

2. Sulphide sulphur added as hydrogen sulphide in concentrations of 0.0022 mg. per 125 cc. may be used as a sulphur source by growing yeast. In higher concentrations it retards yeast growth, especially when a good sulphate containing medium is employed.

3. Cystine stimulates yeast growth slightly in concentrations of 1 to 4 mg. per 125 cc. medium. In higher concentrations and especially in a good sulphate containing medium it retards yeast growth. Cysteine behaves similarly. Possibly the harmful effect of these is in part due to their partial conversion into hydrogen sulphide.

4. Cystine sulphur is partly utilized in synthesizing new yeast protein, but a part of it also remains in the medium as sulphate.

5. In otherwise sulphur free media cysteinic acid stimulates yeast growth very slightly, but in a sulphate containing medium it retards the same.

6. Taurine in concentrations of 2 to 20 milligrams per 125 cc. has no appreciable effect on yeast growth.

7. Taurocholic acid in concentrations of 1 mg. or more per 125 cc. was toxic even in sulphate media.

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Specific absorption studies upon calf rennin.

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The question of the identity of pepsin and rennin has been under consideration for many years, Pikelharing,¹ Pawlow² and others, holding to the view that pepsin and rennin activities were not distinct, with Hammarsten,³ and more recently Fenger,⁴ claim that the two activities are different in character.

¹ Pikelharing, C. A., *Z. Physiol. Chem.*, 1896, xxii, 233-44.

² Pawlow, J. P., *Z. Physiol. Chem.*, 1904, xlii, 415; Schmidt-Nielsen, S., *Z. Physiol. Chem.*, 1906, xlvi, 92.

³ Hammarsten, O., *Z. Physiol. Chem.*, 1911, lxxiv, 142-68; *Ibid.*, 1918, cii, 33-77.

⁴ Fenger, F., *J. Am. Chem. Soc.*, 1923, 249-55.

The study made in this laboratory was carried on in order to help bring further proof as to the identity of these two activities.

A very active preparation of rennin was made by the method of Fenger.⁴ The dried product from this method of preparation showed on the average a milk-curdling power of 1:1,000,000 in ten minutes on fresh pasteurized milk at 40° C. Reprecipitation of this material gave a final product 41.66 times as active as Armour's commercial rennin. It was more active than could be consistently prepared by the sodium chloride salting out process and it had the advantage of being free from absorbed sodium chloride. The product can be kept for a long time without losing activity.

Studies were then carried out in order to determine if a more active product could be prepared. This was attempted by absorbing the rennin activity from the calf preparation, on solid purified casein suspended in solutions at various pH values. In these studies it was observed that the rennin activity could be absorbed to the extent of 90 to 95 per cent when the pH value of the solution was from 4.4 to 4.6. This was shown to be true by testing the filtrates, after absorption, for milk curdling power. It was also observed that the absorbed rennin activity could be recovered from the casein to the extent of 75 per cent to 80 per cent by bringing the solution to a pH value of from 6.4 to 6.6 by means of NaHCO₃. The recovered rennin, however, contained considerable casein, which prevented the exact determination of the purity thereof, hence it was thought that another protein, of different solubilities than casein, might be used to advantage.

Dry, powdered, coagulated, acid treated egg white was then used as the absorbing medium and it was found that only from 17 per cent to 20 per cent of the rennin activity was absorbed by the egg white. It was known from work being carried on in the laboratory by Dr. T. L. McMeekin that hog's pepsin could be absorbed practically quantitatively on coagulated egg white. Studies were then carried out by the method of McMeekin⁵ to determine if the absorbed material on the egg white possessed peptic activity. It was found that solutions of the calf rennin

⁴ Fenger, F., *J. Am. Chem. Soc.*, 1923, xlv, 249-55.

⁵ McMeekin, T. L., Doctorate Dissertation, U. of Chicago, 1925, "Studies on the Purification of Pepsin."

preparation when incubated with egg white in 0.3 per cent HCl for two hours at 40° C. showed digestive powers from 36 per cent to 37 per cent of that of 1:3,000 hog pepsin solution of the same per cent strength. These experiments also showed that this pepsin or pepsin-like material contained in the calf rennin preparation can be removed from its solution to the extent of 84 per cent to 92 per cent by absorption on egg white without appreciable removal or destruction of the rennin activity. The filtrates resulting from the egg white absorption process possessed only slight pepsin proteolytic power, but had from 87.5 per cent to 91 per cent of the milk curdling power of the original rennin solutions.

It was also observed that a mixture of hog preparation and calf preparation when incubated with egg white in 0.3 per cent HCl showed digestive powers equal to the sum of the two. The study shows, therefore, that practically complete separation of hog pepsin and calf rennin can be made by absorption on acid treated egg white and that the calf preparation contains two activities which can be separated from each other without destruction of either one, by absorbing the respective activities upon the proper proteins at properly controlled pH values.

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Effect of visual impulses on the posture of the head.

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It is a well known fact that the normal position of the head is maintained through impulses coming mainly from the otoliths (labyrinthine righting reflexes on the head). An animal with both labyrinths destroyed will not be able to preserve the normal posture of the head when held in the air in various abnormal body positions. According to Magnus,¹ the cat, the dog, and the monkey are exceptions to this rule, in that through visual im-

¹ Magnus, R., *Koerperstellung*, Berlin, 1924, p. 19, 224, 261, 267.