



APPLICATION NOTE | DDS CALORIMETERS

FOOD_ &_ NUTRICIAN: FECES

INTRODUCTION

During the research for animal feed products the feces become important. One aspect may be to improve the digestion and energy absorption of animal feeds.

Part of the research involves determining the calorific value of the feed.

SAMPLE PREPARATION

Feces in general burn very easy when the moisture is very low. If the moisture is high then the spiking method should be used to ignite the sample.

If the sample has been ground into a powder it will not easily press into tablets using a pellet press, because the fibers will not adhere to each other irrespective of the pressure exerted during the pelleting process. Igniting a fine powder is not advised.



An alternative method to ignite the fine sample powder without it splattering during the burning process is to place the powder inside a gelatin capsule.

There are two piking methods:

Traditional Spiking:	Spike mass and Spike CV are needed
Easy Spiking:	Temperature rise of spike is needed

MEASURING THE SPIKE MATERIAL

The Spike material (Gelatin Capsule) must be measured ONCE and then either method can be used.

- Disable the 'MISFIRE LIMIT'=0
- Disable easy spiking by 'SET CAPSULE EN'=NO
- Tare the balance with the crucible
- Put ONE empty capsule into the crucible and weight it (automatic or manual entry)
- Prepare the bomb and run a normal sample
- Once done enter the result in 'SPIKE VALUE'
- Read the temperature rise by 'READ LAST N_RISE'
- Enter the temperature rise in to 'CAPSULE RISE C'
- Enable the misfire limit 'MISFIRE LIMIT'=0.33

The above measures the spike CV (step f) and the spike rise (step h). Now either spiking method can be used!





EASY SPIKE METHOD

This method assumes that all capsules have the same CV (Mass and Material). Then:

- a) Enable Easy spiking by 'SET CAPSULE EN'=YES
- b) Tare the balance with an empty crucible
- c) Fill the capsule with the powdery sample and weigh the crucible with the filled capsule
- d) Enter weight as sample mass either manual or automatically
- e) Prepare the bomb and run a standard determination
- f) The displayed result is the CV of the powder less the temperature rise of the capsule.

TRADITIONAL SPIKE METHOD

- g) Disable Easy spiking by 'SET CAPSULE EN'=NO
- h) Tare the balance with crucible
- i) Weigh the capsule and enter mass in 'SPIKE MASS'. This must be done manually!
- j) Tare the balance
- k) Fill the capsule with the powdery sample and weigh the crucible with the filled capsule
- l) Enter weight as sample mass either manual or automatically
- m) Prepare the bomb and run a standard determination
- n) The displayed result is the CV of the powder less the SPIKE MASS x SPIKE VALUE

RESULTS

1. Code 161G Dog Feces

RESULT	MASS	SID	DATE	BN	INIT DRIFT	FIRING TEMP	AMBIENT TEMP	RS	FINAL TIME
15.293	0.3105	47	14/09/2005	18	0.0005	18.6	19.2	OK	3.1
15.055	0.3704	48	14/09/2005	18	-0.0001	20.1	19.7	OK	3.1
15.243	0.3377	49	14/09/2005	18	-0.0005	20.6	20.5	OK	3.1
15.124	0.3784	51	14/09/2005	18	0.0000	21.7	21.6	OK	3.1
15.299	0.3589	52	14/09/2005	18	0.0001	22.4	22.5	OK	3.1
Average MJ/Kg = 15.203									

2. Code 161F Dog Feces

RESULT	MASS	SID	DATE	BN	INIT DRIFT	FIRING TEMP	AMBIENT TEMP	RS	FINAL TIME
14.551	0.3916	1	13/09/2005	19	-0.0016	24.5	23.0	OK	3.1
14.807	0.361	2	13/09/2005	19	-0.0005	25.3	24.1	OK	3.1
14.854	0.3669	3	13/09/2005	19	0.0007	25.1	26.3	OK	3.1





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14.533	0.3753	4	13/09/2005	19	0.0000	26.6	26.7	OK	3.1
14.730	0.3488	6	13/09/2005	19	-0.0008	27.1	27.5	OK	3.1
Average MJ/Kg = 14.695									

