DETECTION OF ESTROGEN RESIDUE IN BEEF TISSUES

By

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ABSTRACT

The present study focuses on using thin layer chromatography to detect estrogen residues in beef tissues of male and female calves. The samples from lean meat and fat were taken from each 10 male carcasses and also from each 10 female carcasses. The samples were collected from butchers shops and examined for detection of estrogen in lean meat and fat. The obtained results indicated that, estrogen residue was found in lean meat lesser than that recorded in flit of the same samples 6.2, *5.8, 5.3,* 7.9 and 9.2 ng/g corresponding to 11.2, 12.3, 10.5,9.8 and 13.4 ng/g in fat respectively in female tissues. Otherwise, in male tissues it was 3.4, 2.7, 3.8, 1.36 and 4.2, in lean meat but in fat it was 4.6,5.7,5.2,6.15 and 4.9 ng./g, respectively.

INTRODUCTION

For many years hormones were used for fattening purposes. It was originally used in fattening cattle in the 5th decade (**Ferrando *et al.*, 1973; Bongartz and Kuschfeld, 1975; Mizukami 1984 and Meyer *et al.*, 1985**).

Natural steroids can be replaced by synthetic anabolic compounds in illegal treatment in beef cattle and are used in animal production because of the high efficiency of the methods for the detection of synthetic steroids. In the control of treatment with natural steroids the problem is to discriminate between hormone concentration considered as physiological and those resulting from illegal steroid administration (**Simontacch *et al.*, 1999**).

There is increased concern about the large number of compounds with hormonal activity in the environment In particular, compounds with estrogenic activity are thought to be responsible for reported decreased fertilities both in animals and men. This includes both natural and synthetic compounds (**Hogenboom *et al.*, 1999**).

Residues of anabolic agents in meat can remain in the body for a longer period of time and consumption of such meat containing estrogeni material result in fluctuation in estrogenic hormones and disorder in gonadotrophins of lactating mothers (**Akkada and El-Shakly, 1975; Ayat, 1987 and Lone, 1997**).

In the recent years many countries have become aware of the potential hazards of the presence of hormonal residues in meat and have developed various methods for the detection of such residues (**Thomas and Alexander, 1984**).

This work was planned to detect the hormonal residues in beef tissue and fat in male and female carcasses.

MATERIAL AND METHODS

I. Experimental design:

Twenty samples from beef muscle and fat (10 each of male and female) were collected from butchers shops, then packed in separate polyethylene bags and sent to laboratory in ice box as soon as possible to detect estrogen residues

II- Extraction of samples:

The technique was employed in this study *was* recommended by **Medina and Schwartz, (1987)**.

III- clean up and injection of the extract:

The method employed for hormone extraction was cleaned up and injected in Thin Layer Chromatography (TLC) according to method described by **Medina and Sherman, (1986)**.

RESULTS AND DISCUSSION

The hormonal residues (estrogen) in Table (1), indicated that, the residue in female lean meat was ranged from 5.8 to 9.2 with an average of 6.88 ng./g. but in female fat, it was ranged from 9.8 to 13.4 with an average of 11.43 (ng./g)

In this respect, **Hoffman *et al.*, (1975)** detected that estrogen concentration in pregnant heifers was 2 ppb. Also, **Atela *et al.*, (1988)** recorded that estrogen residue in imported meat used as mice fed mixed with a ration and compared with those fed on normal ration.

In Table (2), the hormone residue (estrogen) in male lean meat ranged from 1.36 to 4.20 with an average of 3.09 (ng./g.) but in fat, it was ranged from 4.6 to 6.15 with an average of 5.31 ng./g. These results agreed with those detected by **lange *et al.*, (2001)** who found that the hormone residue in calves

was below that of heifers. Also, these results are in accordance with the results reported by **F.A.O (1987)** and **El- bayomy, (1993)**. While, the obtained observations did not agree with **Swilam, (1995) and Codex Alimentarius Commission (2000)**, which declared that the presence of estradiol residues in the cattle tissues is unnecessary.

Estrogen and estrogen related growth factor has a role in theme mechanism of hormone dependency of endometrium carcinoma cells. This held the view reported by **Hat *et al.*, (1998)** and **Johnston, (2000)**.

Figure (1) demonstrates that there are elevation in estrogen residue levels in female carcasses comparing with male as well as in fat tissue comparing with lean meat and this could be regarded to sex difference and endocrine gland secretion (**Johnston, 2000**).

