

## **Comparison of degree of liking for “Consumer sensory characteristics” of organic and conventional broiler meat by young consumers in Sri Lanka**

### **Comparación del grado de agrado por las "Características sensoriales del consumidor" de la carne de pollos de engorde ecológica y convencional por parte de los consumidores jóvenes de Sri Lanka**

DOI: 10.53499/sfjeasv2n2-013

Received in: January 3rd, 2022

Accepted in: March 31th, 2022

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#### **ABSTRACT**

Chicken meat does not get restrictions when compare to beef & pork within Sri Lankan community. There is increasing trend of consuming broiler chicken meat as the per capita consumption has grown up to 9.8kg /year in 2020. Consumer sensory characteristics such as appearance, smell, tenderness, taste, colour, juiciness and overall likeness are used to compare the preference of organic and conventional chicken meats by using young consumers. Objective of the study is to discover the acceptance level of organic chicken meat over conventional broiler chicken meat among young generation by analyzing consumer sensory characters of both chicken meats. Local breed (organic) and fast growing conventional (non-organic) birds were reared in two batches with equal facilities each comprising of 100 birds. 10 birds were selected randomly from each group which was fed with organic and non-organic broiler feed having same nutritional composition. Conventional birds & organic birds were slaughtered at 32 & 75 days of age respectively. 10 young both sexed tasters of 20-25 years old age were randomly selected and were served with two samples of organic and conventional broiler meat. Breast meat of 10 Nos of selected chicken was received from the processing and cooked to 82 °C internal muscle temperature. A 10g muscle of *P. major* muscle, and served for analysis of sensory characteristics. The tasters were instructed to eat crackers, drink water between each sample to clear the palate, and pause for 20 s between samples. All samples were consumed. Results of consumer sensory characteristics appearance, smell, tenderness, taste, colour, juiciness and overall likeness are reported in the sheet after eating both chicken meat samples from each category. Degree of liking for sensory characters were recorded by a questioner having 1 to 5 scale; (1= strongly unlike; 2 = unlike; 3 = average; 4 = like & 5 = strongly like) after tasting. According to analyzed results 70% of the population likes the appearance of organic chicken while 50% of them like conventional. The population prefers taste (40%); colour (30%) & juiciness (60%) of conventional meat. There is no difference regarding the preference of tenderness of both type of meat. Overall (60%) prefer organic chicken meat where as 40% for conventional. Therefore it can conclude that young generation readily accepts organic chicken meat.

**Keywords:** chicken meat, organic birds, consumer sensory characters, *Pectoralis major*, conventional broilers.

## RESUMEN

La carne de pollo no tiene restricciones en comparación con la carne de vacuno y de cerdo en la comunidad de Sri Lanka. La tendencia al consumo de carne de pollo es cada vez mayor, ya que el consumo per cápita ha aumentado hasta 9,8 kg/año en 2020. Las características sensoriales de los consumidores, como el aspecto, el olor, la ternura, el sabor, el color, la jugosidad y la semejanza general, se utilizan para comparar la preferencia de las carnes de pollo orgánicas y convencionales utilizando consumidores jóvenes. El objetivo del estudio es descubrir el nivel de aceptación de la carne de pollo orgánico sobre la carne de pollo de engorde convencional entre la generación joven mediante el análisis de los caracteres sensoriales del consumidor de ambas carnes de pollo. Se criaron aves de razas locales (ecológicas) y convencionales de crecimiento rápido (no ecológicas) en dos lotes con las mismas instalaciones, cada uno de ellos compuesto por 100 aves. Se seleccionaron 10 aves al azar de cada grupo, que fueron alimentadas con piensos orgánicos y no orgánicos con la misma composición nutricional. Las aves convencionales y las ecológicas se sacrificaron a los 32 y 75 días de edad respectivamente. Se seleccionaron al azar 10 catadores jóvenes de ambos sexos de entre 20 y 25 años de edad y se les sirvieron dos muestras de carne de pollo de engorde ecológico y convencional. La carne de pechuga de 10 números de pollo seleccionado se recibió del procesamiento y se cocinó a 82 0C de temperatura interna del músculo. Un músculo de 10 g de P. major, y se sirvió para el análisis de las características sensoriales. Se instruyó a los catadores para que comieran galletas, bebieran agua entre cada muestra para despejar el paladar y realizaran una pausa de 20 s entre muestras. Todas las muestras fueron consumidas. Los resultados de las características sensoriales de los consumidores: aspecto, olor, ternura, sabor, color, jugosidad y agrado general se recogen en la hoja después de comer las dos muestras de carne de pollo de cada categoría. El grado de agrado de los caracteres sensoriales se registró mediante un cuestionario con una escala de 1 a 5 (1 = muy desagradable; 2 = desagradable; 3 = medio; 4 = agradable y 5 = muy agradable) después de la degustación. Según los resultados analizados, al 70% de la población le gusta el aspecto del pollo ecológico, mientras que al 50% le gusta el convencional. La población prefiere el sabor (40%), el color (30%) y la jugosidad (60%) de la carne convencional. No hay diferencias en cuanto a la preferencia de la ternura de ambos tipos de carne. El 60% prefiere la carne de pollo ecológica y el 40% la convencional. Por lo tanto, se puede concluir que la generación joven acepta de buen grado la carne de pollo ecológica.

