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# APPENDICES

# APPENDIX 1

## A COMPARISON OF TRITIUM RADIOACTIVITY IN PLASMA AND DISTILLED WATER

In most previous studies dealing with determination of body water space (BWSp) and water turn-over rate (WTOR) using the tritiated water (TOH) dilution technique, radioactivity of tritium was determined from purified plasma water obtained by the vacuum sublimation method (Vaughan and Boling, 1961) or from non-protein plasma obtained by a dioxane precipitation method (Springell and Wright, 1976). In the present studies reported in chapter III, VI and VII, the radioactivity of tritium was determined directly from plasma containing solid and colour which presumably reduced the count results.

To evaluate this possible error, a comparison between tritium radioactivity in 0.5 ml of plasma and in 0.5 ml of distilled water to which was added the same dose of TOH (0.5 ml of 25 nCi tritium/ml) was undertaken. This is approximately the same activity as in the plasma from the dilution studies. The plasma used in this comparison was obtained from untreated animals (sheep and goats). The result is shown in Table A.1.

According to Student's t-test, there were no significant differences between radioactivity of tritium in the water and plasma. Although counting efficiency tended to decrease, the differences were negligible.

**Table A.1. Counts per minute (cpm), disintegrations per minute (dpm) and counting efficiency of tritium in plasma and distilled water**

| samples | cpm | dpm | efficiency (%) |
|---|---|---|---|
| **background** | | | |
| 0.5 ml H2O + 0.5ml Pl-s+ 10 ml Sc.F | 13.6 | 27.6 | 52.5 |
| 0.5 ml H2O + 0.5ml Pl-s + 10 ml Sc.F | 14.5 | 29.5 | 52.4 |
| 0.5 ml H2O + 0.5ml Pl-g + 10 ml Sc.F | 12.5 | 25.7 | 51.6 |
| **mean** | **13.5** | **27.6** | **52.2** |
| **in water** | | | |
| 0.5 ml H2O + 0.5 ml TOH + 10 ml Sc.F | 10342.9 | 20881.9 | 53.0 |
| 0.5 ml H2O + 0.5 ml TOH + 10 ml Sc.F | 10214.5 | 20722.6 | 52.3 |
| 0.5 ml H2O + 0.5 ml TOH + 10 ml Sc.F | 10164.3 | 21455.6 | 50.1 |
| 0.5 ml H2O + 0.5 ml TOH + 10 ml Sc.F | 10125.7 | 20443.4 | 50.6 |
| **mean** | **10211.9** | **20875.9** | **51.5** |
| **in plasma** | | | |
| 0.5 ml Pl-s + 0.5 ml TOH + 10 ml Sc.F | 10433.6 | 21208.4 | 52.4 |
| 0.5 ml Pl-s + 0.5 ml TOH + 10 ml Sc.F | 10061.5 | 21238.6 | 49.3 |
| 0.5 ml Pl-g + 0.5 ml TOH + 10 ml Sc.F | 10457.4 | 21358.8 | 52.0 |
| 0.5 ml Pl-g + 0.5 ml TOH + 10 ml Sc.F | 10284.7 | 21165.6 | 51.4 |
| **mean** | **10309.3** | **21242.9** | **51.3** |
| **Student's t test ( water vs plasma)** | **ns** | **ns** | **ns** |

Note : Pl-s = sheep plasma
Pl-g = goat plasma
Sc-F= Scintillation fluid (Ultima Gold)

# APPENDIX 2

## RESPIRATION RATE, BODY TEMPERATURE (RUMEN AND RECTUM) AND PACKED CELL VOLUME

(SUPPLEMENT FOR CHAPTER VII)

Inherent with the experiment reported in Chapter VII, respiration rate, body temperature (rumen and rectum), and packed cell volume were determined.

Respiration rate was measured by counting flank movements. Rumen and rectal temperature were measured simultaneously using two digital thermometers inserted into the rumen and rectum These measurements were carried out at the end of 20 and 40°C temperature treatment when 1.35% salt water was offered. Packed cell volumes of each animals in six consecutive treatments of salt-temperature combination were obtained from the first and the last blood sample in each treatment.

