



Faculty Of  
Biotechnology  
And Animal Husbandry



West Pomeranian  
University  
of Technology  
in Szczecin



**ANIMAL SCIENCE AND AQUACULTURE**  
- challenges and research

IVth INTERNATIONAL SCIENTIFIC CONFERENCE FOR STUDENTS AND PHD STUDENTS

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# EFFECT OF PHYTOGENIC FEED ADDITIVES ON THE MINERAL AND FATTY ACID PROFILE OF THE LONGISSIMUS DORSI MUSCLE IN GROWING PIGS EXPOSED TO AFLATOXIN B1

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# FEED CONTAMINATION



Major concern for human health and livestock welfare



Reasons: high humidity, temperature fluctuations and poor storage conditions

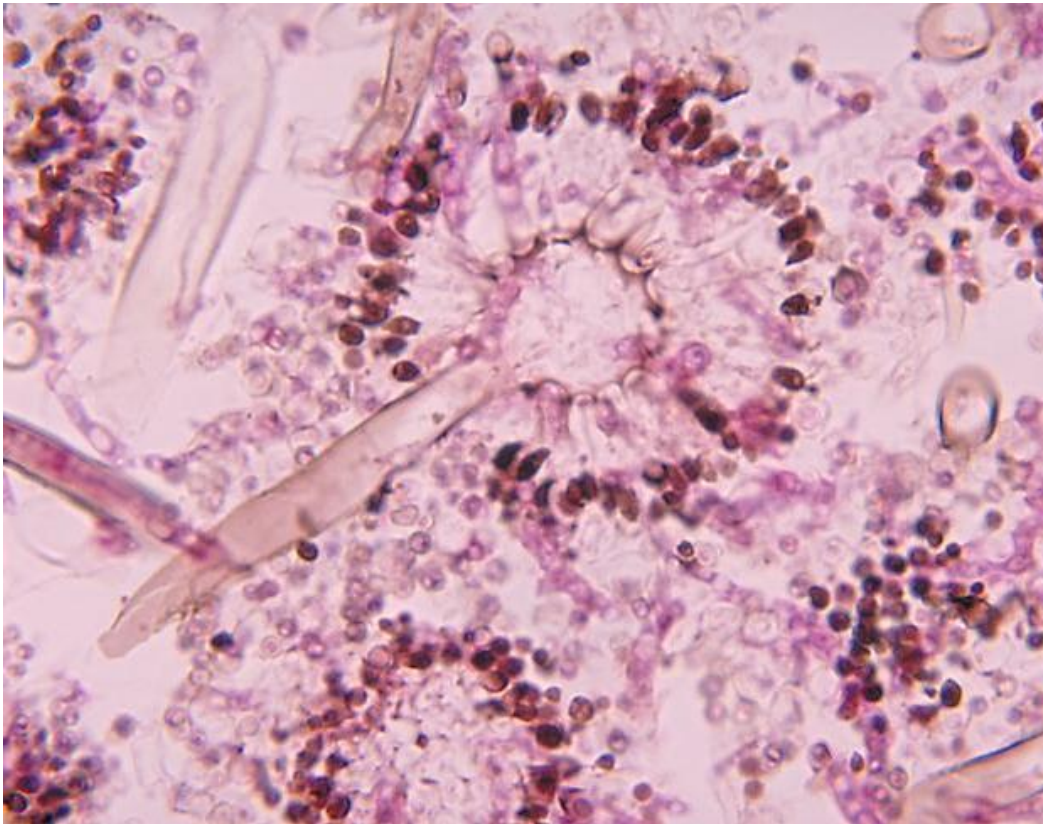


Mold growth – the production of mycotoxins

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# AFLATOXIN B1 (*Aspergillus* spp.) – AFB1



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Hepatotoxic, mutagenic and immunosuppressive effects

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Feed contamination, particularly corn

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Metabolism disruption

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Productivity reduction

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Degradation of the quality of animal-derived products

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# HERBAL EXTRACTS

*Andrographis paniculata*  
**green chiretta**



- Antifungal
- Antibacterial
- Antiviral
- Anti-inflammatory
- Hepatoprotective
- Immune system stimulation

