

STUDY OF THE STRUCTURE OF BIOSUBSTANCES BASED ON COLLAGEN ALBUMENS FROM THE ANIMAL CONNECTIVE TISSUES

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Background

The known uniqueness a squirrel of a collagen, founded on features of pattern and functions, is a reason of a universality of concern to it(him) [1, 2]. A rich source of collagens - animal tissues, owing to what there is a large scientific - practical concern to a meat industry, specially to inedible not enough used to waste and afterproducts of processing inclusive a considerable mass fraction of a collagen [3-5]. In view of heterogeneity of a general (common) albuminous fraction and availability of proteic matters, the technological approaches in obtaining the furbished collagenic substances are reduced to clearing of ballast components in pattern of tissues [6-8]. The apparent advantages of biotechnology determine a urgency of researches on survey of conditions of targeted applying of enzymes for a hydrolysis of attendant biopolymers in achievement of the indicated purpose

The aim of the work is a selective separation of highly refined fractions of collagen albumens from the animal tissues /fig. 1, 2/, a comparative estimation of the structure for native and modified biopolymers and their ability to form the film biomaterials.

Objects

The objects of study were secondary collagen containing raw material of meat industry (veins, tendons, fasciae) and enzymes (proteases).

Methods

Determination of total proteolytic activity has been carried out by modified method of Anson. The rate of collagen destruction was estimated according to the quantity of the formed tyrosine, which was determined according to reaction with the "biuret" reactive. The ultra thin films were colored by method of Van-Hyson.

Results and discussion

The analysis of an elemental composition collagen containing meat raw has shown, that the mean contents of protein 18-24 %, the structure is submitted (shown) water soluble, salt soluble and alkaline soluble by fractions in the ratio, %: 3,0:3,9:17,0. The features of an elemental composition have stipulated initial selection(sampling) of ferment drugs, among which one concern introduce proteolytic. The characteristic tested for processing collagen containing raw of drugs is submitted in table 1

Opening-up of raw executed by preliminary grinding on a top about a dia of openings of a grating of 2-3 mm and mixing with water in the ratio 1:2. A mixture heated to temperature 37-40 °C, the ferment drugs introduced at the rate of on activity, which one previously determined pursuant to a known technique. Processing of raw by enzymes order within 2,5-3 hours. At operating ferment drugs on biopolymers of raw there is their turning into dissoluble products, except for hard-to-reach protein - collagens. After the applicable processing of a mix(mixture) the not dissolved rest(remainder) separated from over sediment of a liquid and received collagenic weights fig. 3.

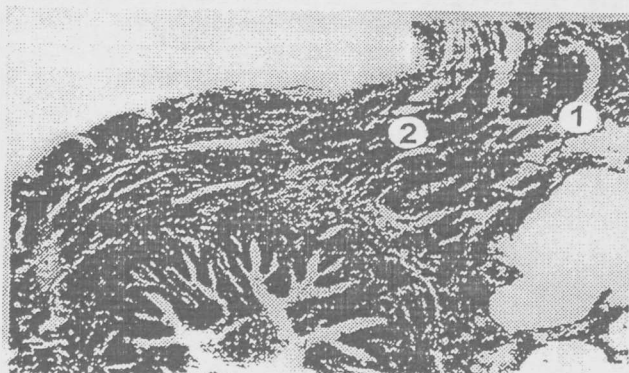


Fig. 1. Morphological features of a constitution of collagenic fibres in hystostructure of the mild large cattle:

× 87,5;

1 - trabecules; 2 - collagenic fibers

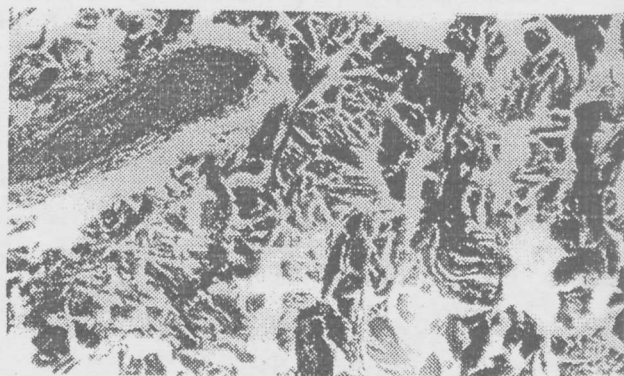


Fig. 2. Morphological features of a constitution of collagenic fibres in hystostructure of the mild large cattle

Purity and integrity of pattern of a collagen - main requirements determining applicability of a drug and the product. An estimation of a degree of operating of ferment drugs on pattern of a collagen - enough composite experimental problem. As the control have used collagenic weight obtained from skins of the large cattle by chemical treatment.