Table A2.1. Respiration rate and body temperature (rectal and rumen) of the sheep drinking 1.35% salt water in 20 and 40°C

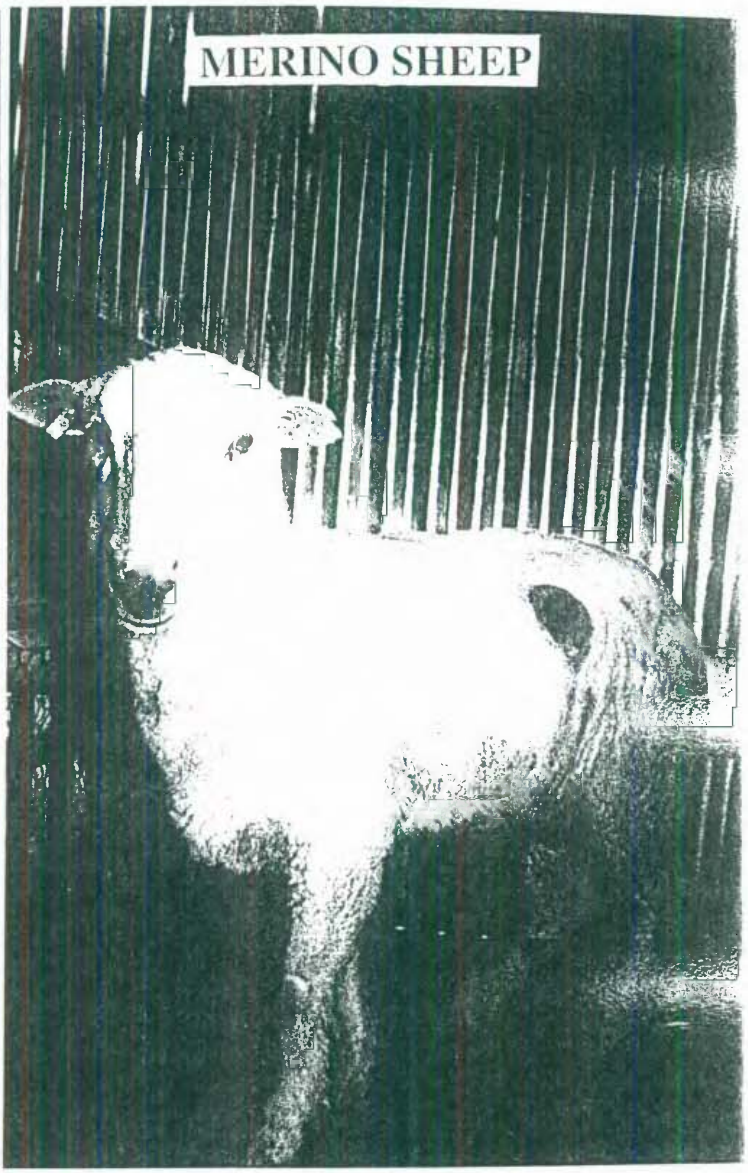
| Sheep | 20°C | | | 40°C | | |
|---|---|---|---|---|---|---|
| No. | Resp.rate (per min) | Rectal temp (°C) | Rumen temp (°C) | Resp.rate (per min) | Rectal temp (°C) | Rumen temp (°C) |
| S1 | 23 - 26 | 39.4 | 39.9 | 120 - 150 | 39.5 | 39.7 |
| S2 | 27 - 28 | 39.4 | 40.1 | 180 - 200 | 40.1 | 40.4 |
| S3 | 22 - 23 | 39.3 | 39.7 | 120 - 150 | 40.0 | 40.0 |
| S4 | 26 - 27 | 39.2 | 39.7 | 200 - 210 | 39.9 | 40.4 |
| S5 | 30 - 50 | 39.5 | 40.1 | 200 - 220 | 40.6 | 40.6 |
| S6 | 31 - 35 | 39.3 | 39.8 | 200 - 250 | 41.7 | 41.8 |