3. Code 161E Dog Feces

RESULT	MASS	SID	DATE	BN	INIT DRIFT	FIRING TEMP	AMBIENT TEMP	RS	FINAL TIME
14.402	0.4373	38	13/09/2005	18	0.0000	24.2	23.3	OK	3.1
14.303	0.8011	41	13/09/2005	18	-0.0009	25.2	24.8	OK	3.1
14.178	0.8008	43	13/09/2005	18	0.0005	26.2	26.0	OK	3.1
14.319	0.8007	44	13/09/2005	18	-0.0008	27.1	26.3	OK	3.1
14.280	0.8001	45	13/09/2005	18	-0.0007	27.2	26.7	OK	3.1
Average MJ/Kg = 14.296									

4. Code 161D Dog Feces

RESULT	MASS	SID	DATE	BN	INIT DRIFT	FIRING TEMP	AMBIENT TEMP	RS	FINAL TIME
15.046	0.8003	1	13/09/2005	19	0.0015	17.4	17.8	OK	3.1
15.290	0.3241	4	13/09/2005	19	-0.0009	20.9	20.4	OK	3.1
15.126	0.404	6	13/09/2005	19	-0.0008	21.4	21.5	OK	3.1
15.440	0.3805	7	13/09/2005	19	0.0000	22.2	22.1	OK	3.1
15.126	0.3846	10	13/09/2005	19	0.0005	24.0	24.2	OK	3.1
Average MJ/Kg = 15.206									

5. Code 161C Dog Feces

RESULT	MASS	SID	DATE	BN	INIT DRIFT	FIRING TEMP	AMBIENT TEMP	RS	FINAL TIME
14.602	0.3777	32	13/09/2005	18	-0.0002	20.6	19.5	OK	3.1
14.686	0.3519	33	13/09/2005	18	-0.0002	21.2	20.0	OK	3.1
14.249	0.3448	34	13/09/2005	18	0.0001	21.4	20.8	OK	3.1
14.530	0.4029	35	13/09/2005	18	0.0001	21.9	21.4	OK	3.1
14.845	0.3609	37	13/09/2005	18	0.0017	23.1	22.7	OK	3.1
Average MJ/Kg = 14.582									





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6. Code T52 Sheep Feces



RESULT	MASS	SID	DATE	BN	INIT DRIFT	FIRING TEMP	AMBIENT TEMP	RS	FINAL TIME
26.384	0.1474	158	5/11/2005	1	6.0E-05	25.4	25.2	OK	3.1
26.713	0.5168	165	5/11/2005	2	-0.0017	20.3	16.7	OK	3.1
26.838	0.4951	166	5/11/2005	2	-0.0019	20.1	17.4	OK	3.1
26.925	0.4941	164	5/11/2005	1	0.0014	17.2	17.8	OK	3.1
26.463	0.5366	167	5/11/2005	1	-0.0014	21.3	18.2	OK	3.1
Average MJ/Kg = 26.664									

7. Code T48 Horse Feces



RESULT	MASS	SID	DATE	BN	INIT DRIFT	FIRING TEMP	AMBIENT TEMP	RS	FINAL TIME
18.165	0.1134	143	5/11/2005	1	0.0017	21.8	23.0	OK	3.1
19.844	0.1121	148	5/11/2005	2	0.0015	22.1	24.0	OK	3.1
18.963	0.1041	149	5/11/2005	2	0.0015	21.9	24.5	OK	3.1
18.929	0.1017	151	5/11/2005	1	0.0016	21.9	24.6	OK	3.1
20.638	0.1041	153	5/11/2005	1	0.0020	21.5	24.9	OK	3.1
Average MJ/Kg = 19.308									





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8. Code S55F Chicken Feces



RESULT	MASS	SID	DATE	BN	INIT DRIFT	FIRING TEMP	AMBIENT TEMP	RS	FINAL TIME
9.205	0.4481	129	5/11/2005	2	-0.0003	20.5	19.6	OK	3.1
9.156	0.4579	130	5/11/2005	1	-0.0001	20.2	19.8	OK	3.1
9.326	0.5349	131	5/11/2005	2	-0.0002	20.5	20.0	OK	3.1
9.185	0.4786	132	5/11/2005	1	0.0004	20.5	20.2	OK	3.1
9.308	0.4483	133	5/11/2005	2	0.0007	20.7	20.4	OK	3.1
9.254	0.4578	134	5/11/2005	1	0.0008	20.8	20.5	OK	3.1
Average MJ/Kg = 9.239									

