нали стани стание на понижение ри, последние общиет условие или стану и то на то на протексов. едина полнессов. на немостри на то, что ощи начи парт позме, језници медаг стоимостниц про-по, немостри на то, что ощи начи парт позме, језници медаг стоимостниц про-на одном немостри на то, что ощи начи парт позме, језници медаг стоимостниц про-по на одном да то, что ощи начи парт позме, језници медаг стоимостниц про-по на одном да то, что ощи начи парт позме, језници медаг стоимостниц про-по на одном на то, что ощи начи парт позме, језници медаг стоимостниц про-позме при одном да то одности и та стоимости на отвение на одном начи поднес-на одном на позма и поста и да скорести и стои позме сосорона, что с канкизара сопециал закизоски и памов 1 56 и 167 при поизвопозие спорока типо. Стоимостична сопециациот поста, усовешнаковате оста зго произвопотие, при митотото сопециал поста и соста и стоимание и то позме стои на сосоние с сопециал поста и сосона за сосоние и стоима сосоние. Это со своем стоими солино поста нариски ста технолисти сосонате и отрежается положитопости поста и соста поста поста и сосонате и поста и стоими сосоние с соста на поста технолисти сосонате и отрежается положитопости с соста на поста сосонате и поста и со произсов и отрежается положитопости с соста сосона и сосонате и поста и со произсов и отрежается положитопости с соста сосона и сосонате и поста и сосонате и сосоние с соста сосона и сосонате и поста и со произсов и отрежается положитопости и соста и соста сосона сосона и поста и сосонате и сосона и сосона и сосона и с соста и сосона и поста и поста и сосона и сосона и сосона и с соста на сосона и поста и поста и сосона и сосона и сосона и сосона и сосона и сосона и с соста и сосона сосона и сосона и сосона и сосона и сосона и сосона и с соста и сосона и с соста и сосона и с и соста и сосона и сосона и сосона и сосона и сосо

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MICROFLORA OF RAW-DRIED BEEF PRODUCTS MANUFACTURED BY AN ACCELERATED TECHNOLOGY S. S. SRHOMARO

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The growth of the available microflora during the ripening and drying of non-commi-nuted meat products was studied primarily with the application of brine curing ures stner, 1958). Also, methods were developed for the application of starter cultures to accelerate ripening with brine curing (Petäja, 1972, 1973; Gorbatov, 1974; Schie fer, 1978) and with combined curing (Liepe, 1978; Dzhevizov, 1982). Microbiologic processes upon dry curing have only scarcely been studied (Nestorov, 1981). The objective of the present work was to study the effect of the application of an accelerated dry curing technology on the growth of available microflora in meat pro-ducts made of non-comminuted beef.

The microbiological status was followed in the manufacture of beef jerk, a national product manufactured on a mass scale. To this end, beef M. semitendinosus muscle was used, by the method developed by us (Chakurov, 1979), based on mechanical treat ment and a higher temperature, and by the traditional technology: a temperature of 4 to 6°C. Changes were monitored, in the microflora responsible for the course of ripening, and in the sanitary indicator microorganisms. Also tests were made to the the absence or presence of microorganisms causing food poisonings. Table 1 shows groups of microorganisms determined. The ripening process resulting from the microi biological processes taking place was monitored by determining pH: potentiometrical ly.

Microorganism Group	the found in the tite	Incubation		
	Medium Used	Tempera-	Duration,	
Micrococci (staphylococci),	Rogosa	30 dollar	<u>h</u> 48	
Enterococci (titre) Coliforms (titre)	Chapman Heina Perry Broth Lactose broth	30 30 30	48 48	
Proteus (titre) Anaerobes	Peptone water Indole production PCA slant agar	30 30	48 48	
(titre) Sulfite-reducing anaerobes	Kitt Tarozi broth	30 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	10 days	
Salmonell (Ferric citrate medium (reinoculation from Kitt Tarozi)	an acceleration	48 (r)	
Letta (presence in 30 g)	Enrichment in selenite broth Reinoculation in phenol	43 55 56 54	24 (S)	
sence in 10 g)	red and Gasner Salt broth Reinoculation on Baird	43 30	24 48	
new technology 18 erre	Parker	30 10 30	11938 48	

Table 1. Determined Microorganism Groups

Results and Discussion

The results of the changes in lactic acid microorganisms and micrococci, when applying the two curing technologies, are shown in Fig. 1. It is obvious that, after 5 days, in both variants the counts of lactic acid microorganisms are low (10²), if



