



## APPLICATION NOTE | DDS CALORIMETERS

### CALORIFIC MEASUREMENT OF FOOD: POTATOE CHIPS

#### INTRODUCTION

Many institutions are doing research and development on food. The aim is to improve the nutritional value of the food, or reduce the calory content, or use the measurement for quality control purposes. This done with a calorimeter because it is fast and reliable. The calorific value of a particular food is the same as the energy content of that food.

#### SAMPLE PREPARATION

A calorimeter is used to determine the calorific value of any substance that can be ignited.

All samples should have no moisture present before analyzing. Freeze-drying the sample can remove the moisture.

No special preparation is required: potato chips burn nicely!

#### 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. During the filling process do not knock the vessel, ensuring that the chip does not move off the cotton.

Because the chips are relative high energy the mass was reduced

**NB: Better to run whole chips than crushed as some oils map be lost in the crushing process.**

#### RESULTS

1. Sample A – Potato Chip (Whole)

RESULT	MASS	SID	DATE	BN	INIT DRIFT	FIRING TEMP	AMBIENT TEMP	RS	FINAL TIME
<b>22.321</b>	0.2047	14	05/05/2005	3	0.0016	20.5	21.5	OK	3.1
<b>21.881</b>	0.1602	13	05/05/2005	1	0.0004	21.1	21.8	OK	3.1
<b>21.820</b>	0.1465	18	05/05/2005	3	0.0018	20.8	22.4	OK	3.1
<b>21.359</b>	0.1478	21	05/05/2005	1	-0.0012	24.1	23.1	OK	3.1
<b>Average MJ/Kg = 21.845</b>									





## 2. Sample B – Potato Chips (Whole)

RESULT	MASS	SID	DATE	BN	INIT DRIFT	FIRING TEMP	AMBIENT TEMP	RS	FINAL TIME
22.463	0.1637	322	04/05/2005	1	0.0016	21.6	22.6	OK	3.1
22.183	0.1277	325	04/05/2005	3	0.0007	23.1	22.8	OK	3.1
22.977	0.1449	326	04/05/2005	1	-0.0002	23.8	22.9	OK	3.1
22.348	0.1212	328	04/05/2005	3	0.0008	23.2	23.2	OK	3.1
22.521	0.1407	329	0.4/05/2005	1	-0.0003	23.8	23.4	OK	3.1
22.162	0.1399	330	04/05/2005	3	-0.0006	23.4	23.7	OK	3.1
<b>Average MJ/Kg = 22.442</b>									

## 3. Sample C – Potato Chips (Whole)

RESULT	MASS	SID	DATE	BN	INIT DRIFT	FIRING TEMP	AMBIENT TEMP	RS	FINAL TIME
21.922	0.1633	5	05/05/2005	3	0.0016	17.9	19.2	OK	3.1
22.026	0.1749	6	05/05/2005	1	0.0002	20.2	19.3	OK	3.1
22.023	0.1326	9	05/05/2005	3	0.0008	20.2	19.9	OK	3.1
21.883	0.2196	10	05/05/2005	1	-0.0001	20.6	20.0	OK	3.1
22.547	0.1421	11	05/05/2005	1	0.0014	20.6	20.3	OK	3.1
<b>Average MJ/Kg = 22.080</b>									

## 4. Sample A – Potato Chips (Crushed)

RESULT	MASS	SID	DATE	BN	INIT DRIFT	FIRING TEMP	AMBIENT TEMP	RS	FINAL TIME
23.438	0.2752	240	28/04/2005	1	0.0005	21.0	22.0	OK	3.1
23.548	0.2746	241	28/04/2005	3	0.0015	21.8	22.1	OK	3.1
23.401	0.3471	243	28/04/2005	3	0.0013	22.8	22.2	OK	3.1
23.598	0.3400	245	28/04/2005	3	0.0013	23.3	22.4	OK	3.1
23.001	0.3139	244	28/04/2005	1	0.0017	22.7	22.6	OK	3.1
22.978	0.3375	247	28/04/2005	1	-0.0010	23.3	22.8	OK	3.1
<b>Average MJ/Kg = 23.327</b>									





## 5. Sample B – Potato Chips (Crushed )

RESULT	MASS	SID	DATE	BN	INIT DRIFT	FIRING TEMP	AMBIENT TEMP	RS	FINAL TIME
24.569	0.2593	311	04/05/2005	1	0.0004	18.8	19.6	OK	3.1
24.988	0.2504	312	04/05/2005	3	0.0016	18.9	20.0	OK	3.1
24.364	0.3082	313	04/05/2005	1	0.0006	20.3	20.2	OK	3.1
24.542	0.2615	314	04/05/2005	3	-0.0008	21.6	20.5	OK	3.1
24.462	0.2617	320	04/05/2005	1	0.0009	21.0	21.6	OK	3.1
24.085	0.2154	327	04/05/2005	3	0.0014	22.7	22.5	OK	3.1
<b>Average MJ/Kg = 24.502</b>									

## 6. Sample C – Potato Chips (Crushed)

RESULT	MASS	SID	DATE	BN	INIT DRIFT	FIRING TEMP	AMBIENT TEMP	RS	FINAL TIME
21.299	0.2498	331	04/05/2005	1	0.0002	23.6	23.8	OK	3.1
21.610	0.2450	332	04/05/2005	3	0.0005	23.9	23.9	OK	3.1
21.572	0.2610	333	04/05/2005	1	0.0003	24.6	23.9	OK	3.1
21.493	0.2485	334	04/05/2005	3	0.0009	24.5	24.0	OK	3.1
21.388	0.2498	335	04/05/2005	1	-0.0002	24.4	24.0	OK	3.1
<b>Average MJ/Kg = 21.472</b>									

**SUMMARY/ CONCLUSION**

The 3 manufacturers of the potato chips were analyzed and yield a small difference in CV.

Manufacturer	Whole	Crushed
A	21.845	23.327
B	22.442	24.502
C	22.080	21.472

It looks like that the crushing process is not successful and that perhaps oil was transferred from one sample to the other. The chips burn without crushing!

