Notes on Finzelberg's pure soluble pepsin

NOTES

ON

Finzelberg's Pure Soluble Pepsin.

(1 to 100.)

PREPARED EXCLUSIVELY BY

H. Finzelberg's Nachfolger,

CHEMICAL LABORATORY,

ANDERNACH on the Rhine.

New York Depot:

ERNEST MOLWITZ,

54th Street, cor. 6th Avenue.

L. BOEKER, Druggists' Printer, 161 William St., N. Y.

PEPSINUM SACCHARATUM. Saccharated Pepsin. U. S. P., 1880.

PEPSIN, the digestive principle of the gastric juice, obtained from the mucous membrane of the stomach of the hog, and mixed with powdered Sugar of Milk.

Saccharated Pepsin is a white powder of a slight but not disagreeable odor and taste, and a slightly acid reaction. It is not completely soluble in water, leaving flocules of pepsin floating in the solution, which, however, dissolve on the addition of a small quantity of hydrochloric acid. Strong turbidity of the acidulated solution indicates the presence of mucus, which also imparts to the Saccharated Pepsin a disagreeable odor and taste, and will eventually impart to it an ammoniacal odor.

One part of Saccharated Pepsin, dissolved in 500 parts of water acidulated with 7.5 parts of hydrochloric acid, should digest at least 50 parts of hard-boiled egg-albumen in 5 or 6 hours at a temperature of 38° to 40° C. (100° to 104° F.).

FINZELBERG'S PEPSIN, as regards its purity and general characteristics, is not only concurrent with the requirements of the United States and British Pharmacopœias, but in its digestive power it is double strength of these two standards, and when Pepsin of the Pharmacopœia is ordered, FINZELBERG'S can be reduced to that strength by mixing it with equal parts of Sugar of Milk.

Finzelberg's Soluble 100% Pepsin.

There is perhaps no article in the drug market, for which there has been so much competition, as pepsin. Numerous kinds were introduced with all the praise and testimonials the interested parties were able to produce, and although some of them gained high favor among the profession, up to the introduction of Finzelberg's, no pepsin has ever combined all the properties expected of a pure article. This combination of virtues has been reached by Finzelberg's pepsin. It is a white, odorless, non-hygroscopic powder, sweet in taste and distinguished from all other pepsins by the fact that it is entirely soluble, never changes or deteriorates, neither by age nor exposure.

Finzelberg's pepsin is the purest active pepsin, brought to the convenient standard of 1 to 100, (by the addition of sugar of milk and cane sugar) i. e. one part of pepsin will dissolve 100 parts of coagulated albumen or 250 parts of fibrin in 6 hours. It is therefore freely taken by the most delicate stomach. In order to test the digestive power of pepsin, the following test by Prof. Wittstein should be strictly observed: Dissolve 1 part of pepsin in 100 parts of water and 1 part of hydrochloric acid, add 2000 parts of water with 25 parts of hydrochloric acid, and add this to 100 parts of fresh boiled, finely chopped white of Egg or 250 parts of fibrin, and let this mixture digest for six hours, with frequent agitation, at a temperature of 100—104° Fahrenheit, when the entire solution must be accomplished. The albumen for the above named purpose should be taken from eggs which have been boiled for 4 minutes and then cooled in cold water in order to be able to separate the white more freely from the yolk. In making comparative tests of different pepsins, the albumen used should all be taken from eggs of the same boiling, as the difference in hardness would naturally impair the exactness of the experiment. Although in this manner every one

is enabled to test the pepsin he buys or uses, there are still many brands in the market which are almost worthless and are nevertheless occasionally prescribed. This apparently strange phenomenon is easely explained by the fact, that very few practitioners or dealers ever take the trouble to make an actual comparative test of the pepsins presented to them, for if they did they would be surprised with the discovery that scarcely any of the so called pepsins will dissolve more than one-third of the quantity of albumen stated on the label or circular. But this will not surprise you after discovering that most of the saccharated pepsins consist almost entirely of sugar and what is called *Pure pepsin without any foreign admixture* consists actually more of stomach scrapings than of pepsin. This unreliableness is the objection to all of them. Then one is entirely insoluble, the other is of a most disagreable taste and odor, a third contains salt and some possess all these disadvantages at once and all these disadvantages are displaced by Finzelberg's pepsin. *It will dissolve the quantity of albumen stated on the label, namely* 100 *times its own weight, being double strength of that required by the British Pharm., it is entirely soluble, it is odorless and of a highly pleasant taste.*

It has long been the object of European pepsin manufacturers to produce a pepsin which would in every respect answer the following requirements. Pepsin should be a white, odorless, soluble and non-hygroscopic powder of a pure sweetish taste and should digest at least 100 times its weight of coagulated albumen or 250 times its weight of fibrin. *A pepsin answering these requirements must necessarily meet the approval of the faculty.* A striking evidence of the solubility of Finzelberg's pepsin is exhibited in the following mixture, which is a very favorite formula of those physicians who have convinced themselves of the superior quality of Finzelberg's pepsin.