**Palabras clave:** carne de pollo, aves ecológicas, caracteres sensoriales del consumidor, *Pectoralis major*, pollos de engorde convencionales.

## 1 INTRODUCTION

There is wide variety of consumer patterns in Sri Lanka as the majority of population is Buddhists. Protein enriched diets such as meat; eggs and milk are mainly popular among young generation. Chicken meat does not get restrictions when compare to beef & pork within Sri Lankan community. There is increasing trend of consuming broiler chicken meat as the per capita consumption has grown up to 9.8kg /year in 2020.

Table 1: Details of the poultry industry Sri Lanka

Item	2007	2010	2015	2020
poultry population (million)	13.77	14.01	34.76	41.97
chicken meat production ('000) MT	100.06	104.16	164.45	216.16
human population (million)	20.04	20.65	20.97	21.92
per capita availability of chicken meat kg	4.98	4.86	7.81	9.80

People are more concern about the food they eat; due to different diseases which caused by mal practices of local agriculture (eg:- Kidney disease). Therefore organic products are getting popular because consumers believe that organic products are free from antibiotics, hormone, other harmful chemicals and produced ensuring animal welfare when consider about organic livestock products.

### 1.1 ORGANIC BROILERS

Birds of local breeds are reared in organic broiler farms feeding them with organic food which is available locally or on farm. The birds are managed maximizing the freedom, welfare to keep them happy life until they are slaughter at the age of more than 70 days. No chemicals and no antibiotic were given. Therefore herbal medicines were used in case of disease prevention.

### 1.2 CONVENTIONAL BROILERS

As in other countries fast growing genetically modified birds are conventional broilers which are reared in limited space within a poultry house preferably in an environment controlled house. In Sri Lanka conventional broilers are harvested at the age of 30-35 days which contributes to the main reason of preference of 1kg average broiler chicken meat by consumers hence it can avoid additional cost of portioning the over weighted broiler carcass in marketing.

### 1.3 CONSUMER SENSORY CHARACTERISTIC

Regarding a food, consumers’ sensory characteristics can be categorized in different ways. These characteristic may affect by the habits, religion, culture, nation and physical characters such as age, sex etc. Appearance of the food is the first sensory character which contributes to accept or reject the food by the consumer. Colour of the food is also one of the main characters which determine the preference of the consumer over the particular food. Three other characters juiciness, tenderness & taste are individual preference of the consumer. Consumer sensory characteristics such as appearance, smell, tenderness, taste, colour, juiciness and overall likeness are used to compare the preference of both chicken meats by using young consumers.

### 1.4 PREFERENCE OF YOUNG CONSUMERS

Young generation of Sri Lanka mainly like fast foods rich in protein originated from animals. Chicken as a meat among other types of meat item does not carry any ban within the Sri Lankan community. Therefore young consumers also readily accept chicken as the main protein source of their food. In this study the young generation is selected from age 20 years old to 25 years old.

