



64th

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ANNUAL MEETING
OF THE EUROPEAN FEDERATION OF ANIMAL SCIENCE



Effect of Yeast extract replacing SDPP on growth performance and intestinal of weanling piglets

Xin Wu PhD



中国科学院亚热带农业生态研究所
Institute of Subtropical Agriculture, The Chinese Academy of Sciences



OUTLINE

● Introduction

● Experiment design

● Results and discussion

● Conclusion



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1 Introduction

- **Weaning stress of piglets is often associated with reduced food consumption as well as temporary reductions in weight gain and growth**
- **This can result in postweaning lag, a time of depressed feed intake and of increased diarrhea and disease, intestinal dysfunction and atrophy, and mortality in piglets**

Harms of weaning on piglets



digesta enzyme activities

ADG-slow growth -Mortality



diarrhea

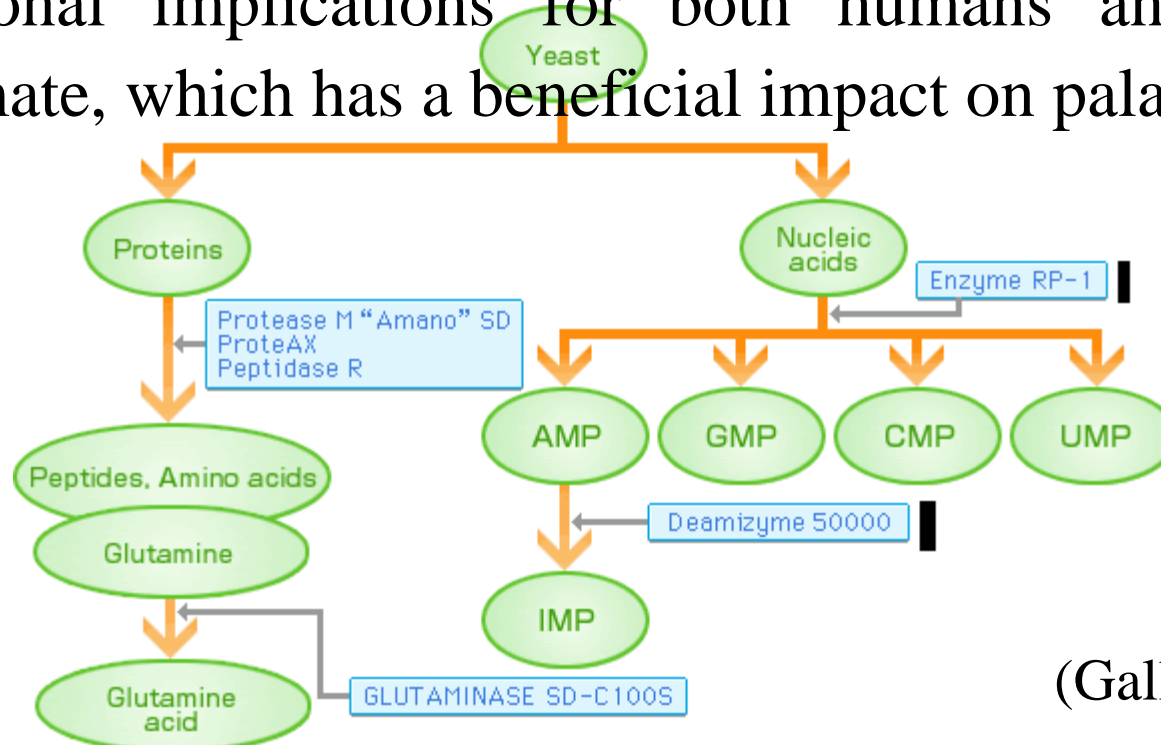
SDPP and YE

- Spray dried plasma protein (SDPP) is an effective protein source for use in the Phase I (d 0 to 14 postweaning) diet for the early-weaned pig
- However, it may have potentially dangerous of infection source, which are now coming under public scrutiny

(Coffey and Cromwell 1995; Gilet al . 2007; Wichers 2009; Perez-Bosque et al . 2010)

SDPP and YE

- Yeast extract (YE) is a vegetable protein source derived from yeast cell contents. It is a kind of high quality feed ingredient, contains functional nutrients and easy to digest.
- YE is rich in nucleotides (5-12%), which offer important nutritional implications for both humans and livestock; glutamate, which has a beneficial impact on palatability.



