# 5-P37

## SENSORY CHARACTERISTICS OF SOUTH AFRICAN CHICKEN COOKED ACCORDING TO A DRY OR MOIST HEAT COOKING METHOD

SM van Heerden, HC Schönfeldt, MF Smith* & PE Strydom

Animal Nutrition and Animal Products Institute, Agricultural Research Council, Private Bag X2, Irene, South Africa, 0062
*Agrimetrics institute, Agricultural Research Council, Private Bag X640, Pretoria, 0001

**Background**
An important part of sensory analysis is to show not only the attributes that consumers like or dislike, but also the most important characteristic determining the overall acceptability. Meat cookery and its evaluation by sensory panels is normally the final step in the evaluation of various treatments on animal carcasses. Furthermore the method of cooking is very important if certain carcass qualities are to be related to palatability or consumer preference. Meat is one of the foods in which texture is the dominant quality characteristic. Texture is an important characteristic of meat (tenderness versus toughness) and includes properties related to the structural components of food. To evaluate food texture, it is important to consider the sensory perception as well as the structural components. Some researchers have found that juiciness is a separate but principal component of texture profiles for cooked meats. There are two aspects of juiciness in meat. One is the release of fluid during the first few chews and second is the sustained juiciness due to the stimulation of saliva (Lyon and Lyon, 1989:329-340).

**Objective**
The purpose of the study was to determine to what extent the sensory characteristics will differ between conventionally frozen and spin-chilled frozen chickens obtained from three breeds when cooked according to a moist or dry heat cooking method, of skin, white and dark meat obtained from South African chicken.

**Methods**
The samples were selected according to the specifications and divided into either conventionally frozen or spin – chilled and frozen samples. The samples were immediately stored in a - 20 °C freezer. Eleven weeks later the sensory analysis was done on the conventionally frozen and spin – chilled and then frozen chickens. 36 chickens were divided into frozen (n = 18) and frozen (spin – chilled) (n = 18) chickens. For each treatment (frozen and frozen (spin – chilled)) the chickens were cooked according to a dry (n = 9) and moist (n = 9) heat cooking method. The chickens were thawed for 48 hours at 4 °C prior to cooking. The skin was removed and the breast and thigh were dissected from the chicken carcass and portioned into six (20 mm x 20 mm x 20 mm) cubes. It were immediately wrapped individually in pre-coded (3-digit random numbers) aluminium foil squares. Due to limited sample size available only six trained sensory subjects were used to evaluate the sensory quality attributes of the chickens. The panelists were all experienced and familiar with the general principles of sensory analysis and were specifically trained for the project.

**Results and discussion**
Sensory results showed no significant difference in the odour of the skin, white meat or dark meat nor in the flavour of the skin and dark meat obtained from either conventionally frozen or frozen (spin – chilled) (Table 1). In addition the colour, initial and sustained juiciness of traditionally frozen versus frozen (spin – chilled) chicken did not differ significantly.

However, the white meat and dark meat of conventionally frozen chicken were significantly ($p \leq 0,01$ and $p \leq 0,05$) more tender respectively and the white meat contained significantly less residue ($p \leq 0,05$) than that of frozen (spin-chilled) chicken. The flavour of conventionally frozen dark and the off-flavour of skin meat were significantly ($p \leq 0,01$ and $p \leq 0,05$ respectively) more intense compared to that of the frozen spin-chilled treatment

With the exception of juiciness, method of cooking did not have a significant effect on sensory attributes of different chicken portions. There was with one exception no significant difference between the odour, flavour or off-flavour of skin, white or dark meat cooked according to either a dry or moist heat cooking method (Table 1). The odour of white meat cooked according to a dry cooking method was significantly more typical ($p \leq 0,05$) compared to that cooked according to the moist heat cooking method. Campbell et al. (1980:131) also reported that palatability scores for tenderness and flavour were in favour of a dry heat cooking method.

The initial impression and sustained juiciness of dark meat was significantly higher ($p \leq 0,01$) when cooked according to a moist heat cooking method compared to that cooked according to a dry heat cooking method. This finding corresponds to that of Paul and Palmer (1972:495-526) that the initial impression of juiciness and sustained juiciness was higher in dark meat of the moist heat cooking method than that of the dry heat cooking method. This is also supported by a study of Lyon and Lyon (1989:329-340), who indicated that there is a significant difference in juiciness, due to the cooking method with moist heat cooking favouring increased juiciness.