### 1.5 NUTRITIONAL VALUE OF ORGANIC & CONVENTIONAL CHICKEN MEAT

When compare with other types of meat chicken meat has less fat and high protein. Therefore most of the consumers in everywhere of the world likes chicken meat unconditionally. According to USAD National Nutritional Database nutritional value of chicken meat is given in the following table.

Table 2: Nutritional value of conventional chicken meat – skinless, boneless breast 100g

<b>Nutrient</b>	<b>Skinless, boneless breast</b>
Calories	114
Protein (grams)	21.2
Total fat (grams)	2.6
Saturated fat (grams)	0.6
Monounsaturated fat (grams)	0.8
Polyunsaturated fat (grams)	0.4
Cholesterol (milligrams)	64
Sodium (milligrams)	116
Iron (milligrams)	0.4

Organic birds roam outside for their food and mainly depend on natural food sources. That makes the meat get tastier, hard, dark colour which contributes to increase the nutritional composition. Table below gives value of composition of chicken meat breast. When compare with conventional chicken meat the values are much higher.

Table 3: Nutritional value of organic chicken meat – skinless, boneless breast 100g

<b>Nutrient</b>	<b>Skinless, boneless breast</b>
Calories	130
Protein (grams)	25
Total fat (grams)	1
Saturated fat (grams)	0
Monounsaturated fat (grams)	0.2
Polyunsaturated fat (grams)	
Cholesterol (milligrams)	80
Sodium (milligrams)	125
Iron (milligrams)	

## 2 OBJECTIVES

Objective of the study is to discover the acceptance level of organic chicken meat over conventional broiler chicken meat among young generation by analyzing consumer sensory characters of both chicken meats.

## 3 METHOD

Broilers are fast growing birds slaughter at the age of 30-35 days in Sri Lanka. Organic birds are slaughter for meat at 70-80 days of age. Local breed and fast growing conventional birds were reared in two batches each comprising of 100 birds. 10 birds were selected randomly from each group which was fed with organic and non organic broiler feed having same nutritional composition. They were managed in same environment condition providing conventional, housing in an indoor pen (0.09 m<sup>2</sup>/bird); and under organic, housing in an indoor pen (0.09 m<sup>2</sup>/bird) with access to a grass paddock (0.37m<sup>2</sup>/ bird). Conventional birds & organic birds were slaughtered at 32 & 75 days of age respectively.

10 young tasters were randomly selected and trained them to taste muscle samples. These tasters were of both sexes in between the age of 20-25 years. Each taster was served with two samples of organic and conventional broiler meat. Tasters were not informed the type of the meat sample.

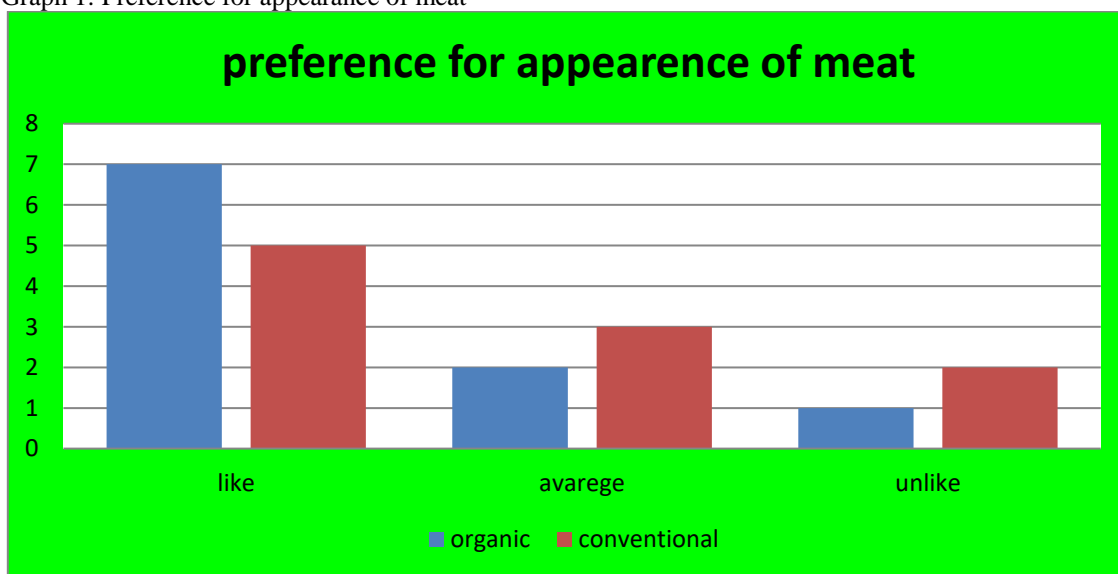
Breast meat of 10 Nos of selected chicken was received from the processing without skin. The breasts were wrapped in aluminum foil, and cooked at 177<sup>0</sup> C in a conventional preheated gas oven to 82<sup>0</sup> C internal muscle temperature. The cooked chicken was allowed to cool at room temperature for 10 min, prior to serve, and separated the muscles to extract only *Pectoralis major*. A 10g muscle was cut from the medial area of each *P. major* muscle, and served for analysis of sensory characteristics. The muscle is served in room temperature along with water and unsalted crackers (two crackers per young taster). The samples were kept warm until served, by storing in preheated oven at 121.1<sup>0</sup> C. The tasters were instructed to eat crackers, drink water between each sample to clear the palate, and pause for 20 s between samples. All samples were consumed.