(Gallois et al., 2009)

1 Introduction

- **The aim of this experiment was conducted to investigate the effects of Yeast extract (YE) replacing SDPP on growth performance and intestinal of early-weaned piglets.**

(Gallois et al., 2009; Superchi et al., 2012)

Experiment design 1

Experiment 1

- Eighty-nine piglets from 10 pens (average pen weight 6.22 ± 0.31 kg, $n=5$) were grouped into 2 treatments in a completely randomized block design and fed diets with a SDPP diet or YE diet, respectively.
- On age of 35 d, six piglets identified as closest in BW to the average within each pen were selected randomly from each treatment.

Experiment design 2

Experiment 2

- Six piglets (average BW 15.2 ± 1.5 kg) were chosed and surgically fitted with a catheter in the jugular to investigate the dynamic changes of plasma amino acids



Effect of SDPP and YE on growth performance in piglets

Items	SDPP group	YE group
Initial body weight (kg)	6.24 ± 0.53	6.21 ± 0.56
Average daily gain (g)	150.55 ± 32.82	147.89 ± 38.03
Liver weight:BW	2.65 ± 0.23	2.16 ± 0.05
Kidney weight:BW	0.27 ± 0.009	0.23 ± 0.01

Plasma and YE protein source treatments gave similar growth performance for average daily gain, feed intake and gain to feed ratios

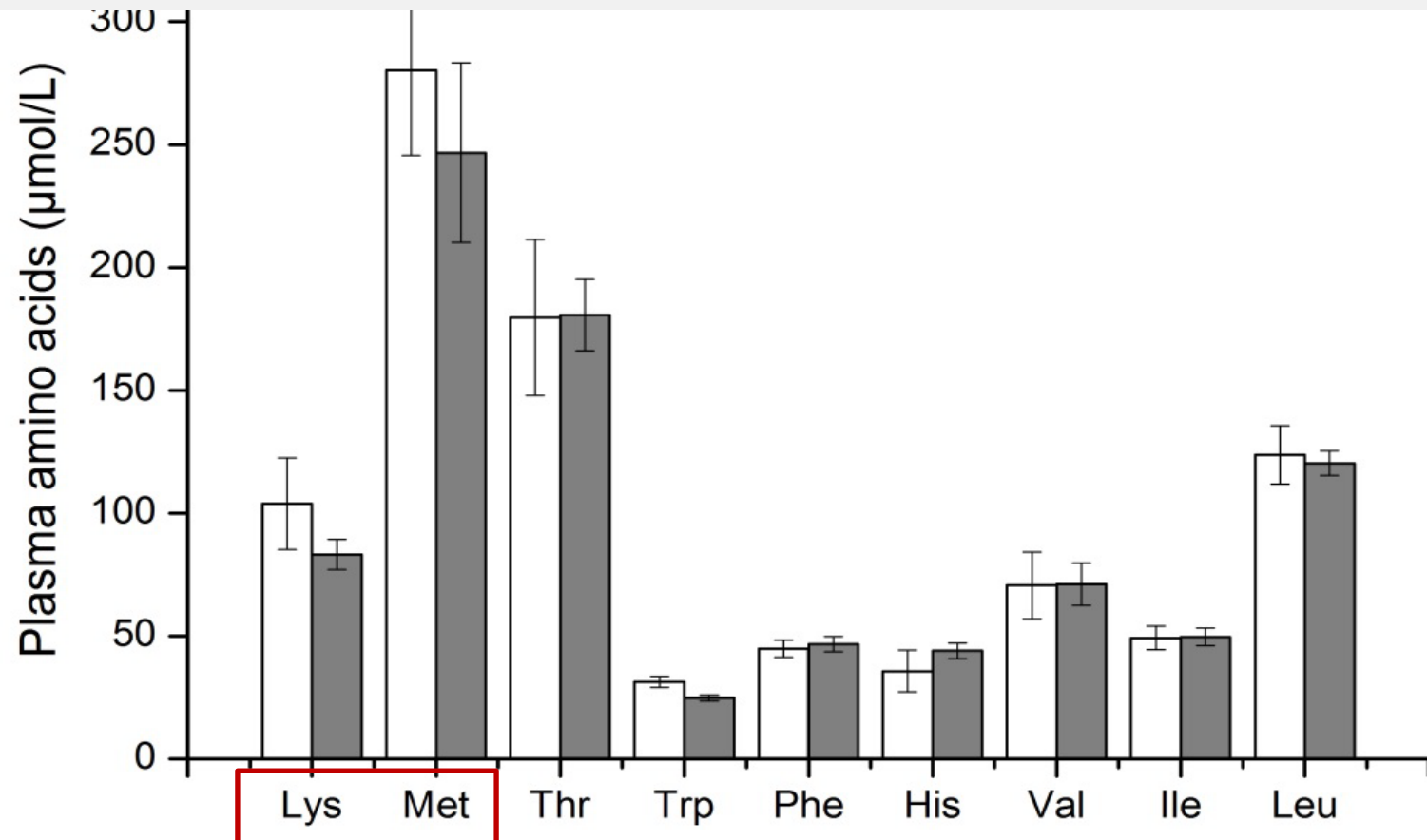
Effect of SDPP and YE on plasma biochemical indexes in piglets

