A STUDY ON DRIED MEAT PRODUCT OF CHINA YAK AND ITS TECHNOLOGY

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SUMMARY

China Yak lives in the Qing-Zhang plateau grasslands with an elevation of above 3,000 meters,where there is no pollution, pure nature ecological environment, Yak meat has the characteristic of tenderness, deliciousness and gameness. Using L. Leistner Hurdle Effect and the advanced Hazard Analysis Critical Control Point (HACCP) system and high pressure steam-cooking method,the technology of yak dried meat products were found out. And a half of time,650 KW electric energy per ton was saved,producing efficiency increased by 10%, cost decreased by 5--10%.The yak dried meats have the characteristic of beautiful color,pure scent,proper hardness, delicious appetite, its aw<0.70,pH=5.8,En<840mv,and C.f was not discovered. They were in accord with national standard (GB2229- 81) . The research and utilization of yak dried meats just begin,it would greatly contribute to improving people's meat structure and promoting people's health.

Key Words:Yak meat,L.Leistnet Hurdle Effect

HACCP system

Introduction

Thirteen million yaks live in the Qing- Zhang plateau grasslands with an elevation of above 3,000 meters.The output of yak meat was greet and it's nutritional value is high quality, containing high- protein and low- fat. The plentiful resources were not developed scientifically and utilized rationally because of many resources. The meat was named as Green-Game-Food and welcomed recently, because of coming from nature grasslands and unpolluted environment.To greatly improve and develop the yak meat resources and promote the economy of the nationalities in west china,this study was conducted to produce a series of dried meats of yak by advanced methods.

1.Materials and Methods

1.1 Materials and Instrument.

Use fresh yak leg meat 500kg as raw material, supplementary materials were salt, sugar, gourmet powder, cooking wine,star anise,brown peppercorn, licorice root, ginger power, chilli powder,et al.The main instruments were LUFFT-aw analyzer (made in Germany), En analyzer, Amino Acids Analyzer-20750105 (made in Japan) , DB-210 Type Blast Constant Temperature Coal-scuttle,YSQ.SG4b-300 Type Pressure Cooker,Microbe Physical-Chemical Index detecting equipment, PHs -10A Digital pH Acidity Analyzer.

1.2 Research Methods

1.2.1 Determine the technological process of yak dried meat Raw meatí·cleaní·cut into pieces(500g/piece)í·precook (30min)í· cut into slices(3cm)í· add supplementary materials and recook (5pa,25min) í· dry í·toast(50-60íμ,3h)í· cool(<25íμ)í· detectí·package

1.2.2 Research Content

1.2.2.1 Analysing chemical composition of the yak meat and content of hemoglobin and red cell,determine nutritional value of the meat.

1.2.2.2 Useing HACCP system to control the technological process, ensure safty and storing-up of the products.

1.2.2.3 Using L.Leistner Hurdle Effect to study the quality of the product and prepare excellend formula.

1.2.2.4 Studying the influence of pH,sugar,salt on taste.

1.2.2.5 Using high pressure steam-cooking method reducded the time of steam-cooking and toasting, decreased electric energy and product costs,et al.

1.2.2.6 Probing the economic benefit of the trial product after being coming into maket.

2. Results and Disscussion

2.1 Chemical composition of the yak meat (see also Table 1,2,3)

Table 1.Chemical composition of the yak meat and in comparison

í·1.The content of red cell and hemoglobin were determined by the HeMu dillution liquid method and the Sali analyzer (100%=14.5g),respectively.
í·2.Adult yak (male)>3.5 years old,Adult yak (female)>2.5 years old.
í·3 Young yak (male):1.5-3 years old,Young yak (female): 1. 5- 2. 5 years old.
í·4 There is no significant difference among groups by t-test (p>0.05) í·

Table 3 Content of main amino acids of yak meat and in comparison with other meats(%)

The resources of china yak meat were abundant. The dressing percentage and net meat percentage were 52% and 45%, respectively. The live weight of adult male and female yak were 300kg and 200kg respectively. Protein content of fresh yak meat was 21.5%, higher than that of other meats,fat content was 2.6%,lower than others, belongs to high- protein and low fat meat.The nutritional value of yak meat was high quality,often eating it would be of great benefit to one's health.
The content of red cell was 7.43-9. 13 million/mm 3 , the average content of hemoglobin was 12.49.Both were higher than that of other species,which maybe attrtribute to the ecological enviroment of high elevation and low pressure.Therefore,the colour of yak meat was vivid red.
The main amino acids of yak meat were no significant difference(p> 0. 05) compared with cattle meat and pork,but slightly lower than rabbit meat and chicken.
2.2 Using HACCP system had made out technological process of yak dried meat product,promoted management level of enterprise, avoided unnecessarily wasting of raw material,protected products from going bad, prolonged storage time,brought full of vitality to factory (see also
Table 4).
Table 4.The technology of dried yak meat with the HACCP system

