AN EVALUATION OF THE EATING QUALITIES OF VENISON FROM FARMED AND FERAL RED DEER

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Venison from feral and farmed (grass-fed and feedlot) red deer of ages 6, 12, 18 and 27 months was compared and evaluated by sensory tests, and for tenderness or toughness by instrumental methods as well. Comparison of two meats as minced patties using the triangle test showed that differences between venison from deer on the same diet were often about the same and seldom very much less than those between venison from animals such as grass-fed and feral on different diets. This means that the flavour and other eating qualities such as odour and juiciness were very close, and marked differences anticipated between farmed and feral deer were not observed in hygienically handled venison. These results were supported by comparisons of venison cooked in various ways and served as a complete meal where it was often impossible to identify the source of the venison.

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INTRODUCTION

When red deer began to be farmed at the Invermay Agricultural Research Centre in late 1973, it was thought important to know how the flavour, tenderness and juiciness of their venison compared with that of the wild or feral animal.

For over ten years most venison exported from New Zealand has gone to West Germany and all came from feral or game animals. There is a very strong image or mystique associated with eating game meats, and it was wondered whether Germans would accept venison from farmed animals. On the other hand, the farming of deer and its supervised slaughter opened new, potentially large markets, such as Australia and the United States, where milder flavoured venison might be more welcome.

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It was thought that, if a panel of Invermay staff could not detect significant flavour differences between venison from farmed and feral deer when the meat was served alone, it was unlikely that differences would be observed when venison was served as a meal. But to be certain dishes were prepared and two pieces of meat served, usually from two red deer but sometimes from a red deer and another animal such as a fallow deer, a sheep or a steer.

EXPERIMENTAL

The evaluation of meat is much more difficult than cheese, for example, because it is essential to use exactly the same cuts as different muscles have different texture and flavour, and each piece of meat must be cooked in the same way so panelists are not influenced by visual clues like colour and do not evaluate extraneous factors such as browning.

Laboratory tests were therefore done with minced venison, which ensured that each panelist received similar samples but which prevented evaluation of toughness which was done separately.

Carcasses from 12-, 18- and 27-month-old red deer were conditioned at 4° C for 7 days and stored as primal cuts at −12° C. Carcasses from 6-month-old deer were conditioned for 14 days, partly because of the scarcity of this age group and partly because it was the practice at that time. When required for testing, hind legs were thawed in a refrigerator for 3 days, then the venison, minus the semimembranosus muscle, was triple minced through a cutter plate with 3.2 mm holes.

Mince samples of 725 g were mixed with 0.5% salt and 165 g portions were formed into patties in metal moulds (11 cm^2 × 1 cm). Four such patties from two sources were added alternately to a griddle at 100° C (low setting) and cooked for 11 minutes, turning twice. The patties were removed in the same order, wrapped in aluminium foil to keep them warm and moist, and placed on a steam bath. Each square patty was cut into 8 right-angled triangles for tasting so each portion was the same shape.

Pairs of venison were tasted by 19 to 21 panelists, using the triangle difference test in which 3 samples were presented to participants who were told that 2 samples came from the same animal and one did not. They were asked to select the single sample and to indicate the difficulty of choice and to rate the samples in intensity of appetizing smell, sharpness, meat flavour and after-taste. The four flavour intensity measurements were analysed only if there was a significant difference between the two meats, and only for panelists selecting the correct single sample.

The samples were presented on prewarmed porcelain plates and were identified by 3-digit random numbers. Samples were made to appear as alike as possible and all tests included a grass-fed sample. Each test actually comprised two triangle arrangements; the first ten panelists might receive a single feral sample and the remaining panelists a single grass-fed sample. Five deer from each source (grass-fed, feedlot and feral) were tested.

Within-source tests were designed to determine flavour differences between venison from deer on the same diet — *e.g.*, grass — and were a measure of individual animal variation. The procedure closely resembled that used for comparing meat from different sources but panelists were not told the meat in each test came from the same source; one sample was described as belonging to another source. As previously, one sample was always labelled grass-fed.

Venison from red deer on different feeds was also compared in complete meals at the Otago Polytechnic Catering Department and Invermay Agricultural Research Centre. Dishes included roast leg or shoulder, casseroles, Wiener Schnitzel, pies and grills. These tests permitted, in addition, measurement of gamy flavour, tenderness or toughness, dryness or juiciness, and acceptability. Tenderness was also measured with instruments such as the Warner Bratzler meat shear.

RESULTS AND DISCUSSION

The results of the Invermay triangle tests will be considered first.

Surprisingly, the strongest flavours were found with the youngest animals of age 6 months and during the cooking an intense vinegar, toffee odour filled the room. This was probably due to the longer conditioning period. But the feral venison of this age seemed to have the most characteristic flavour, frequently described as liver-like, which is associated with gaminess. Such deer are probably not weaned and the stronger flavour may be due to their consumption of milk as well as the longer conditioning period.

With 18-month-old deer, flavour and other properties of venison from animals on the same feed — *e.g.*, grass — were found to be similar to those of venison from deer on different feeds. This meant that the 3 classes of venison (grass-fed, feedlot and feral) did not differ very strikingly, if at all, in flavour.

However, tests with 27-month-old deer gave statistically significant ($P < 0.05$) evidence that there was a detectable difference between venison from grass-fed and feral deer but possibly not between that from grass-fed and feedlot deer. Venison from feral and feedlot deer was not compared.

It should be emphasized that the level of significance is the lowest statistically recognized and such a difference would probably

not be observed when venison was served as a meal. This proved to be so in meal tests. Participants (7 to 9) found it almost impossible to identify feral from farmed venison, and in one test could not distinguish venison from a red and fallow deer.

Perhaps most surprising was the delicate flavour of the venison, and seldom was a strong or gamy flavour noticed, though on a few occasions venison was described as resembling wild duck in flavour.

Conditioning venison at 4° C for 7 days may be too long as hardly ever was a tough piece of meat eaten but often one that was overtender, distintegrating in the mouth. We believe venison should be slightly chewy or a little tough.

Roast venison tends to dry out in the mouth, which is obviously undesirable but may be overcome by basting, and was not observed with venison chops brushed with a vegetable oil before grilling.

It became clear during these tests that the metabolism and condition of deer vary greatly throughout the year, and that the most useful data would be obtained at their probable commercial slaughtering ages (15 and 27 months). Data on 27-month-old animals have already been discussed and tests are now being carried out on meat from 15-month-old deer.

In conclusion, venison is a low-fat meat with a distinct but mild flavour, largely unaffected by diet.

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