

BIOCHEMICAL METHODS FOR DETECTING MEAT QUALITY

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INTRODUCTION

The quality of meats are different according to the sources they come from. Due to different religious believes and eating habits in different countries are different districts, the selections of meats are various. Thus it is a problem concerning both consumers and the administration of commodity inspection deeply to discriminate and identify different kinds of meats and the probable mixing, blending and adulteration. This article presents, after a sequence of studies, a series of methods for solving the problem cited above.

MATERIALS AND METHODS

Materials see text, methods see references cited below.

RESULTS

Item I
1) We used DE to separate 11 kinds of proteins from pig, beef, rabbit, mutton, chicken, goose and 5 kinds of fishes: carp, butter fish, silver carp, grass carp, bighead. The DE spectra of these muscle proteins were different in numbers of line and position and can be differentiated clearly from each other. (Ref.1)
2) By IAD method, using antisera prepared by immunizing rabbits with water infusions of pig muscle & chicken muscle separately, three different kinds of meats (pig, mutton, chicken) were differentiated. (Ref.2)

Item II
1) Detection of blending of different animal meats
a) By using DE method, we obtained that the DE spectra of mixed muscle samples (pig & chicken; pig & goose; chicken & goose) are different from those of single muscle samples respectively. The blending can be detected. (Ref.1)

b) By using IAD method, the blending of muscles of pig & mutton and of pig & chicken were detected, and the quantity of blending can also be estimated. (Ref.2)

2) Detection of blending of plant proteins in animal meats

a) By IAD method, the blending of plant proteins in pig muscle was detected, and the quantity estimated. (Ref.2)

b) By determination of the quantity of total creatinine, the amount of plant proteins was estimated. (Ref.3)

c) By determination of the quantity of total nitrogen, the amount of plant proteins was likewise estimated too. (Ref.3)

3) Detection of the blending of plant proteins in meat products.

a) By total creatinine method

b) By total nitrogen method

a),b) as above (Ref.3)

Item III

1) Evaluation of the quality of fresh meat (pig)

a) The content of net muscle protein
The value was obtained by subtracting the value of 8 times hydroxyproline from the amount of total protein. The more the content of net muscle protein, the higher the quality of the meat. (Ref.3)

b) The content of tryptophane (Trp.) and hydroxyproline (Hyp.)

In general, when the content of Trp. in meat is high, that of Hyp. is low, then the meat quality is superior. e.g. M.lumbar eye > M.biceps femoris > M.supra spinatus. (Ref.4)

c) CPK activity

The CPK activities determined, no matter by what method, were related positively with the edible quality of meat e.g. M.longissimi > M.psoas major; M.lumbar eye > M.biceps femoris; M.lumbar eye > M.psoas major > M.supra spinatus. (Ref.3,5,6,7,8,9,10)

d) PHI activity

The activity of PHI was related to CPK activity and can also be used as a biochemical index of meat quality. (Ref.7)

2) Evaluation of meat products quality
Using total creatinine method, the % of animal meat in meat products (such as canned meats, sausages etc.) can be determined. (Ref.3)

3) Discrimination of fresh meat, frozen meat and spoiled meat

In fresh meat, the content of free crea-

tinine is very low, whereas in frozen and spoiled meat, the contents are higher than the former. Thus the determination of free creatinine is a measure of discrimination of fresh meat, frozen meat and spoiled meat. Furthermore, the creatine content is higher in uncooked meat, so it can also be used as an index. (Ref.3)

CONCLUSION

We developed and confirmed, after a series of studies, that eight kinds of biochemical indices viz. total creatinine, creatine, total nitrogen (or total protein), net muscle protein, hydroxyproline, tryptophane, creatine phosphokinase and phosphohexose isomerase and two methods --disc electrophoresis, immunoagardiffusion can be used in:

- 1) Differentiation and identification of various kinds of meats
- 2) Detection of whether there is adulteration or blending of meats
- 3) Evaluation of the edible quality of meats

These studies were based upon solid biochemical theories. The indices and methods are accurate and reliable, and can be recommended as a suitable series of methods in practical assay works.

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