Table 5.Results of Hurdle Effect of dried meat product and measurement of quality
í·The perfume was made by ourselves as following:aniseed,cassia bark, sharen, white pepper,ginger powder,and it's proportion was 5:2: 2: 1: 2, respectively.
Table 5 shows,the colour of dried meat was as same as the cattle's without adding pres. The products' En were less than (<)840mv,aw <0. 70, pH=5.8,and c.f was not discovered. The products were completely in accord with the demand of L.Leistner Hardle Technological Effect.Table 6 shows:dried meats of yak had similar taste to cattle's but the former had the characteritic of special flavor: proper hardness, beautiful colour,pure

savour,long after tast, being easily chewed and promoting apptite.All of these characteristics would change people's unproper viewpoint on vivid colour and hardness of yak meat.

2.4. The proportion of salt,sugar and spices and value of pH had significantly ($p<0.01$) effected on the dried meat's taste(see also
Table 7.)
Table 7. The effect of value of pH and proportion of salt,sugar, spices on taste(repeats=30).
Table 7 shows,when pH was 5.6-7, salt content was 1. 5%, sugar content 6-8%,spices 0.5%,the dried meat had proper taste, beyond these ranges,it would become acidy or puckery; saltless or extremely salty; savoryless or extremely savory ($p<0.01$).The northern chinese think 2.0% salt content is proper and seldom add sugar,but the southern chinese think 1.5% salt and 6-8% sugar content are proper.
2.5 The advanced pressure-steam cooking technology had been used, it shortened cooking and toasting time and made yak meat more tender, economized much electric energy,increased producing efficiency of yak dried meat.The technology was initiated in china (See also table 8).
Table 8. Comparison of the advanced pressure steam- cooking technology with the common's
Table 8 shows,when pressure increased to 5 bar, it only spent 30 min. in steam-cooking and saved a half of time. Moreover, the toasting time was shortened from 4-6h to 2.5-3.0h, so it would economize on electric energy 650kw per ton meat,decrease cost by 5- 10%, increase producing efficiency by 5- 10%. The technology was welcomed for increasing economic efficiency.
2.6 Comparison of the determination indexes of yak dried meat products with the National Standard(GB),it concluded that the quality of products was fine and reached the ideal research target(See also
Table9).
Table 9 shows,the yak dried meat products had 115-216 bacteria per gram,and the number of colibacillus flora was less than 0.3/100g, and no panthogenic bacteria were found.The products were completely in accord with the demand of GB2729-81,because the advanced L. Leistner Hurdle Effect and the HACCP system were used.It efficiently inhibited Salmonella,Clostridia,Staphylocosis and Listeria.Most Colibacllus flora was inhibited,and storage time was enhanced. The successful products heve been made out.
2.7.The benefit of the yak dried meet products during trial product and trial-marketing was remarkable.In the winter of 1993 twenty tons of products in ten cities of Sichuan province had been sold, and the profits of 128,000Yuan(úñ) were gained.If the products are available in the whole year,500,000Yuan (úñ) would be gained.
Table 9. Comparison of the determination of the yak dried meat products with the National Standard (GB)í· í· pathogenic bacteria was not determined.

3.Conclusion

3.1 The yak meat resources in Qing-Zhang plateau are plentiful and the quality is very high.Another way to get high- protein meat would be achieved, provided it is developed scientifically and utilized rationally.
3.2 The nutritional value of yak meat was high quality,the content of protein of the meat was over 21.5% and fat only 2.6%,belongs to high -protein and low-fat meat.The yak meat was tender,delicious and savory, and named as"Green Health Food".The studies of the yak meat have been focussed people's interest recently.

3.3 The yak meat contained higher hemoglobin content and its colour was vivid red.When NaNO2 wasn't added and steam-cooking technology of 5 bar pressure was used,the colour of the end products was golden yellow and similar to that of cattle's.The former products were more tender, proper hardness and longer after taste, and had the function of stimulating appetite and digestion.
3.4 Using L. Leistner Hurdle Effect pattern and HACCP system controlled process technology,the quality and safty of the products were well ensured.
3.5 Using the high pressure steam- cooking method shortened the cooking and toasting time by 1/2,saved electric energy on 650kw per ton, increased producing efficiency by 10%,decreased cost by 5- 10%. The technology was the most advanced in chinese processing industries of dried meats.
3.6. The control point of HACCP systemwas pay more attention to during research,when pH was less than 5.6-7.0,salt content was 1. 5- 2%, sugar content was 6-8%,spices was 0.5%,the ideal formula which had the best taste have been got.
3.7. In the process of yak dried meat,NaNO 2 was not added and ensured $aw<0.70$,and no c.f was discovered. The products were in accord with GB2729-81.The end products are good quality and the unproper view on yak product have been changed.

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