Calculation of interplanar spacing intervals dhkl and intensities (on a maximum and integral) diffraction lines conducted under the special programs on a computer «Scintilla».

Table 1

Biochemical properties of ferment preparations Proteolytic operating

Ferment preparations	Source	General proteolytic activity, ed/g	Collagenolytic activity, ed/mg
Protofulvoviridin	Str. fulvoviridis	230,0	0,28
Protochromogenin	Str. chromogenes	253,3	0,38
Protoworthmanin	P. worthmanii	250,0	0,60
Protosubtilin g10h	Bac. subtilis	216,0	0,08
Protosubtilin g20h	Bac. subtilis	400,0	0,18
Megaterin	Bac. megaterium	700,0	0,07

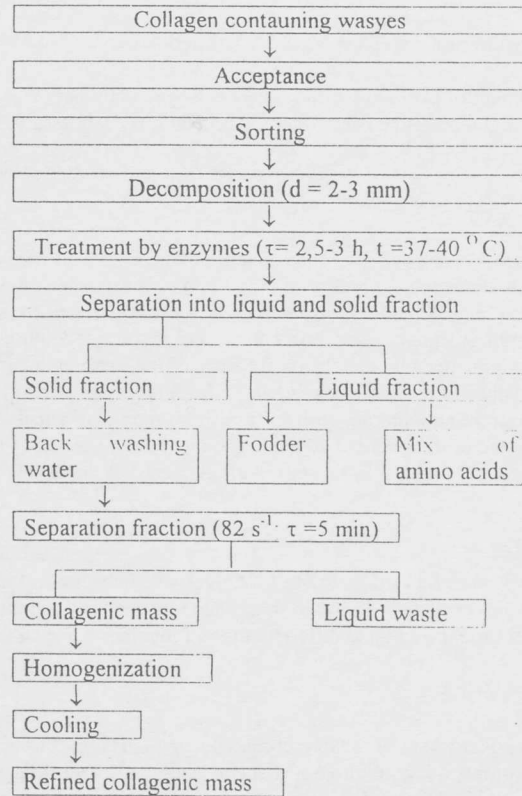


Fig. 3 Collagen mass preparation scheme

The obtained experimental data are characteristic by conformity to the majority of known rated - tabulated values of interplanar spacing intervals and maximum relative intensities for is model of a collagen, isolated of miscellaneous sources.

The registration of integral intensities on the area under diffraction lines, as against an estimation of intensities on a maximum line on a diffractogram, has allowed essentially to increase test-sensitivity and to find out impurity phases, the mass fraction which one is rather small as contrasted to main.

All interplanar spacing intervals identified as applicable to the general data for interplanar spacing intervals at a X-ray diffraction from crystal lattice of a collagen under miscellaneous corners(angles), except for a sample № 7, for which one the availability of three unidentified impurity phases is captured. It, on all visibility, is connected to a steep destruction of collagens in pattern of tissues during long-lived (more than 48 h) ferment processing by protosubtilin g20h and confirms by availability of impurity of a phase of gelatine in a sample, for which one 4 diffraction lines identified.

Conclusions

Specific action of some fermentive preparations from microbial sources in the processes connected with the transformation of biopolymers in the structure of animal tissues has been established. Identification of thermogravimetric characteristics and the comparative evaluation of phase content of half-finished collagen samples obtained on the base of biotechnological and chemical methods of the preliminary treatment has been carried out. Possibilities and advantages of methods of biotechnology in the solution of applied tasks on the production of the given functionality on the base of fermentive treatment of the meat industry collagen-containing raw materials.

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