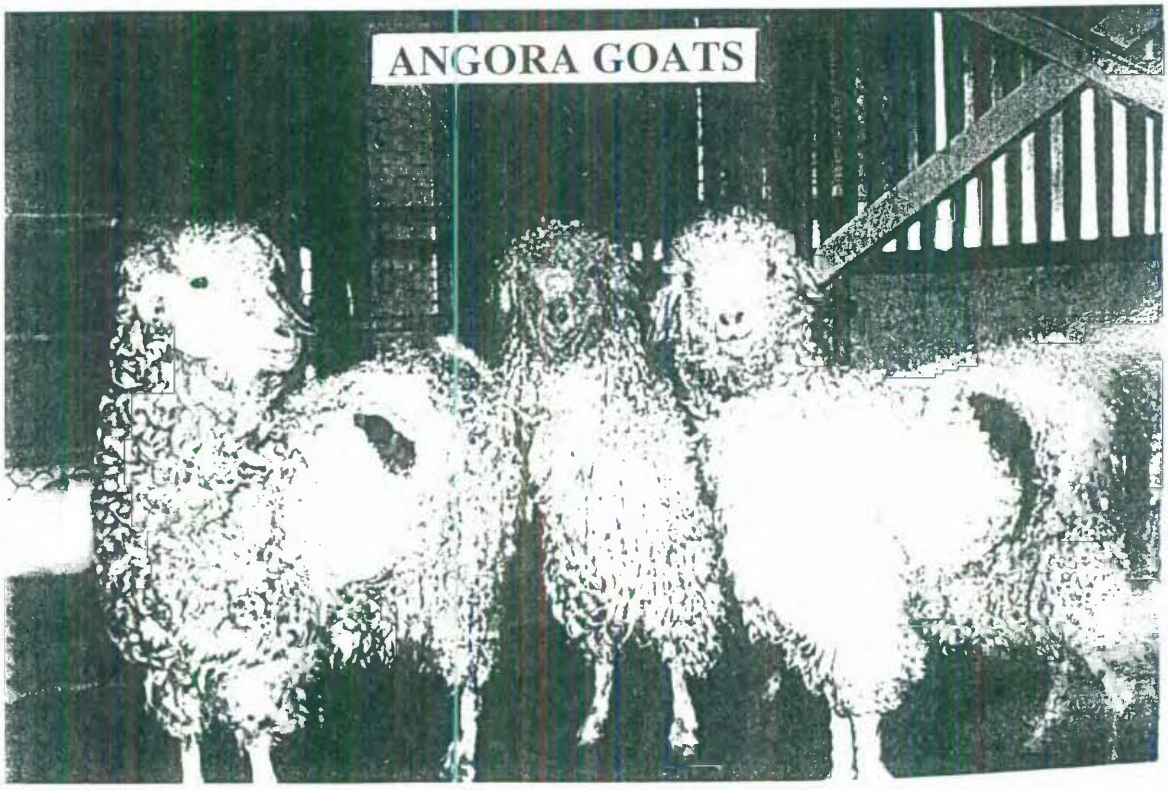
Table A2.2. Packed cell volume of the sheep drinking fresh or salt water in 20 and 40°C

| Sheep | 20°C | | | 40°C | | |
|---|---|---|---|---|---|---|
| No. | freshwater | 0.6% salt | 1.35%salt | freshwater | 0.6% salt | 1.35%salt |
| S1 | 37.0 | 30.4 | 27.0 | 34.0 | 29.0 | 28.0 |
| S2 | 36.0 | 30.0 | 27.0 | 34.0 | 25.0 | 20.0 |
| S3 | 40.0 | 29.0 | 25.0 | 36.0 | 27.5 | 25.0 |
| S4 | 38.0 | 34.0 | 30.0 | 35.0 | 32.0 | 30.0 |
| S5 | 39.0 | 34.0 | 30.0 | 36.5 | 30.0 | 27.0 |
| S6 | 35.0 | 31.0 | 27.0 | 33.5 | 29.0 | 25.0 |

# PHOTOGRAPHS OF THE EXPERIMENTAL ANIMALS (MERINO SHEEP, ANGORA AND AUSTRALIAN FERAL GOATS


AUSTRALIAN FERAL GOAT


MERINO SHEEP


ANGORA GOATS