CHANGES OF RAPESEED GLUCOSINOLATES IN DIGESTIVE TRACT OF HEN

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INTRODUCION

In a earlier in vitro experiment it was found, that inactivation of endogenous rapeseed myrosinase had no significant effect on decomposition of glucosinolates of high glucosinolate rapeseed oil meal incubated with the content of digestive tract of hens /Rotkiewicz et. al 1985/. In a present experiment we tried to find out in which section of digestive tract of hen the decomposition of glucosinolates takes place and to check the rate of decomposition.

MATERIAL AND METHODS

High glucosinolate /Var.Skrzeszowicki/ rapeseed oil meal /HGR/ with inactivated myrosinase was used. Experiment was made on 72 8-week old broiler chicken. After 23 hrs of fast each bird was fed 30 ml HGR and water mixture /3:7/, containing Cr_2O_3 as indicator. Birds were slaughtered 1, 2 or 4 hrs after feeding, immediately samples of mixed blood were taken and the digestive tract removed and divided into 4 parts.The content of each part /1-crop,2-both stomachs,3-small intestine,4-large intestine and caeca/ was washed out into separate flask.
In the pooled samples /3birds per sample/ the content

of Cr_2O_3 and glucosinolate derivatives was determined / Youngs and Wetter 1967 /.

RESULTS AND DISCUSSION

Distribution of rapeseed meal in the digestive tract of birds / tab. 1 / was calculated from the content of Cr_2O_3 in digesta. The level of glucosinolates in intestinal content decreased during digestion / tab. 2 /. The rate of disappearance of glucosinolates varied depending on the segment of digestive tract and the time after feeding / tab. 3 /. The lowest level of glucosinolates was found in stomach content 4 hours after feeding. Generally it was found, that in the content of the last segment of the digestive tract, 4 hours after force-feeding still about 55% of dietary ITC and 70% of dietary OZT were present in intact form.

No detectable amount of intact glucosinolates or glucosinolate derivatives were found in blood serum. The last observation is contradictory to the conclusions of Campbell and Cansfield / 1980, 1983 / that glucosinolates of HGR with inactivated myrosinase are absorbed from the digestive tract of hen in intact form.

LITERATURE

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Tab. 1 DISTRIBUTION OF RAPESEED MEAL IN DIGESTIVE TRACT OF BIRDS AT 1,2 AND 4 HRS AFTER FORCE-FEEDING

Part of digestive tract	hrs after feeding	Distribution of rapeseed meal / % / in digestive tract of birds						
		1	2	3	4	5	6	mean
crop	1	22	22	34	27	47	18	28
	2	9	13	8	12	6	4	9
	4	0	0	0	0	0	0	0
stomach	1	30	33	19	27	16	16	24
	2	20	19	14	20	18	31	20
	4	24	19	16	22	20	14	19
small intestine	1	44	43	47	44	34	64	46
	2	66	59	67	50	60	47	58
	4	51	50	65	66	63	33	55
large intestine and caeca	1	4	2	0	2	4	2	2
	2	4	10	13	18	16	18	13
	4	25	31	19	12	18	53	26

Tab. 2 CONCENTRATION OF ITC AND OZT IN MG/G HGR DRY MATTER IN DIFFERENT PARTS OF DIGESTIVE TRACT AT 1,2 AND 4 HRS AFTER FORCE-FEEDING

Part of digestive tract	hrs after feeding	ITC-3-butenyl and ITC-4-pentenyl [x]	OZT[x]
HGR	0	1,52	5,36
crop	1	1,35	4,61
	2	1,00	2,96
	4[xx]	-	-
stomach	1	1,17	2,35
	2	0,71	1,71
	4	0,36	0,92
small intestine	1	1,35	5,59
	2	1,02	4,92
	4	0,63	3,89
large intestine and caeca	1	1,33	5,36
	2	1,20	4,98
	4	0,86	3,90

x - each value is a mean of 18 birds

xx - crop of birds didn't contain any feed 4 hrs after force feeding

Tab. 3 THE RATE OF DISAPPEARANCE OF ITC AND OZT IN DIFFERENT PARTS OF DIGESTIVE TRACT AT 1, 2 AND 4 HRS AFTER FORCE-FEEDING

Part of digestive tract	hrs after feeding	ITC and OZT calculated from Cr_2O_3 content of digesta /mg/ x		ITC and OZT found in digesta / mg / x	
		sum of ITC-3-butenyl and ITC 4-pentenyl	OZT	sum of ITC-3-butenyl and ITC 4-pentenyl	OZT
c r o p	1	7,15	25,22	6,08	20,40
	2	6,03	21,25	3,91	11,21
	4	-	-	-	-
stomach	1	5,28	18,64	3,96	7,88
	2	4,50	15,87	1,98	4,76
	4	2,22	7,83	0,53	1,26
small intestine	1	10,97	38,71	7,87	32,47
	2	13,10	46,36	7,55	36,64
	4	6,45	22,76	2,56	16,18
large intestine and caeca	1	0,74	2,60	0,52	2,40
	2	2,90	10,25	2,12	8,95
	4	3,22	11,37	1,70	7,29

x - each value is a mean of 18 birds