Results were recorded in a pre tested evaluation sheet. Consumer sensory characteristics appearance, smell, tenderness, taste, colour, juiciness and overall likeness are reported in the sheet after eating both chicken meat samples from each category. Degree of liking for sensory characters were recorded by a questioner having 1 to 5 scale; (1= strongly unlike; 2 = unlike; 3 = average; 4 = like & 5 = strongly like) after tasting.

#### 4 RESULTS

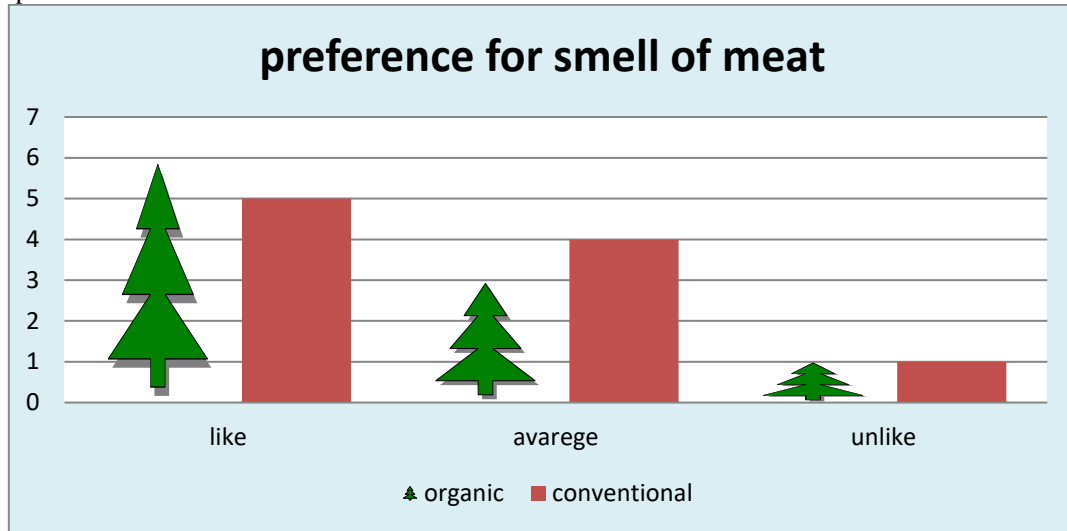
According to the result sheets like=4 and strongly like=5 are summarized as “like” similarly unlike=2 and strongly unlike=1 are summarized as “unlike”. Consumer sensory characteristics appearance, smell, tenderness, taste, colour, juiciness and overall likeness are reported.