The obtained results in the present study allow to conclude the presence of estrogen residue as an anabolic agents in meat either originated from slaughtered animals own endocrine system or anabolic agents administrated to the living animals The problems created from hormonal residues are highly undesirable for human beings as it presents a public health hazards

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Table (1): Hormonal Residues in Female tissues (lean meat and fat) by T.L.C. (ng./g.).

No. of examined samples	Lean meat	Fat
1	6.20	11.20
2	5.80	12.30
3	5.30	10.50
4	7.90	9.80
5	9.20	13.40
Average	6.88±10.73	11.43± 0.64

Table (2): Hormonal residues in male tissues (lean meat and fat) by T.L.C. (ng./g.).

No. of examined smnples	Lean meat	Fat
1	3.40	4.60
2	2.70	5.70
3	3.80	5.20
4	1.36	6.15
5	4.20	4.90
Average	3.09±10.49	5.31±0.21

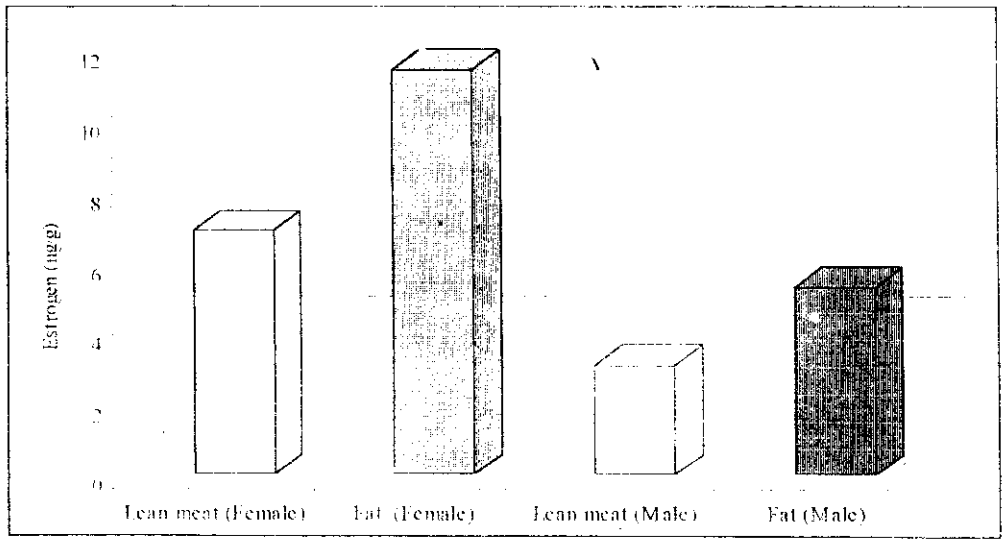

Figure (1): Demonstrates level of estrogen hormone (ng/g) in learn meat and fat of female comparing with male beef.

الملخص العربي

بقايا هرمون الاستروجين في أنسجة الأبقار

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تم في هذه الدراسة قياس نسبة هرمون الاستروجين بطريقة شرائح الطيف الرقيق الكروماتوجرافية في أنسجة ذكور وإناث الأبقار المعروضة للبيع في محلات الجزارة حيث تم جمع عدد ٢٠ عينة (١٠ عينة من كل من أنسجة ودهن الذكور والإناث).

وبينت النتائج أن نسبة الهرمون في الإناث أعلى من الذكور وكذلك كانت في العضلات أقل من الدهن فكانت في عضلات الإناث ٦,٢، ٥,٨، ٥,٣ ، ٧,٩ ، ٩,٢ بمتوسط تركيز ٦,٨٨ ، نانوجرام/ جرام، بينما في دهن الإناث ١١,٢، ١٢,٣، ١٠,٥، ٩,٨، ١٣,٤ بمتوسط تركيز ١١,٤٣ على التوالي ، كانت نسبة الهرمون في لحوم الذكور ٣,٤، ٢,٧، ٣,٨، ١,٣٦، ٤,٢ والدهون ٤,٦، ٥,٧، ٥,٢، ٦,١٥، ٤,٩ بمتوسط ٥,٣١ نانوجرام/ جرام على التوالي.

هذا وقد تم مناقشة الأهمية الصحية لهذه البقايا واستخدامها للتعرف على الذبائح.