Items	SDPP group	YE group
ALP(U/L)	361.2±60.13	384±99.33
ALT(U/L)	67.2±19.04	63.2±11.84
AST(U/L)	62.2±8.44	57.4±11.65
GLU(mmol/L)	5.96±1.08	5.42±1.44
LDH(U/L)	615.6±43.46	637.2±68.47
TP(g/L)	52.66±2.32	54.4±3.55
U(mmol/L)	2.27±0.38	2.68±0.64
LAC	66.5±16.09	59.18±13.71
TIB(umol/L)	62.84±40.36	68.46±8.17
FE(umol/L)	57.8±36.52	46.02±18.05
P	2.47±0.25	2.21±0.26
Ca	2.85±0.08	2.81±0.29

There were no differences ($P>0.05$) in plasma biochemical indices between the YE and SDPP groups. Compared with the SDPP group, the plasma P of the piglets in the YE groups had a decreased trend ($P>0.05$)

Effect of SDPP and YE on plasma essential amino acids in the jugular artery

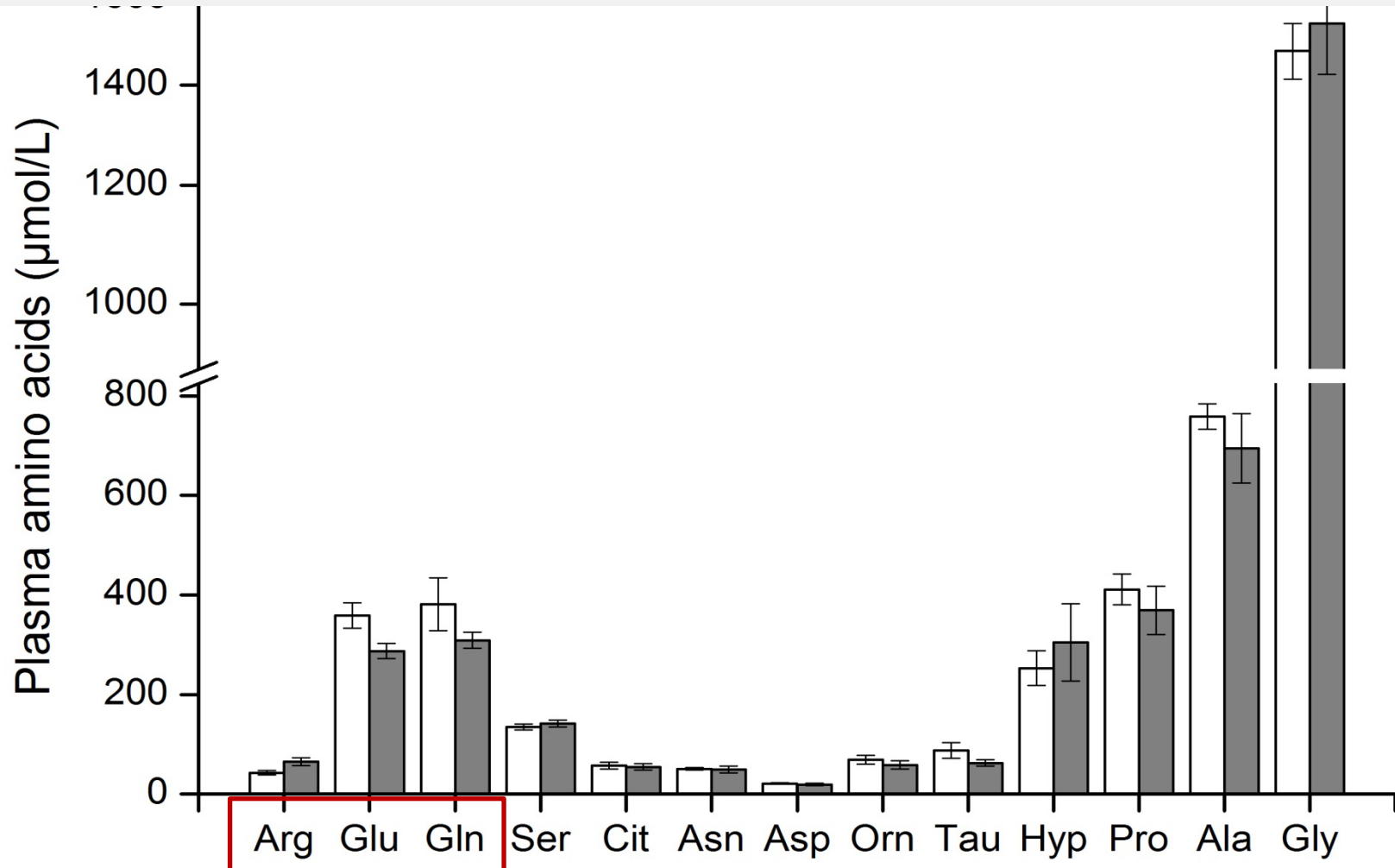
Compared with the SDPP group, essential amino acids including Lys, Met and Trp in the YE groups had a decreased trend ($P>0.05$). Dietary supplementation with YE decreased Glu and Gln concentrations in the plasma of weanling piglets



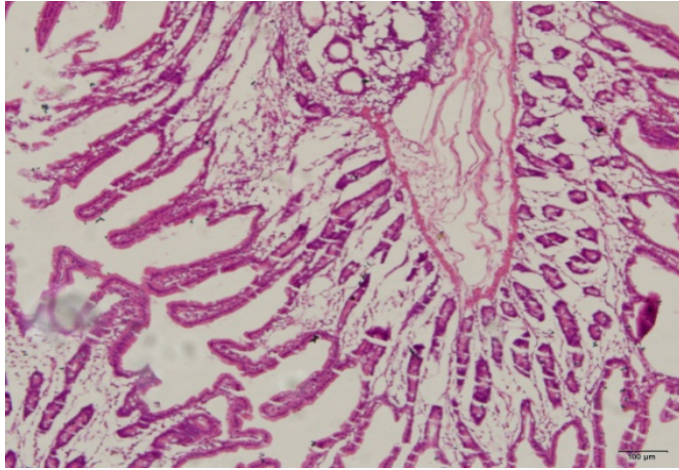
*Means with different superscript letters differ significantly ($P<0.05$).

Effect of SDPP and YE on plasma non-essential amino acids in the jugular artery

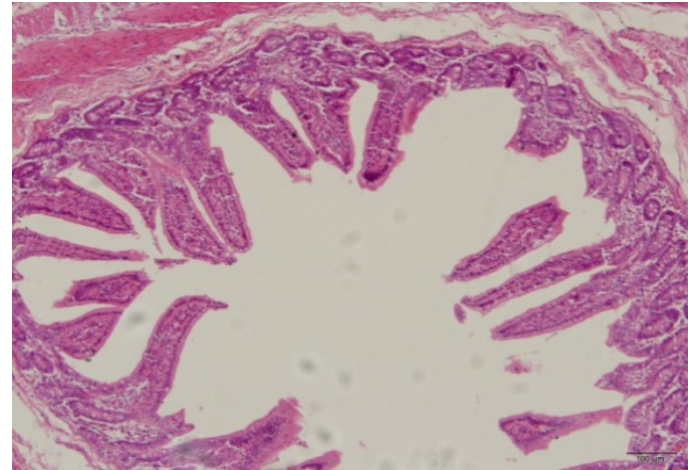
Compared with the SDPP group, YE tended to decreased Glu and Gln concentrations in the plasma of weanling piglets