Graph 1: Preference for appearance of meat



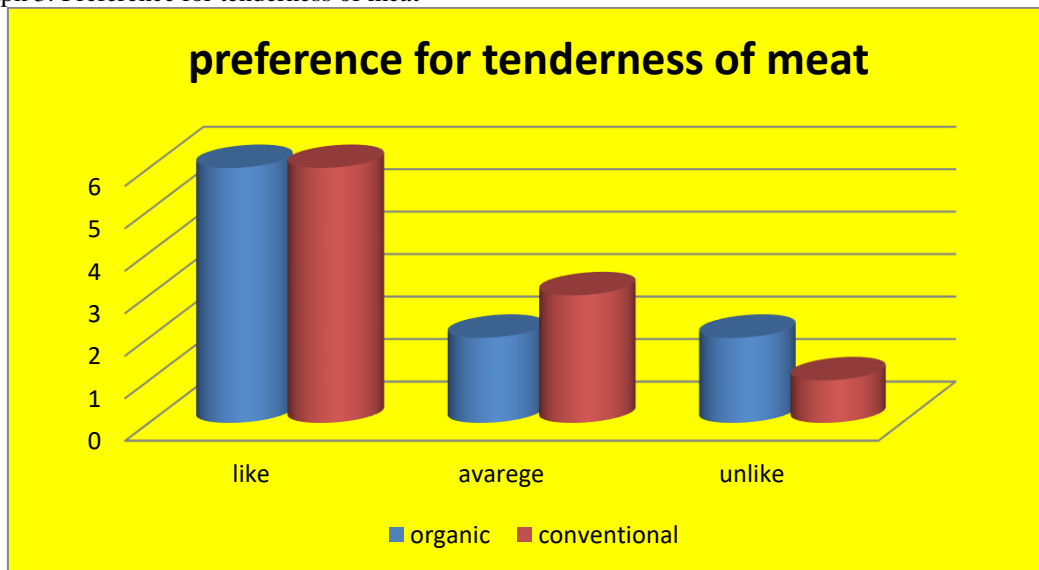
70% of the tasters like the appearance of organic meat while 50% likes the appearance of conventional broiler meat. Only 10% of the tasters dislike organic meat sample while 20% dislike the conventional meat sample.

Graph 2: Preference for smell of meat



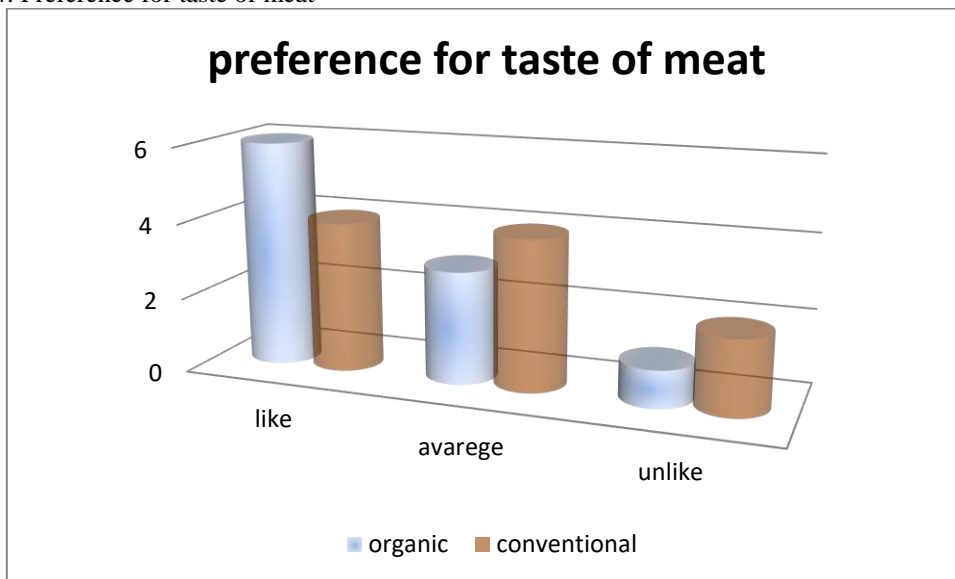
As the appearance more people like the smell of organic chicken meat which was 60% over 50% for conventional. It is interesting to see 10% of the tasters dislike smell of both organic and conventional meat.

