APPLICATION NOTE | DDS CALORIMETERS

C1.5 ALTERNATIVE METHOD FOR CALORIFIC MEASUREMENT OF FOOD SAMPLE – STELLENBOSCH UNIVERSITY SAMPLE : DVK324 SHEEP FEED

INTRODUCTION

Many institutions are doing research and development on food. The aim is to improve the nutritional value of the food. The parameters may be to compare different foods or different manufactures or to generically improve the food. Other aspects may be to improve the digestion and energy absorption of animal feeds.

Part of the research involves determining the calorific value of the food. The calorific value of a particular food is the same as the energy content of that food.

The food can be for either human or animal consumption.

Institutions performing this type of research include:

Animal and Dairy research
Department of Agriculture
Universities
Technicons
Government or private food industries

SAMPLE PREPARATION

Many food samples once they have been ground into a powder will not easily press into tablets using a pellet press, because the fibres will not adhere to each other irrespective of the pressure exerted during the pelleting process.

An alternative method to ignite the sample without it splattering during the burning process is to place the powder inside a gelatine capsule. The capsule ignites easily thus causing the sample to ignite while confirming the sample during the ignition phase.

The calorific value of each batch of gelatine capsules must be determined. This value along with the mass of the capsule is used in the spike application of the calorimeter.

FREEZE-DRYING PROCEDURE

The procedure for freeze drying is:

- Place a thin layer of the sample onto a flat plate - layer should not be more than 2-3 mm thick.
- Place the plate in a freezer for minimum of 24 hours.
- After 24 hours remove the plate and spoon the sample immediately into a glass bottle and seal.
- Allow the sample now to come to room temperature before use.
- Also keep the bottle sealed when not removing samples.

SPIKING

If a sample does not ignite easily or not at all, then the spiking method of ignition can be used. In this method a benzoic acid tablet is added to the crucible with the sample. The benzoic acid burns easily and ignites the sample; the energy of the benzoic acid is removed from the calculation of the calorific value.

ANALYSIS

Once the sample has been prepared the determination can be carried out in the normal method.

Ensure that the firing cotton touches the sample – with tablets lay the cotton on the bottom of the crucible and then move the tablet on top of the cotton. During the filling process do not knock the vessel, ensuring that the tablet does not move off the cotton.

When substances are being analysed for the first time always check after the determination for any residue on the walls of the vessel and check that the entire sample has burnt.

After a determination clean the inside of the vessel and the crucible before starting the next determination.

RESULTS

Stellenbosch University Code DVK324 Sheep Feed

RESULT	MASS	SID	DATE	BN	INIT DRIFT	FIRING TEMP	AMBIENT TEMP	RS	FINAL TIME
15.781	0.1745	15	12/09/2005	18	0.0004	19.9	19.8	OK	3.1
15.774	0.1343	16	12/09/2005	18	-0.0013	21.2	20.4	OK	3.1
15.695	0.1534	17	12/09/2005	18	-0.0013	21.7	21.1	OK	3.1
15.470	0.1623	18	12/09/2005	18	-0.0011	22.4	21.5	OK	3.1
15.395	0.1491	19	12/09/2005	18	0.0004	22.6	22.8	OK	3.1
Average MJ/Kg = 15.623									

CONCLUSION

The calorific value of almost any food type can be determined. Calorific value analysis of a food type is one of many results required to determine the nutritional value of any food for either human or animal consumption.