Representative staining of jejunum mucosal morphology of piglets



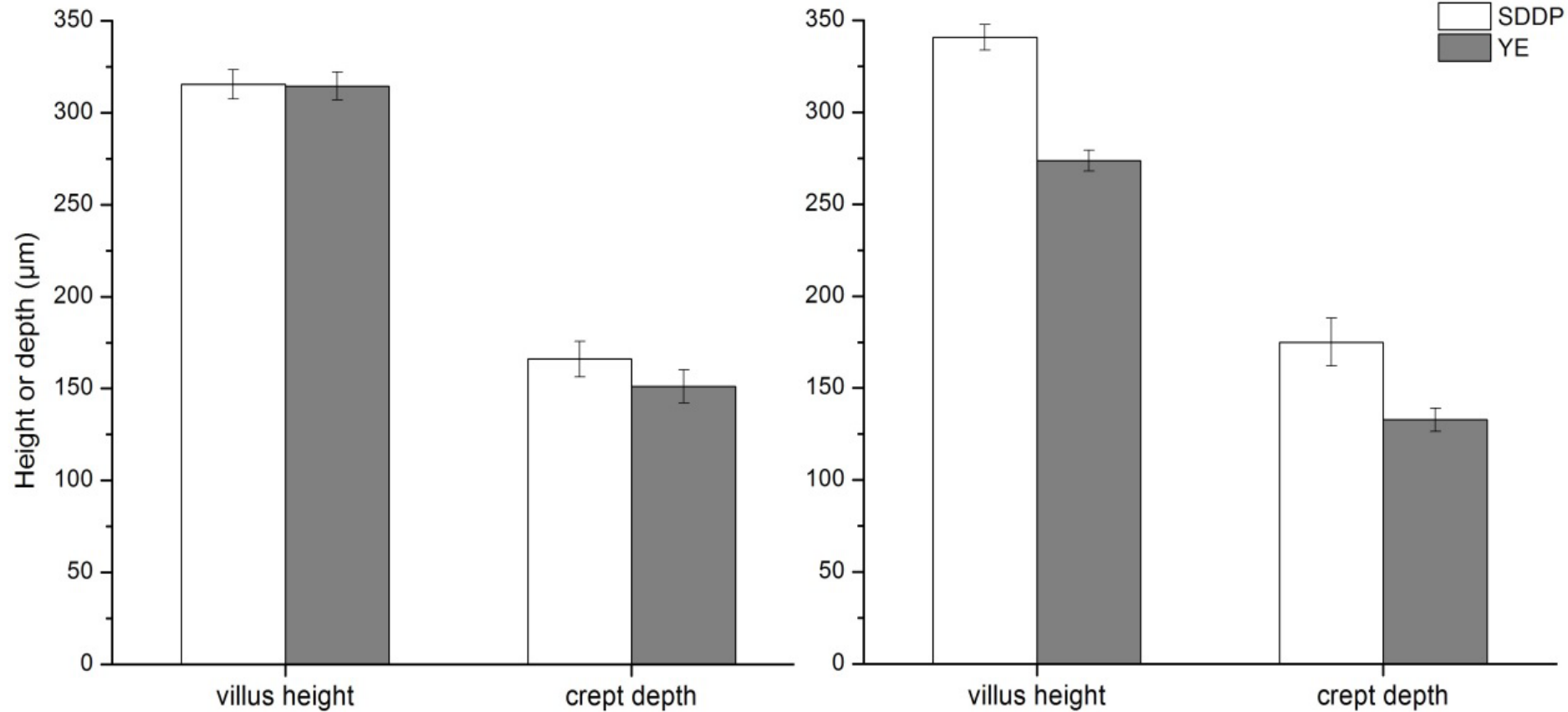
SDPP group



YE group (HE 10×10)