**Conclusions and recommendations**
This study shows that white and dark meat from conventionally frozen chickens were more tender than from the spin-chilled and then frozen chicken. The flavour of conventionally frozen chicken was more intense than that of spin-chilled and then frozen chickens. From the results of this study it is clear that dark meat is more juicy (initial and sustained) when cooked according to a moist heat cooking method, meat obtained from chicken cooked according to a dry heat cooking method

It is recommended, based on the results of this study that a similar analysis on chicken portions available in the retail market be conducted. Results of the two studies should then be compared to make meaningful recommendations to the end-consumer regarding the eating pleasure of South African chicken. Although not enough replications were included in this study to determine the effect of breed on eating quality, differences were found with CVA and it is recommended that this aspect should be further investigated.

**References**


Campbell, A. M. 1980. The experimental study of food. Constable. London.

Lyon, B. G. and Lyon, C. E. 1989. Texture profile of broiler pectoralis major as influenced by post-mortem deboning time and heat method. Poultry Science, 69:329-340.

Paul, P.C and Palmer, H. H. 1972. Food theory and applications. John Wiley and Sons. New York.


**Table 1:The effect of treatment and cooking method on sensory attributes of chicken**

| *Attribute (1 = least favourable, 8 = most favourable)* | | *Treatment* | | | | *Cooking method* | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | *Frozen* | *Spin Chilled* | *SEM* | *p-value* | *Dry* | *Moist* | *SEM* | *p-value* |
| **Odour:** | Skin | 6,354 | 6,248 | 0,077 | 0,350 | 6,287 | 6,315 | 0,077 | 0,804 |
| **Flavour:** | Skin | 6,633 | 6,474 | 0,063 | 0,083 | 6,609 | 6,498 | 0,063 | 0,211 |
| **Off flavour:** | Skin | 6,735 | 6,483 | 0,082 | 0,037 | 6,602 | 6,617 | 0,820 | 0,899 |
| **Odour:** | White meat | 6,796 | 6,868 | 0,275 | 0,050 | 6,974 | 6,691 | 0,075 | 0,012 |
| | Dark meat | 6,735 | 6,763 | 0,075 | 0,797 | 6,830 | 6,668 | 0,075 | 0,141 |
| **Colour:** | White meat | 7,002 | 6,907 | 0,055 | 0,230 | 6,952 | 6,957 | 0,055 | 0,943 |
| | Dark meat | 6,904 | 6,996 | 0,044 | 0,149 | 6,933 | 6,967 | 0,044 | 0,597 |
| **Initial Impression of Juiciness:** | Dark meat | 6,130 | 6,026 | 0,067 | 0,280 | 6,165 | 5,991 | 0,067 | 0,074 |
| | White meat | 6,596 | 6,533 | 0,069 | 0,170 | 6,311 | 6,619 | 0,069 | 0,004 |
| **Tenderness:** | White meat | 6,732 | 6,041 | 0,140 | 0,001 | 6,372 | 6,400 | 0,140 | 0,890 |
| | Dark meat | 6,883 | 6,768 | 0,071 | 0,049 | 6,796 | 6,765 | 0,071 | 0,756 |
| **Sustained Impression of Juiciness:** | White meat | 5,042 | 5,004 | 0,085 | 0,693 | 4,933 | 5,122 | 0,085 | 0,127 |
| | Dark meat | 6,008 | 6,024 | 0,065 | 0,859 | 5,831 | 6,200 | 0,065 | 0,001 |
| **Residue:** | White meat | 1,672 | 2,067 | 0,119 | 0,025 | 1,844 | 1,894 | 0,119 | 0,768 |
| | Dark meat | 1,752 | 1,756 | 0,064 | 0,968 | 1,781 | 1,746 | 0,064 | 0,870 |
| **Flavour:** | White meat | 0,920 | 0,935 | 0,057 | 0,889 | 6,891 | 6,965 | 0,075 | 0,488 |
| | Dark meat | 7,139 | 6,957 | 0,046 | 0,008 | 7,057 | 7,039 | 0,046 | 0,775 |
| **Off-flavour:** | White meat | 7,254 | 7,170 | 0,075 | 0,440 | 7,213 | 7,211 | 0,075 | 0,896 |
| | Dark meat | 7,211 | 7,054 | 0,057 | 0,060 | 7,115 | 7,150 | 0,057 | 0,667 |

**SEM: Standard Error of Means** **p-value: F probability**