereal proteins. J. Sci. Food Agr. **13:** 62–72 (1962).
5. JONES, R. W., BABCOCK, G. E., TAYLOR, N. W., and SENTI, F. R. Molecular weights of wheat gluten fractions. Arch. Biochem. Biophys. **94:** 483–488 (1961).
6. JONES, R. W., and DIMLER, R. J. Electrophoretic composition of glutens from air-classified flours. Cereal Chem. **39:** 336–340 (1962).
7. JONES, R. W., TAYLOR, N. W., and SENTI, F. R. Electrophoresis and fractionation of wheat gluten. Arch. Biochem. Biophys. **84:** 363–376 (1959).
8. MCCALLA, A. G., and VERMÁ, SIRISH C. Sedimentation of gluten in several dispersing reagents. Can. J. Biochem. Physiol. **40:** 1123–1128 (1962).
9. MCDONALD, C. E. An improved method for the preparation of wheat gliadin. Cereal Chem. **39:** 311–317 (1962).
10. NIELSEN, H. C., BABCOCK, G. E., and SENTI, F. R. Molecular weight studies on glutenin before and after disulfide-bond splitting. Arch. Biochem. Biophys. **96:** 252–258 (1962).
11. ORMANDY, R., and COHEN, J. B. A new method for the estimation of nitrates and nitrites in water. J. Chem. Soc. **1890:** 811–815.
12. PENCE, J. W. The flour proteins. Cereal Sci. Today **7:** 178–180 (1962).
13. TAYLOR, N. W., and CLUSKEY, J. E. Wheat gluten and its glutenin component: viscosity, diffusion and sedimentation studies. Arch. Biochem. Biophys. **97:** 399–405 (1962).
14. WOYCHIK, J. H., BOUNDY, JOYCE A., and DIMLER, R. J. Starch gel electrophoresis of wheat gluten proteins with concentrated urea. Arch. Biochem. Biophys. **94:** 477–482 (1961).
15. WOYCHIK, J. H., DIMLER, R. J., and SENTI, F. R. Chromatographic fractionation of wheat gluten on carboxymethylcellulose columns. Arch. Biochem. Biophys. **91:** 235–239 (1960).