℞	Pepsini Finzelberg	2 drachm.
	Acidi hydrochlorici diluti	1 "
	Glycerini	4 "
	Aquae q. s. ad	8 ozs.
M. S.	Tablespoonful three or four times a day.	

It is to be borne in mind that some kind of acid should always accompany the administration of pepsin as the efficacy of it is thereby much increased.

The digestive power of Finzelberg's pepsin remains unimpaired, even if kept for years, nor will it be destroyed by exposure to a dry heat of 212° F., as demonstrated by Prof. E. Salkowski.

Sherry or Rhine Wine are grateful vehicles for the administration of pepsin, but owing to the fact that pepsin wine will loose its digestive quality in a considerably short time it should always be prepared fresh when needed or only be kept in stock in such quantities as are readily disposed of.

Among the many applications of Finzelberg's pepsin, the following ones are also highly recommended.

There are patients, whose stomachs are very sensitive to certain drugs and they are either unable to retain them or will experience great inconvenience if those drugs are retained. The physician therefore is not unfrequently compelled to abstain from a treatment which otherwise would have just been indicated. Quinine for instance, will in many people cause severe and convulsive pains in the stomach. Experience has shown however, that this is avoided when accompanied by pepsin. This combination with pepsin can of course be extended to all medicines which have a similar effect upon the stomach. Digitalis, as is well known, very often causes disorders of the stomach. Medicines, which will destroy the digestive power of pepsin are naturally excepted.

Acids, such as phosphoric, sulphuric or other acids are sometimes the source of violent cramps, while when combined with pepsin they are accepted by the stomach without any molestation whatever, thereby also increasing the efficacy of the acid.

As an evidence of the high reputation which Finzelberg's pepsin already enjoys in Europe, we submit the following extracts from some well-known European scientific journals:

Virchow's Archiv für pathologische Anatomie und Physiologie und für klinische Medicin, vol. 81, 1880.

"On the effect of ferments, the notion of peptone and the hemialbuminose of Kuehne by Prof. E. Salkowski."

etc. etc. "In most of my experiments I used a pepsin made by Finzelberg of Andernach o. Rhine. This preparation as will be shown in the following, proved to be very active." etc. etc.

"The success of these experiments, to define the result herewith, was that between the effect of the genuine ferment and the one artificially produced (Finzelberg's pepsin) at a temperature of 212° F. for 3 or 4 hours, no difference whatever was perceived."

Schweizerische Wochenschrift für Pharmacie, No. 52, 1880.

"Note sur les pepsines et pancréatines commerciales."

Il y a environ 25 ans que Corvisart médecin de l'empereur Louis Napoléon recommandait déjà l'usage de la pepsine pour le traitement de certaines affections gastriques et si son emploi ne s'est pas vulgarisé aussi rapidement qu'on aurait pu s'y attendre, cela provient essentiellement du fait que cette drogue, jusqu'à présent d'un prix fort élevé, a rarement été livrée au commerce à un dégré de pureté suffisant.

L'activité, le pouvoir dissolvant des pepsines varie énormément et sur 20 préparations différentes que j'ai pu examiner, il n'en est pas une qui ait été trouvée pareille à l'autre. Je me bornerai à citer ici les chiffres extrêmes que j'ai obtenus pour le pouvoir dissolvant:

1 grm. Pepsine Witte dissout en moyenne 100 grm. de fibrine ou d'albumine coagulée (quelques échantillons dissolvaient 95 grm., d'autres 100 grm., d'autres 110 grm.).

1 grm. Pepsine granulée (Lamatsch) prov. de Gehe & Cie. dissolv. 40 grm.

1 grm. id id id autre prov. id seulement 20 grm.

1 grm. Pepsine amylacée (prov. d'une maison française) dissolv. 10 grm.

1 grm. id id id de Gehe & Cie.) id 20 grm.

1 grm. Pepsine allemande soluble (semblable comme aspect et solubilité à la pepsine Witte), qui m'avait été procurée par la maison N. d. H. Bernouilly & fils à Bâle et préparée par Mr. H. Finzelberg à Andernach dissolvait 350 grm. de fibrine humide on the blanc d'oeuf coagulé dans le même temps et le même milieu.

