Exemplar Materials: Unit 8 Investigating the Scientist's Work

EXEMPLAR PORTFOLIO WORK UNIT 8 **Record of data collected: Task 2b, AO2**	**Commentary on Mark Allocation**

EXEMPLAR PORTFOLIO WORK UNIT 8

Record of data collected: Task 2b, AO2

Results EDTA /standard solution of calcium ions	Recording results AO2a Mark band 2 2 marks.

EDTA /standard solution of calcium ions

Burette reading	1	2	3
Final reading cm^3	3.10	5.80	8.60
Start reading cm^3	0.00	3.10	5.80
Volume used in cm^3	3.10	2.70	2.80

If an explanation of why the first titration result is ignored, then Mark band 2 3 marks.

$$\text{Average volume used} = \frac{2.70 + 2.80}{2} = 2.75 \text{ cm}^3$$

For Mark band 3 see comments at end of this task.

EDTA /whole milk

Burette reading	1	2	3
Final reading cm^3	8.30	16.40	24.40
Start reading cm^3	0.00	8.30	16.40
Volume used in cm^3	8.30	8.10	8.00

$$\text{Average volume used} = \frac{8.00 + 8.10}{2} = 8.05 \text{ cm}^3$$

Similar tables given for
- skimmed milk
- semi-skimmed milk
- long life semi-skimmed milk
- goats milk
- soya milk (dairy alternative)
- Flora proactive chloresterol lowering milk
- tea milk
- Yoghurt drink (munch bunch)

The titration values were used to calculate the mass of calcium in mg. in 25cm^3 milk

Limited processing and calculation contributes to AO2b and AO2c.

Calculation for whole milk

AO2c for calculations is Mark Band 1 2 marks.

$$\text{No. of moles EDTA} = \frac{8.05 \times 0.1}{1000} = 0.000805$$
$$= \text{No. moles calcium ions}$$

Mass of calcium ions = 0.000805 x 40 = 0.0322 g = 32.2mg in 25cm^3
Mass of calcium ions in 100 cm^3
Mass of calcium ions in 100 cm^3 = 32.2 x 4 = 128.8mg

Table comparing experimental and published data

Sample	From experiment	Published
Whole milk	128.8mg	119mg
Skimmed milk	133.6mg	124mg
Semi-skimmed	132mg	120mg
Long life semi skimmed	134.4 mg	120mg
Goats milk	132mg	120mg
Soya milk	141.6 mg	148mg
Tea milk	132mg	Not given
Flora	152mg	Not given
Yoghurt milk	114.1 mg	Not given

More variety of recording / processing and selection of data is needed to reach mark band 3

Further results of the investigation - could include

- a survey on daily intake of milk etc
- types of milk people drink etc
- need for calcium
- statistical data on milk intake (type/amount/cohort)

Possibly further experimental work on the contents of milk to include a different type of calculation /method of recording could also be added

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Complex calculations etc. could involve error calculations for AO2c.

Data has been related to the objectives of the investigation

AO2 b Mark Band 1 2 marks have been awarded.

Comments on differences in results needed to obtain Mark band 2 AO2b.

Also Mark band 2 could be awarded if the results of the weighings and the calculation for the reference solution containing Ca2+.

Total Marks AO2 = 6