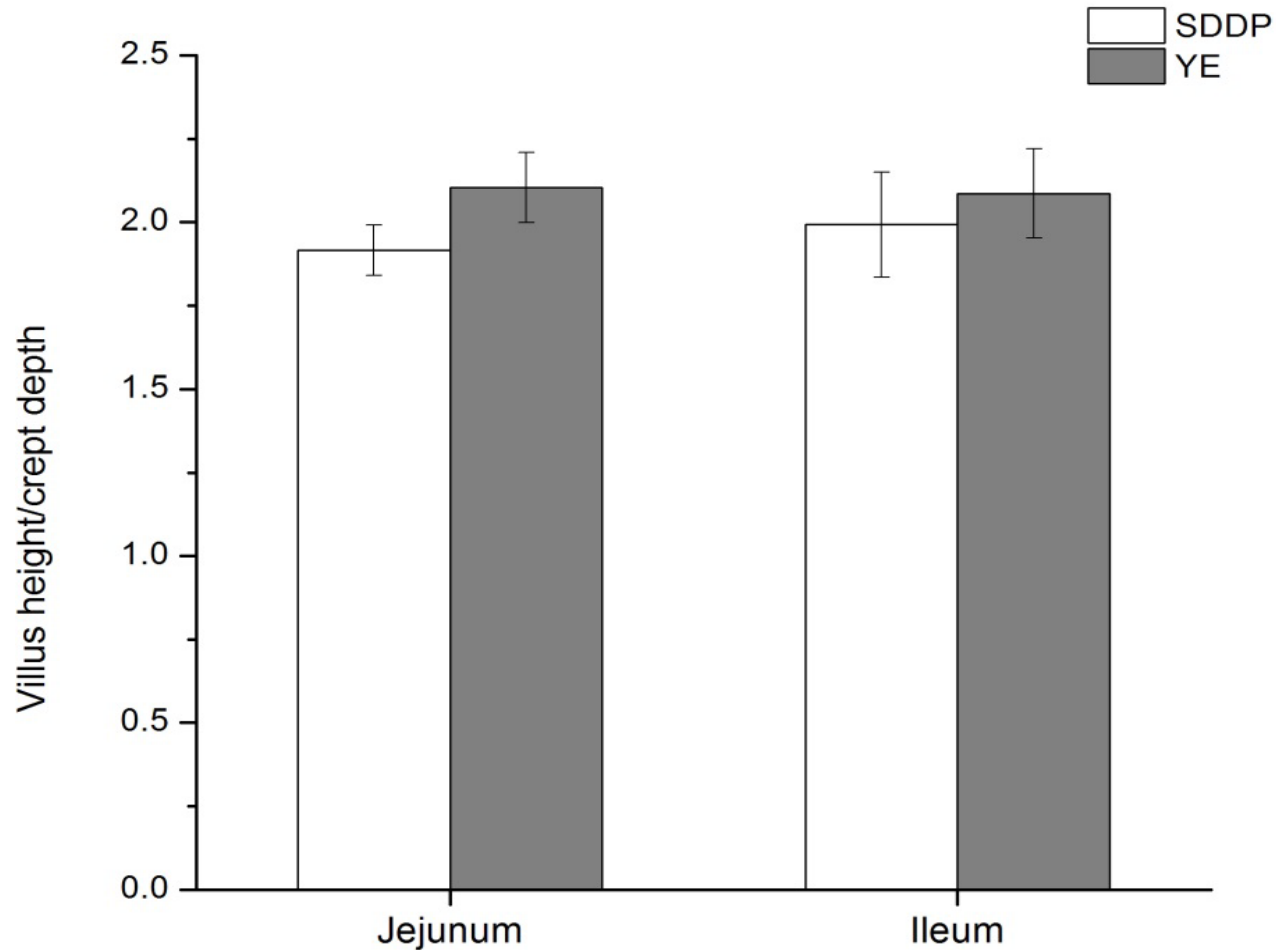
- **There were no differences ($P>0.05$) in villus height and crept depth between the YE and SDPP groups.**

The second stage



YE tended to decrease the crept depth in the ileum.