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eny. any. Fig. 1. New Yithin the same period, micrococci (staphylococci) have reached 10³ in the days, lactic acid microorganisms reach 10⁴ vs. 10³. Micrococci count already 10³ for count variants. Lactic acid microorganisms continue to increase and, on day 18, they is already in the staphylococci). By that time, the new technology jerk already fit for marketing, while in the traditional technology, ageing and drving continue and a finished product is only obtained on day 42, when a certain reduction can be found in the counts of both groups of microorganisms, which are in the range of 10²-10⁴. No differences can be found in the titres of sanitary indicator microor-ganisms between the products manufactured by the two technologies (Table 2). They com ply with sanitary and hygienic requirements for this group of meat products. The in-creased temperature applied does not favour the growth of that group of microorga-nisms probably, on the one hand, owing to the accelerated growth of lactic acid micro nisms probably, on the one hand, owing to the accelerated growth of lactic acid mic-roorganisms which are known to have an antimicrobial action and, on the other, owing to the faster reduction of pH value. The titre of encerchic model action is high to the faster reduction of pH value. The titre of anaerobic vegetative forms is his er in the new technology products. Anaerobic spore forms were not determined. Not in one case was the presence of salmonelles notherenic statistics and a reduction one case was the presence of salmonellae, pathogenic staphylococci or sulfite-reducing vegetative or spore forms found.

Irrespective of spore forms found. Irrespective of the fact that, towards the 18th day, the counts of micrococci and lactic acid microorganisms are equalized in the products manufactured by the two technologies, the faster initial growth in the new technology products has a positive effect on the sensory score and the rate of drying. Fig. 2 illustrates the faster p^H reduction in experimental variants. reduction in experimental variants. The results obtained from the studies conducted give grounds to make the following

- (1) The applied accelerated technology of dry curing favours the growth of available microorganisms which predetermine the ageing of the products made of hon-comminuted beef. Micrococci and lactic acid microorganisms play the most important role for the ageing of this group of products.
 (2) The increased temperature used in the new technology does not result in any enhanced growth of sanitary indicator microorganisms (coliforms and proteus) or microorganisms causing food poisonings: pathogenic staphylococci, salmonellae,
 (3) The applied accelerated technology.
- (3) The ageing of the products manufactured by the new technology is effected faster.
 With them, minimum pH value is attained within about 15 days, vs. 28 in control variants.

References

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Storage, days	0	5		12		18		28	
Indicators		A	B	A	в	A	В	B	
Enterococci	>10 ⁻¹ - 10 ⁻¹	>10 ⁻¹ - 10 ⁻¹	×10 ^{−1}	×10 ^{−1}	×10 ⁻¹	> 10 ⁻¹	>10 ⁻¹	>10	
Coliforms	>10 ⁻¹ - 10 ⁻¹	>10 ⁻¹ - 10 ⁻¹	>10 ⁻¹ - 10 ⁻¹	>10 ⁻¹	>10 ⁻¹	> 10-1	<u></u> →10 ⁻¹	>10	
Proteus	>10 ⁻¹	· >10 ⁻¹ - 10 ⁻¹	>10 ⁻¹	>10 ⁻¹	>10 ⁻¹	>10 ⁻¹	>10 ⁻¹	>10	
Anaerobes: Veg. forms	10 ⁻¹ - 10 ⁻²	×10 ⁻¹ - 10 ⁻³	>10 ⁻¹ - 10 ⁻¹	10 ⁻¹ - 10 ⁻³	10 ⁻¹	10 ⁻¹ - 10 ⁻⁵	10 ⁻² - 10 ⁻⁴	10 ⁻³	
Spores	> 10 ⁻¹	10 ⁻¹ د	10 ⁻¹ د	>10 ⁻¹	>10 ⁻¹	>10 ⁻¹	>10 ⁻¹	10	

in, had a standard and not continue to the stand with the standard of the standard of the standard of the standard of the standard (the standard of the traditional technology fit for any standard of the sta

Table 2. Changes in the titres of sanitary indicator microorganisms

A = Experimental samples

to 600. Conversion temperature, and by us (Chakurov, ty sold at the sold of the sold of the traditional sold as the sold of the sold of the sold of the traditional sold of the sold of th

B = Controls

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