

A Note on the Growth Promoting Properties of an Enzymatic Hydrolysate of Casein

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In a recent paper¹ it was demonstrated that the catheptic enzyme of spleen acting on proteins at pH 4—5 rather rapidly produced a mixture of amino acids and low molecular peptides. The investigation was carried out to study the proteolytic split products obtained by the digestion of protein known to contain Castle's extrinsic factor. As a preliminary procedure to the clinical application the possible presence of toxic products formed during the hydrolysis was tested on young rats. It was found that the administration of the hydrolysate had no unwarranted influence on the growth curves when compared with the growth curves of the control animals.

In this series of experiments the average daily food consumption was not determined but the general impression obtained was that the food intakes of the rats in the experimental series were less than the intakes of the control animals. A quantitative determination of the possible difference was accordingly carried out in a new series of experiments.

EXPERIMENTAL

The animals were young albino rats with an average weight of about 80 g, of the stock bred in the Department of Hygiene of the University and the diet used was that recently described by Gard.² The animals were kept in individual cages. The catheptic casein hydrolysate was obtained by digesting 4 litres of a 3 % casein solution with 0.6 kg of beef spleen at 30° C for 72 hours. The hydrogen ion concentration was adjusted to pH 4.2 after periods of 24 hours. At the end of the digestion period insoluble material

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was centrifuged of and the centrifugate concentrated *in vacuo* at 15° C, so as to contain about 20 mg of nitrogen per ml and then glucose was added to a final concentration of 75 mg per ml. Assuming an average nitrogen content of 16 % in the digested proteins the rats were given a volume of the hydrolysate corresponding to 3 g of protein per kg body weight and day with pipettes. This group of animal, like the control group, was given the stock diet and water *ad libitum*: weighings of the food consumed and of the animals were made each day. The growth data are given in table 1.

Table 1. Growth of rats on a mixed diet with the addition of a catheptic protein hydrolysate.

Group	No. of animals	Average daily weight gain	Average daily food consumption	Weight gain per g food eaten
Experimental	16	2.4 ± 0.11*	11.0 ± 0.24*	0.22 ± 0.010*
Control	15	2.5 ± 0.12	16.3 ± 0.31	0.15 ± 0.012

* The values in these columns are the means and the standard errors.

The average daily weight gain was the same in both groups in accordance with the previously obtained results. On the other side there was a considerable difference in the average daily food consumption. The small amount of catheptic hydrolyzed protein with glucose daily administered (0.36 g of dry substance) was capable of promoting a significant increase in the weight gain per g food eaten. This property of the hydrolysate may possibly be correlated with the presence of enzyme resistant peptides with special growth effects in the extract.³ The presence of a similar effect in a tryptic digest of casein has previously been demonstrated by Wolley.⁴ The chemical and clinical properties of the hydrolysate are being further studied at present.

SUMMARY

The administration of small amounts of a catheptic casein hydrolysate to young rats significantly increased the weight gain per g food eaten.

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