Graph 3: Preference for tenderness of meat



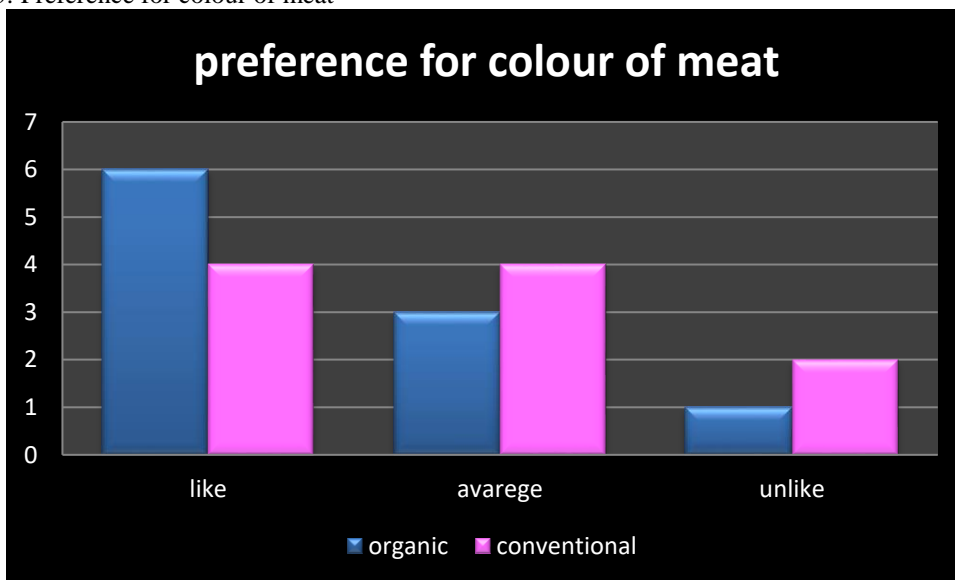
Both organic and conventional meat samples gathered same results for tenderness.

Graph 4: Preference for taste of meat

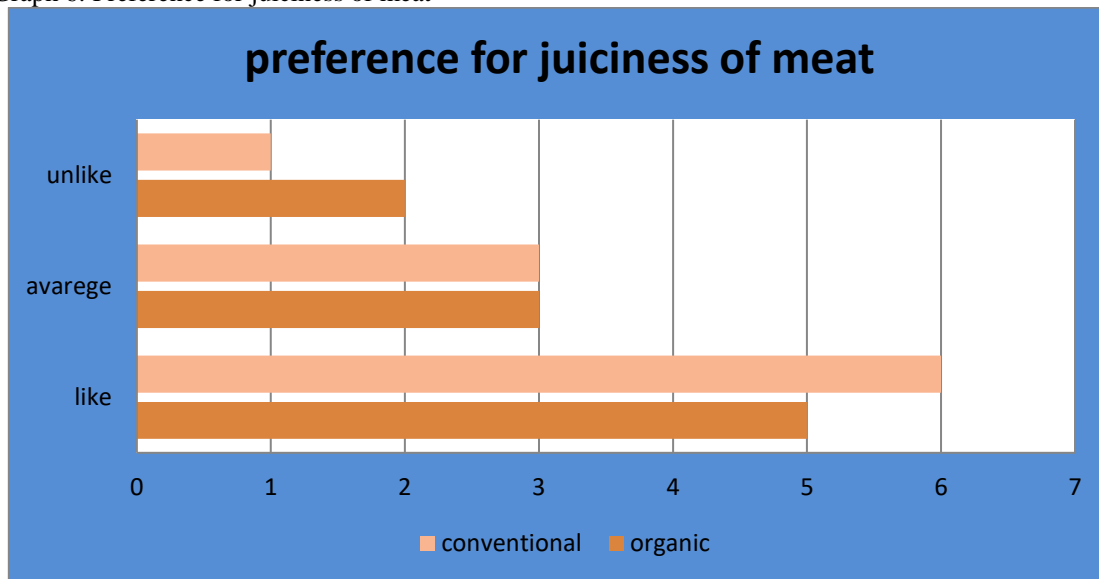


60% of tasters prefer the taste of organic meat sample and they do like the colour of the meat sample than conventional meat.