Tous ces essais furent faits simultanément dans une étuve dont la température était maintenue entre 40 et 50° C. J'employai pour chacune de ces préparations de la fibrine et du blanc d'oeuf coagulé entre 80° et 90° et de l'eau acidulée au 3 et 4 millièmes d'acide chlorhydrique vrai. etc. etc.

C. Coeytaux, pharmacien à Echallens.

Pharmaceutische Zeitung No. 5, 1881.

"Pepsinum Germanicum and Vinum Pepsini. By O. Schlickum."

The report published in No. 1 of this journal on Dr. Ewald's examinations of the different pepsins in the German market, prompted me to repeat my investigations on the same subject which I had begun two years ago. For this purpose I subjected to a close examination especially the following three brands of pepsin: 1. Witte's of Rostock. 2. Finzelberg's of Andernach. 3. Marquart's of Bonn.

I conducted the experiments according to directions given by Dr. Hager in his well-known "Manual of Practical Pharmacy" (Vol. I, page 643). 0,1 gramme of pepsin, dissolved in 100 grammes of water were digested, at a temperature of 35° C., with 2 grammes of hydrochloric acid and 10 grammes hard boiled white of egg. After about 12 hours, Witte's as well as Finzelberg's pepsin had dissolved the entire quantity of albumen, but the solutions, upon exact neutralization, produced heavy precipitates of syntonin.

In the solution of albumen as well as in the neutralization, I detected no difference between the two preparations. Both pepsins were equal in their digestive power and both gave equally heavy precipitates of syntonin; they were completely identical, as though they were the same preparation. After a continued digestion of 12 hours more, I failed to produce any precipitate upon neutralizing the albuminous solutions, but only a slight turbidity. As the report of Dr. Ewald's investigations was calculated to show the inferiority of Finzelberg's pepsin, I felt a deep interest to conduct these tests very carefully. I therefore subjected a sample of Finzelberg's pepsin, which I had kept in my office for a year and a half to the

same manipulations and it stood the test most excellently, showing that its activity had not been impaired by age. Marquart's pepsin proved to be decidedly weaker than the two other brands. As it failed, even after two days digestion, to dissolve all the albumen, it cannot be called a 100% pepsin, like Witte's and Finzelberg's, as it dissolved only 60%.

The principal object in pepsin is always its activity, and I therefore commenced my report with it. But its physical properties are also essential and *in this respect I must confer unlimited praise on Finzelberg's pepsin.* Finzelberg's pepsin possesses an extremely white color, a pure sweet taste (of sugar of milk) and is almost odorless. It forms a clear solution with 100 parts of water, having only a slight white sediment. This solution does not foam upon shaking, is perfectly neutral, will not get turbid upon the addition of tannic acid or chloride of iron, *and will become perfectly clear upon the addition of hydrochloric acid,* as well as alkaline carbonates.

Marquart's pepsin is distinguished from Finzelberg's by its yellowish tint, otherwise it possesses the same properties as Witte's pepsin; it is intermingled with brownish specks and its 1% solution throws down a yellow sediment. Its odor is much stronger than Finzelberg's and plainly perceptible. It tastes sweet and salty, being due to the presence of 2% of table salt (chloride sodium), its aqueous solution foams heavily upon agitation (due to the presence of mucus?) but in the other respects it shows the same purity as Finzelberg's preparation. *In consequence of these comparative tests I came to the conclusion to give preference to Finzelberg's pepsin, for, though not superior in strength to Witte's pepsin, it surpasses that preparation by its general features.* Marquart's pepsin is left far behind, as its strength is very much below that of either of the other two preparations.

For the purpose of comparison I also experimented with some Vinum pepsini, which I had made myself a year ago and which had been kept in a sealed bottle, entirely filled; but I cannot speak highly in its favor. Its digestive power was, even after the addition of considerable quantities of hydrochloric acid not very great, corresponding to about 0,05 grammes pepsin in 100 grm of wine. It would indeed be preferable and commendable to the authors of the

new Pharmacopoeia to substitute for the present Vinum pepsini a preparation made by dissolving about 1% of good pepsin in a suitable wine and which, of course, could be prepared ex tempore.

Pharmaceutische Zeitung No. 6, 1881.

"Pepsinum Germanicum and Vinum Pepsini."

Under this title my colleague, Mr. Schlickum published an article in No. 5 of the Pharm. Ztg., in which he disproves the allegations of Mr. Ewald in No. 1 of this paper and comes to the conclusion, that as far as peptonizing power is concerned, there existed no difference between Witte's and Finzelberg's pepsins and that even in regard to appearance and taste preference should be given to Finzelberg's preparation.