*Silybum marianum*  
**milk thistle**



- Hepatoprotective
- Antioxidant

*Curcuma longa*  
**tumeric**



- Antioxidant
  - Anti-inflammatory
  - Energy metabolism regulation
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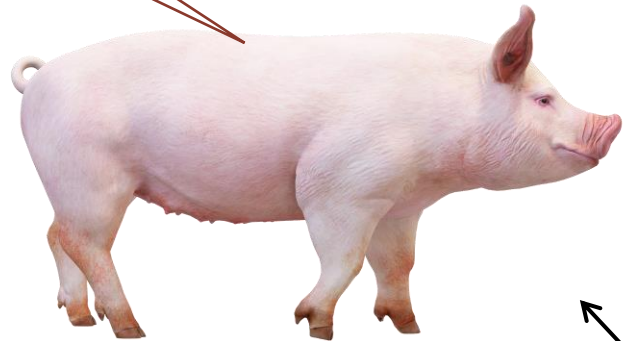
## AIM OF THE STUDY

The aim of this study was to evaluate the effects of herbal extracts derived from *Andrographis paniculata*, *Silybum marianum*, and *Curcuma longa* on **the mineral profile and fatty acid (FA) composition** in the longissimus dorsi muscle of growing pigs exposed to AFB1.

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Day 0 35th 42th 56th 70th

# RESEARCH MATERIAL



50 Topigs Norsvin hybrid pigs

5 x n=10 (50)

C

PC

AP

SM

CL

standard feed



AP (30 mg/kg)

SM (120 mg/kg)

CL (120 mg/kg)

AFB1 (120 mg/kg)

AFB1

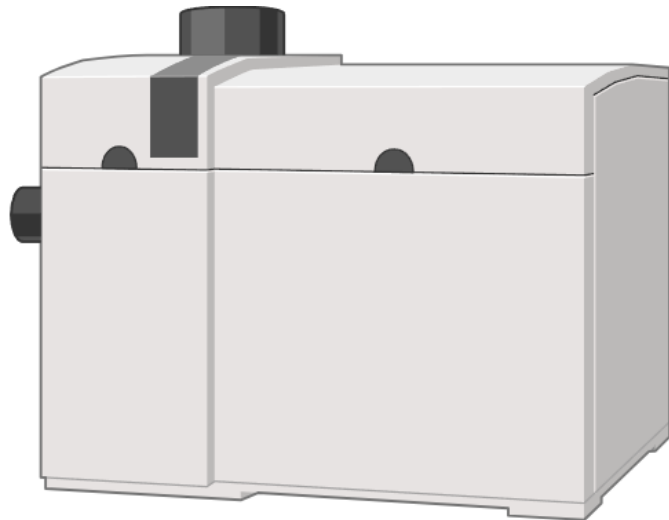
AFB1

AFB1

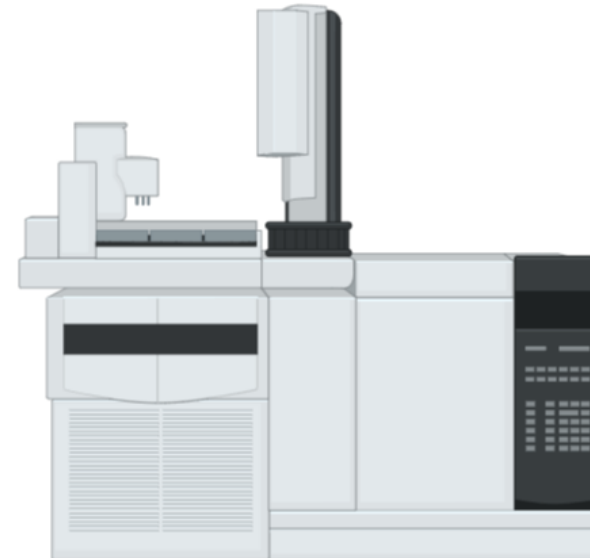
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# METHODS

**Mineral profile** was determined by **ICP-OES** (Inductively Coupled Plasma Optical Emission Spectrometry)



**Fatty acid composition** was analyzed using **GC-MS** (Gas Chromatography–Mass Spectrometry)



# RESULTS – MINERAL PROFILE

Grupa	Ca	K	Zn	Mn	Cr	Se
C	65,04ab	4057ab	22,65a	0,256ab	0,486ab	0,469ac
<b>PC (AFB)</b>	67,83ab	4507ab	27,76ab	<b>↓ 0,190b</b>	<b>↑ 0,540b</b>	<b>↑ 0,574c</b>
AP	<b>59,35a</b>	<b>3808a</b>	<b>24,57a</b>	<b>↑ 0,330a</b>	<b>↓ 0,391a</b>	<b>↓ 0,338ab</b>
SM	65,88ab	4583b	26,67a	0,220b	0,563b	<b>↓ 0,322b</b>
CL	71,71b	4146ab	<b>33,41b</b>	0,203b	0,544b	0,489c
SEM	1,15	88,8	0,81	0,0119	0,0139	0,0200
P	0,01302	0,02801	0,00006	0,00055	0,00016	0,00001