Graph 5: Preference for colour of meat

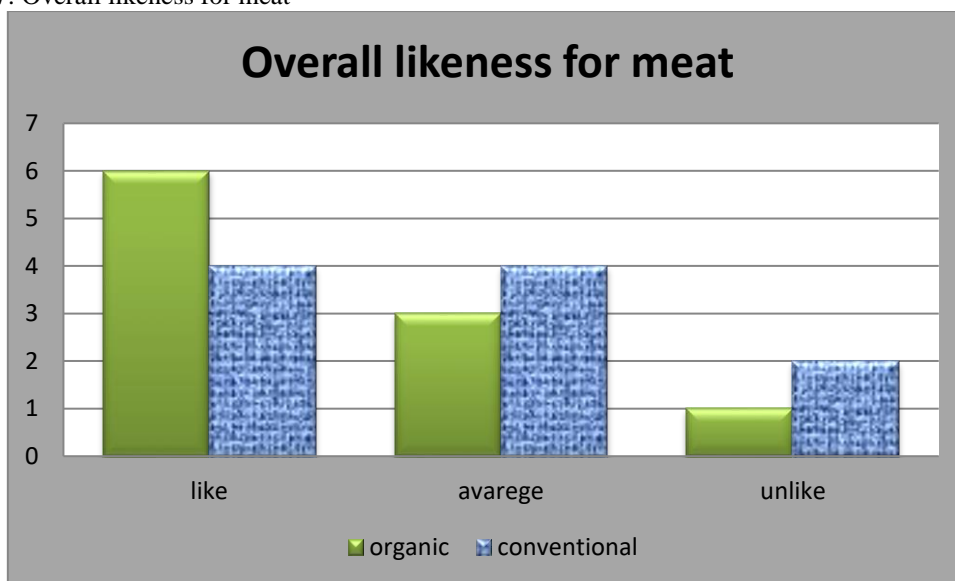


Graph 6: Preference for juiciness of meat



The organic meat is hard so that sample achieve preference of 50% of the population while conventional meat juiciness is much higher which figure out 60%. It is significant that none of the tasters dislike juiciness of the conventional chicken sample.

Graph 7: Overall likeness for meat



Among the sample population, most of the young tasters responded that they like organic chicken than conventional chicken.

## 5 DISCUSSION

Organic chicken meat is dark in colour and a bit harder as that derived from local birds reared for more than 70 days.

Several factors such as breed, age at slaughter, outdoor access and housing conditions were very different between the organic and standard broilers in the present study, which resulted in very different sensory profiles of these products as indicated. Other studies have shown that poultry meat characteristics are influenced by factors such as age, feed, genotype, growth rate, body composition and locomotors activity. In the present study especially the texture attributes were significantly influenced as a consequence of the very different production characteristics of the standard and organic products. The fact that the breast meat from the standard broilers is tender with a 'shorter' fibre structure is consistent with other studies showing that younger birds have tender meat. However, some studies on slow-growing broilers indicate that certain breeds can have a different development in meat tenderness when age at slaughter is close to sexual maturity. Sexual maturation has been suggested also to affect the flavour of the broiler meat by enhancing it to its maximum during the process.

Therefore a consumer test might have achieved liking scores often prefer the things they are familiar with, and it has been suggested that long-term exposure to conventional broiler meat may be an obstacle to the liking of meat from other broiler products. Consumer panel, meat tenderness may not be the only important attribute when differences in overall liking are to be found. In addition, other factors such as geographical and cultural origins of the consumer can be expected to influence consumer preference for different qualities of food products, just as other quality dimensions such as locally produced food, animal welfare, environment, etc. may influence consumer perception.

## 6 CONCLUSION

According to analyzed results 70% of the population likes the appearance of organic chicken while 50% of them like conventional. The population prefers taste (40%); colour (30%) & juiciness (60%) of conventional meat. There is no difference regarding the preference of tenderness of both type of meat. Overall (60%) prefer organic chicken meat where as 40% for conventional. Therefore it can conclude that young generation readily accepts organic chicken meat.

Therefore organic chicken production should be improved in Sri Lanka. Special fast food that is preferred by young generation should be developed using organic chicken meat. This will increase the demand for organic chicken meat and the young crowd is able to enjoy healthy chicken meat.

## **7 FUTURE RESEARCH**

As there is increasing trend towards organic livestock farming in Sri Lanka. Chicken meat and meat by products could be produced by using organic chicken. More research should be done to identify the possibility of development of different fast food using organic chicken meat in which more attention should be needed not to include artificial materials.

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