Before Mr. Schlickum ever published the result of his investigations, the undersigned was requested by Mr. Finzelberg, with whom he is in business relations, to make investigations in reference to these two pepsins and then to give a résumé. Mr. Schlickum however, preceded me in this, but I cannot abstain from stating here that my investigations correspond with those of Mr. Schlickum in every particular and I hereby fully endorse his words "though equal in strength to Witte's pepsin, preference should be given to Finzelberg's as it exceeds Witte's by its general features."

G. Berg, Dresden.

Archiv der Pharmacie, Zeitschrift des Deutschen Apotheker-Vereins, March 1881.

"Comparative examinations of two German preparations of pepsin. By Dr. O. Litzenmayer, Wittstein's Laboratory at Munich."

In consideration of the constantly increasing consumption of pepsin and of the different actions of some of the pepsins in the market, the report by Dr. Ewald (Zeitschrift für klinische Medicin, I, page 231) was thought to be a welcome contribution. Meanwhile, however, the statements made by that gentleman were repeat-

edly disapproved; these circumstances led me to compare particularly the two pepsins in question, which were competing for the first rank, namely Witte's of Rostock and Finzelberg's of Andernach o. Rhine, and also because opinions on the quality of commercial pepsins were published from our laboratory before. (Wittstein, Archiv der Pharmacie, XI, 1, page 78.)

For this purpose I admitted only the commercial article into the sphere of my investigations and I therefore never procured it directly from the manufacturer, but from domestic and foreign drug houses. Each and every test was repeated with each sample, all under the same conditions and with the greatest care.

The two manufactures, as they thus reached my hands, exhibited nearly the same physical and chemical properties. Witte's pepsin presents a non-hygroscopic white powder with a slight inclination to gray and is intermingled with small dark specks, some plainer visible than others. Its taste is salty and sweetish, its odor slightly aromatic. (The odor peculiar to most pepsins seems to be disguised by some aromatic.) 1 gramme on the addition of 1 C. C. of hydrochloric acid, sp. gr. 1,125, dissolved in 100 C. C. of water leaves on an average 0,4% to 0,8% of residue of a brownish yellow color.

Finzelberg's pepsin is likewise a non-hygroscopic, but also a pure white and perfectly uniform powder; it possesses a pure sweetish taste and a scarcely perceptible odor. In testing it for its solubility in the same manner as Witte's, it also leaves a residue of about 0,4% to 0,9% of a somewhat yellowish color. To study the digestive effects of the two pepsins, according to Wittstein's proportions, 0,1 gramme of either pepsin, dried over sulphuric acid, was dissolved in 0,1 gramme hydrochloric acid and 10 grammes of water and then to this solution 10 gramms of finely cut, hard boiled white of chicken-egg, 2,5 gramms of hydrochloric acid (sp. gr. 1,125) and 200 gramms of water were added and the whole digested at a

temperature of 30—40° C. with frequent agitation. These experiments demonstrated plainly, that the time required for the complete digestion of albumen depends much upon the hardness and much more so upon the fineness of the albumen. When finely cut albumen, which had been boiled longer than 4 minutes, was used, it required always more than 6 hours for complete digestion, up to 12 hours being necessary. Finely cut albumen of 4 minutes boiling and which was therefore pretty soft, required about 6 hours for solution. In taking however, albumen of six hours boiling and beating it to a fine pulp, no more than 3 or 4 hours were required for complete digestion. While continuing these experiments up to the complete solution of the albumen, it was always plainly visible in the different samples of pepsin *that Finzelberg's was constantly ahead of the others and after the solution of Finzelberg's sample had been effected, there was always some albumen undissolved yet in the others.*

As a more appropriate method for determining the intensity of action of the two pepsins, I interrupted some of the tests previous to complete solution and then gathered the undissolved albumen on a filter, dried it between bibulous paper and then weighed it. In a test with mashed albumen of 5 minutes boiling, the remaining portion after 4 hours digestion amounted in the case of Witte's samples, to 6,7—12,3%, in Finzelberg's to only 2,0—7,5% of the albumen originally employed. In a test with finely cut albumen of 6 minutes boiling, the undissolved portion amounted in Witte's test to 50% and in Finzelberg's to 31,50%, after a digestion of 6 hours. Each of these samples was obtained from the same druggist.

