

ABSTRACTS.

ANALYTICAL CHEMISTRY.

A New Method for the Determination of Starch. A. VON ASBOTH.

The direct determination of starch in cereals, by inverting the starch with hydrochloric acid and determining the resulting sugar by means of Fehling's solution, is subject to serious errors, inasmuch as some of the cellulose is liable to be changed into sugar, and also that some of the sugar resulting by inversion is further decomposed by the prolonged boiling.

The author, acting upon the statement of Zulkowsky (*Wagner, Jahresb. 1878, p. 753*) that baryta water produces insoluble precipitates in solutions containing soluble starch, found on investigation that the precipitate is of uniform composition, having the formula $\text{BaOC}_{24}\text{H}_{40}\text{O}_{20}$ and containing 19.10% of BaO. The precipitate is slightly soluble in water, but insoluble in excess of baryta water or alcohol.

Forty-five per cent. alcohol completely separates the precipitate from dilute solutions.

For starches the following method was used: About 1 grm. starch is digested on the water-bath, in a 250 c.c. flask containing 150 c.c. of water, until the starch is changed to a clear paste. 50 c.c. of baryta water are then added to the warm solution, the flask securely stoppered and the mixture well shaken for about two minutes, and finally 45% alcohol is added to dilute the mixture to 250 c.c. It is allowed to cool, filled up to the mark with 45% alcohol, and, after again thoroughly mixing, the precipitate is allowed to separate. In the meantime 10 c.c. of the baryta water are titrated with $\frac{N}{17}$ hydrochloric acid, using phenolphthalein as indicator, and deducting the number of c.c. of $\frac{N}{17}$ acid used, from the amount required to neutralize 50 c.c. of the clear liquid from the flask. The starch and baryta water mixture generally clarifies within ten minutes. The difference between the two titrations multiplied by 5 and then by 0.0324 (the starch equiv. of 1 Ba O) gives the weight of starch in grammes. It is necessary to use well boiled distilled water in the above work and to supply

the baryta water apart from contact with the air, so as to prevent precipitation of carbonate.

For determining the starch in cereals, the following modification of the process was used. About 3 grms. of the cereal is rubbed up in a mortar with very little water, and by successive washings the starch gradually transferred to a 250 c.c. flask. Finally, the residuum is also transferred to the flask and the whole diluted to about 100 c.c.

For very hard substances, such as corn, rice, peas, etc., hot water may be used as above. Then place the whole for 30 minutes into boiling water until the starch is dissolved, cool and add 50 c.c. baryta water and shake the mixture for about 2 minutes. Fill up to mark with 45% alcohol, mix and let the mixture stand for about 10 minutes. If necessary filter a portion of the clarified mixture through glass, wool or asbestos. Titrate 50 c.c. and proceed as before.

In examining various cereals and using the above method for the starch determinations, the author apparently shows that the cereals contain little or no sugar, whereas, by use of other methods, often 4% of sugars have been found. In peas the author found that the filtrate from the baryta precipitate obtained as above, contained a substance which, besides giving the various protein reactions, also, after inversion by hydrochloric acid, reduced alkaline copper solution. (*Rep. d. Anal. Chem.* 8, 299-308.)

J. F. G.

Determination of Albumen according to Milton and Commaille. R. PALIN.

In the precipitation of albumen by mercuric nitrate or acetate all the albumen is precipitated, but the acids simultaneously liberated dissolve some of the precipitate formed, and therefore cause a loss. A slight excess of dilute potassium hydrate solution added gradually to neutralize the liberated acid which is set free during the precipitation will cause the albumen to be completely precipitated.

1. The precipitate is collected on a tared filter, thoroughly washed with water, dried at 100° C. and weighed. The mercuric oxide is then determined and deducted from the first weight, the difference being the amount of albumen.

2. Or, the precipitate caused by the mercuric nitrate is thoroughly washed and then digested with a solution of barium hydrate, filtered while hot, and after cooling the barium is precipitated by neutralizing with dilute sulphuric acid. It is filtered to remove the barium sulphate, the filtrates evaporated, dried at 100° C. and weighed, giving the weight of protein. (*Fres. Zeit.* **26**, 329.)

J. F. G.

(N. B.—It is well to ignite the last residue and deduct the resulting ash. J. F. G.)

Determination of Protein Compounds in Milk. R. PALM.

The author, as a result of a comparison of the different methods for determining the protein compounds of milk, considers the precipitation of the proteids by lead oxide as the only method giving correct results, for by the ordinary methods the hemialbumen and milk peptone are not precipitated and therefore lost. The following method was therefore used: To 10 g. of milk 0.2-0.3 g. of lead oxide (litharge) are added and the whole evaporated, by which the protein compounds combine with the lead oxide. The residue is then washed with water and transferred to a tared filter. After thorough washing, it is dried at 100° C. and weighed, which gives the weight of proteins plus lead oxide. The latter is then determined by ignition of the residue, and deducted from the weight of protein and lead oxide, the difference being the protein in the quantity of milk taken.

If it is desired to make a quantitative separation of the different protein compounds the above method can be applied to the filtrates after the separation of the albumen and casein. (*Fres. Zeit.*, **26**, 319-329.)

J. F. G.

Abstracts of American Patents Relating to Chemistry.

(From the Official Gazette of the U. S. Patent Office.)

February 15th, 1887.

357,659.—Obtaining chlorine by electrolysis. D. G. Fitzgerald.

Chlorine is generated by means of an anode of lead peroxide, in conjunction with any suitable cathode, and with an electrolyte capable of evolving chlorine.

357,696.—Carbonic acid gas generator. J. F. Behlmar.

February 22d, 1887.

358,082.—Composition of matter as a substitute for hard rubber. A. W. Sperry.

Composed of ivory dust or the like material, making up substantially fifty per cent. of the compound, a starch mixture consisting of starch, tannin, and an alkali, as alum, a binder mixture consisting of a resinous gum dissolved in alkali, as caustic soda, and milk, glue, shellac and alcohol, the whole combined and intimately mixed.

358,196.—Apparatus for distilling ammonia. H. Grüneberg and E. Blum.

358,213.—Process of preserving milk. J. Meyenberg.

358,300.—Manufacture of liquid extracts of coffee. M. Samelson.

The extract is prepared by first treating coffee with cold water, then with warm water, and finally with boiling water, and combining the three fluids.

March 1st, 1887.

358,612.—Baking powder. A. W. Holway.

Consists of mucic acid, an alkaline carbonate, and anhydrous starch.

358,662.—Process of producing silicious metals and utilizing the same for metallurgical purposes. C. Hensler.

Silicious copper, silicious tin, and silicious zinc are produced by melting the respective metals with silicious iron.

358,816.—Photography. A. M. Jacobs.

358,817.—Photographic reproduction. A. M. Jacobs.

March 5th, 1887.

358,865.—Production of mixed azo coloring matter. C. A. Martins.

358,901.—Fluid ink eraser. J. W. Tallmadge.

Consists of acetic acid and solution of calcium hypochlorite.

359,148.—Separation of glycerin from fats. R. Giebertmann.

W. R.