9. Code A80F Chicken Feces



RESULT	MASS	SID	DATE	BN	INIT DRIFT	FIRING TEMP	AMBIENT TEMP	RS	FINAL TIME
12.146	0.4100	280	5/18/2005	2	0.0014	21.9	25.8	OK	3.1
12.164	0.3701	281	5/18/2005	1	0.0011	22.5	25.9	OK	3.1
12.449	0.4073	282	5/18/2005	2	0.0016	21.5	26.1	OK	3.1
12.458	0.3725	283	5/18/2005	1	0.0016	21.6	26.3	OK	3.1
12.229	0.3964	284	5/18/2005	2	0.0011	22.9	26.4	OK	3.1
12.263	0.4879	288	5/18/2005	1	0.0017	22.4	27.0	OK	3.1



**Average MJ/Kg = 12.285**

10. Code C60F Chicken Feces



RESULT	MASS	SID	DATE	BN	INIT DRIFT	FIRING TEMP	AMBIENT TEMP	RS	FINAL TIME
14.595	0.4370	315	5/19/2005	1	0.0017	21.8	25.7	OK	3.1
14.701	0.4270	316	5/19/2005	2	0.0017	21.9	25.8	OK	3.1
14.655	0.4311	317	5/19/2005	1	0.0011	22.8	26.0	OK	3.1
14.704	0.4644	318	5/19/2005	2	0.0018	22.0	26.3	OK	3.1
14.718	0.4874	320	5/19/2005	2	0.0016	21.2	26.7	OK	3.1
14.423	0.4810	325	5/19/2005	1	-9.0E-05	23.9	27.1	OK	3.1
Average MJ/Kg = 14.633									

11. Code B97F Chicken Feces



RESULT	MASS	SID	DATE	BN	INIT DRIFT	FIRING TEMP	AMBIENT TEMP	RS	FINAL TIME
13.264	0.4418	289	5/18/2005	1	0.0018	22.9	27.0	OK	3.1
13.355	0.4627	290	5/18/2005	2	0.0014	23.3	27.0	OK	3.1





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12.754	0.4360	295	5/18/2005	1	-0.0018	21.6	19.5	OK	3.1
12.451	0.5353	296	5/18/2005	2	0.0004	19.3	19.7	OK	3.1
13.220	0.4667	298	5/18/2005	2	-0.0007	20.0	20.3	OK	3.1
13.134	0.4785	301	5/18/2005	1	0.0003	20.1	21.0	OK	3.1
Average MJ/Kg = 13.029									

12. Code C63F Chicken Feces



RESULT	MASS	SID	DATE	BN	INIT DRIFT	FIRING TEMP	AMBIENT TEMP	RS	FINAL TIME
12.645	0.4003	335	5/23/2005	2	-0.0002	19.0	20.4	OK	3.1
12.644	0.3895	336	5/23/2005	1	0.0003	19.1	20.6	OK	3.1
12.607	0.3675	337	5/23/2005	2	-0.0003	21.0	21.0	OK	3.1
12.555	0.4121	338	5/23/2005	1	-0.0003	20.6	21.4	OK	3.1
12.850	0.4124	339	5/23/2005	2	0.0002	20.9	21.7	OK	3.1
12.738	0.4142	340	5/23/2005	1	0.0005	20.8	22.0	OK	3.1
Average MJ/Kg = 12.673									

13. Code U5 Rabbit Feces





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RESULT	MASS	SID	DATE	BN	INIT DRIFT	FIRING TEMP	AMBIENT TEMP	RS	FINAL TIME
17.885	0.1485	175	5/12/2005	2	0.0017	19.2	20.9	OK	3.1
17.578	0.1472	177	5/12/2005	2	-0.0008	22.1	21.3	OK	3.1
17.926	0.1393	178	5/12/2005	1	0.0001	21.1	21.7	OK	3.1
17.549	0.1588	181	5/12/2005	1	-0.0010	22.9	22.4	OK	3.1
Average MJ/Kg = 17.734									

CONCLUSION

The above samples of animal feces differ largely. However, we are not aware of experiments or research performed on the animals.