To determine the peptonizing effect of the two manufactures, I treated the filtered solutions of the foregoing tests with 10 grammes of nitric acid (sp. gr. 1,2) each. In all cases heavy precipitates of Syntonin were produced. Filtered and dried on filtering paper, these precipitates weighed, in the case of Witte's pepsin 18,5—18,7%

and in Finzelberg's 10,9—14,7 % of the albumen originally employed. In another test where all the albumen had been dissolved, the precipitate of syntonin amounted in Witte's pepsin to 17,0 and in Finzelberg's to 10—13,2 %.

These results show beyond doubt that as for physical quality and especially for digestive and peptonizing power Finzelberg's pepsin is slightly superior to Witte, but at all events equal to it.

At last I would state that 4 different samples of Finzelberg's pepsin, obtained from different sources, were in their appearance and effect entirely identical.

Business Report of Gehe & Co., Dresden, April 1881.

PEPSIN. At present three different pepsins compete for superiority in the German market. Hitherto we have considered the respective efforts of each brand to obtain the highest rank, for simple newspaper skirmishing, but we have since been convinced through careful examination that the article with neutral reaction (Finzelberg's pepsin), which appeared in the market lately is in fact one, in which the most advantageous properties are combined and is an article which more than any other deserves the some what euphemistic term 100 % pepsin.

CORRESPONDENCE.

Provincial Nursery and Hospital,
ANDERNACH.

In the Prov. Insane Asylum at Andernach there has been used for the past year and a half, to a great extent and for all the various forms of dyspepsia the Pepsinum pur. of Finzelberg and we were not only highly pleased with its general properties, such as

color, odor, taste and stability, but in its therapeutic effect it was also the best *).

While Finzelberg's pepsin in regard to its digestive and peptonizing capacity, dissolving 100 times its weight of albumen or 250 times its weight of fibrin, is at least equal to Witte's, it is in its general character far superior to the latter. Witte's pepsin has a yellowish appearance, a cinnamon-like odor and also the same taste with a salty admixture and shows under the microscope numerous crystalline brownish bodies.

Finzelberg's pepsin looks pure and white, is almost odorless and has a simple sweet taste ; it is devoid of all dark or colored specks. The aqueous solutions of the two pepsins differed in like manner. Witte's preparation forms a yellowish solution, especially when concentrated. Finzelberg's pepsin is perfectly colorless in its solution, just like sugar of milk. I had occasion to procure some Finzelberg's pepsin made in May 1879 and some of Witte's made in November of the same year. Of these two older preparations, Finzelberg's proved to be sound in every respect, while Witte's had suffered severely in its digestive quality, it being reduced to 75% and apparently it had attracted moisture as it was clogged up in small globules.

All these examinations were conducted according to Dr. Wittstein's method.

Andernach, Jan. 25th, 1881.

Dr. med. F. Schuchardt.

*) With equally beneficial results, as mentioned by the author of this letter, Finzelberg's pepsin has been applied in cases of sea sickness.

The passengers, as soon as they were approached by the harbingers of this dreadful malady, took a pinch of the pepsin with acidulated water (5 drops of hydrochloric acid to a half tumbler of water). This operation was repeated several times a day, especially directly before or after eating. The results were extremely satisfactory and they certainly invite future experiments in this direction, as this acidulated pepsin solution is also easily taken by children. Moreover it is not difficult to explain this effect of pepsin with hydrochloric acid physiologically.

Dr. v. PIEVERLING,
Prop. "Maximilian Apotheke",
Glück St. 1.

Munich, Febr. 5th, 1881.

Dear Sir :

In granting your request with pleasure, I cannot fail to state that in regard to activity as well as general qualities I never handled a pepsin which could compare with that prepared by you. The effect is just what you claim for it, i. e. it will dissolve 100 times its weight of albumen in somewhat less than 6 hours. The same of course, can be said of Witte's pepsin, but your preparation excels Witte's by the entire absence of any impurities that could affect the organs of taste or smell unfavorably. It is a perfectly homogenous substance, soluble up to traces and the solution is colorless. These are advantages only reached approximately by Witte's pepsin. But also French and English pepsins, which, to get the best, I procured at fancy prices, cannot stand a comparison with yours.

Yours very Respectfully,

Dr. v. Pieverling.

Finzelberg's pepsin is recommended to all who are free from any National prejudice, and who prescribe an article not for its nationality, but for its merits, and those, who prescribe domestic pepsins simply, because they are American are specially invited to investigate, to compare by actual test, (according to Dr. Wittstein's directions as given in the foregoing pamphlet) the brands of pepsin which they deem most effective with Finzelberg's and we feel assured that they will never again prescribe any other than Finzelberg's pepsin.