# RESULTS – FATTY ACID COMPOSITION (SFA/MUFA/PUFA)

	C	SD	PC(AFB)	SD	AP	SD	SM	SD	CL	SD
<b>SFA</b>	37,06b	0,47	↓ 36,25c	0,65	↑ 39,24a	0,35	↑ 37,28b	0,49	↑ 37,06b	0,58
<b>MUFA</b>	47,66ab	0,21	↑ 48,41c	0,50	↓ 47,33a	0,15	↓ 47,86b	0,46	↓ 47,90b	0,38
<b>PUFA</b>	15,28bc	0,40	15,33c	0,40	↓ 13,43a	0,32	↓ 14,86b	0,20	15,04bc	0,29
<b>ω3</b>	1,36c	0,01	1,34bc	0,02	↓ 1,28a	0,01	↓ 1,33b	0,01	1,34bc	0,03
<b>ω6</b>	13,92bc	0,41	13,99c	0,40	↓ 12,16a	0,31	↓ 13,53b	0,20	13,70bc	0,28
<b>MUFA/SFA</b>	1,29b	0,02	↓ 1,34c	0,04	↓ 1,21a	0,01	↓ 1,28b	0,03	↓ 1,29b	0,03
<b>MUFA/PUFA</b>	3,12c	0,08	3,16bc	0,09	↑ 3,53a	0,09	↓ 3,22b	0,05	3,19bc	0,05
<b>PUFA/SFA</b>	0,41bc	0,02	0,42c	0,02	↓ 0,34a	0,01	↓ 0,40b	0,01	↓ 0,41b	0,01
<b>ω6/ω3</b>	10,25b	0,36	10,47b	0,33	↓ 9,52a	0,22	10,14b	0,17	10,25b	0,25

SFA – saturated fatty acids; MUFA – monounsaturated fatty acids; PUFA – polyunsaturated fatty acids

# RESULTS – SPECIFIC FATTY ACIDS

		C	SD	PC (AFB)	SD	AP	SD	SM	SD	CL	SD
C14:0	Myristic acid	1,52b	0,04	1,50b	0,04	↑ 1,57a	0,06	1,54ab	0,02	1,54ab	0,04
C16:0	Palmitic acid	22,85bc	0,39	22,35c	0,36	↑ 24,20a	0,27	↑ 22,92b	0,56	↑ 22,98b	0,35
C16:1	Palmitoleic acid	3,00bc	0,05	2,96c	0,07	↓ 2,96a	0,05	↓ 2,91b	0,11	↓ 2,94b	0,08
C17:0	Heptadecanoic acid	0,30b	0,02	0,30b	0,02	↓ 0,27a	0,02	↓ 0,27a	0,01	0,29ab	0,01
C18:0	Stearic acid	11,99bc	0,31	11,70c	0,45	↑ 12,87a	0,19	↑ 12,14b	0,15	11,92bc	0,30
C18:1 <i>n</i> -9c	Oleic acid	40,18ab	0,17	↑ 40,90c	0,45	↓ 39,92a	0,06	↓ 40,41b	0,34	↓ 40,45b	0,34
C18:2 <i>n</i> -6c	Linoleic acid	11,61bc	0,40	11,70c	0,41	↓ 9,82a	0,32	↓ 11,22b	0,22	11,39bc	0,28
C18:3 <i>n</i> -3	α-linolenic acid	0,80c	0,01	↓ 0,79b	0,01	↓ 0,72a	0,01	0,78b	0,01	0,78b	0,02
C20:4 <i>n</i> -6	Arachidonic acid	0,93ab	0,02	0,92b	0,02	↑ 0,94a	0,01	0,93ab	0,02	0,93ab	0,01

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# PODSUMOWANIE



Exposure to AFB1 significantly disrupted both mineral and fatty acid profiles in pig muscle tissue, potentially affecting meat quality and animal health.



Herbal extracts modified these effects, though outcomes varied by plant species.



*Andrographis paniculata* produced mixed results—despite its anti-inflammatory properties, it may negatively affect fatty acid metabolism.



The observed changes under the influence of supplementation with extracts may be related to maintaining muscle anabolism, and in theory, negative changes in the FA profile may indicate catabolic processes.



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# THANK YOU FOR YOUR ATTENTION

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