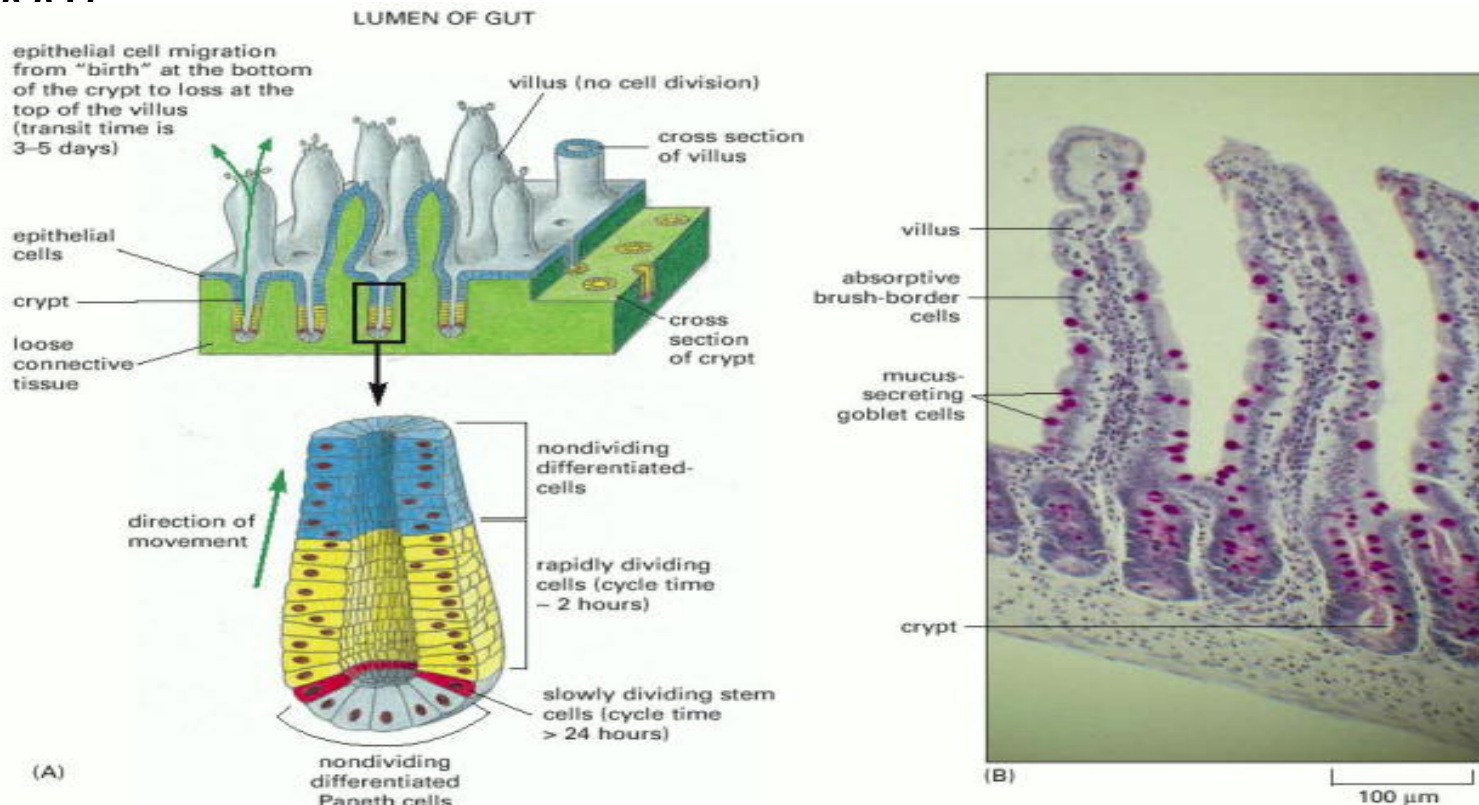
Representative staining of ileum mucosal morphology of piglets



Effect of SDPP and YE on Villus heightcrept depth ratio in jejunum and ileum in weanling piglets (n=5).

Discussion

- Nucleotides are functional to numerous biochemical processes. In healthy conditions dietary nucleotides are probably not essential, however, during stressful or limited nutrient intake periods, dietary nucleotides may become essential (Dancey et al., 2006)

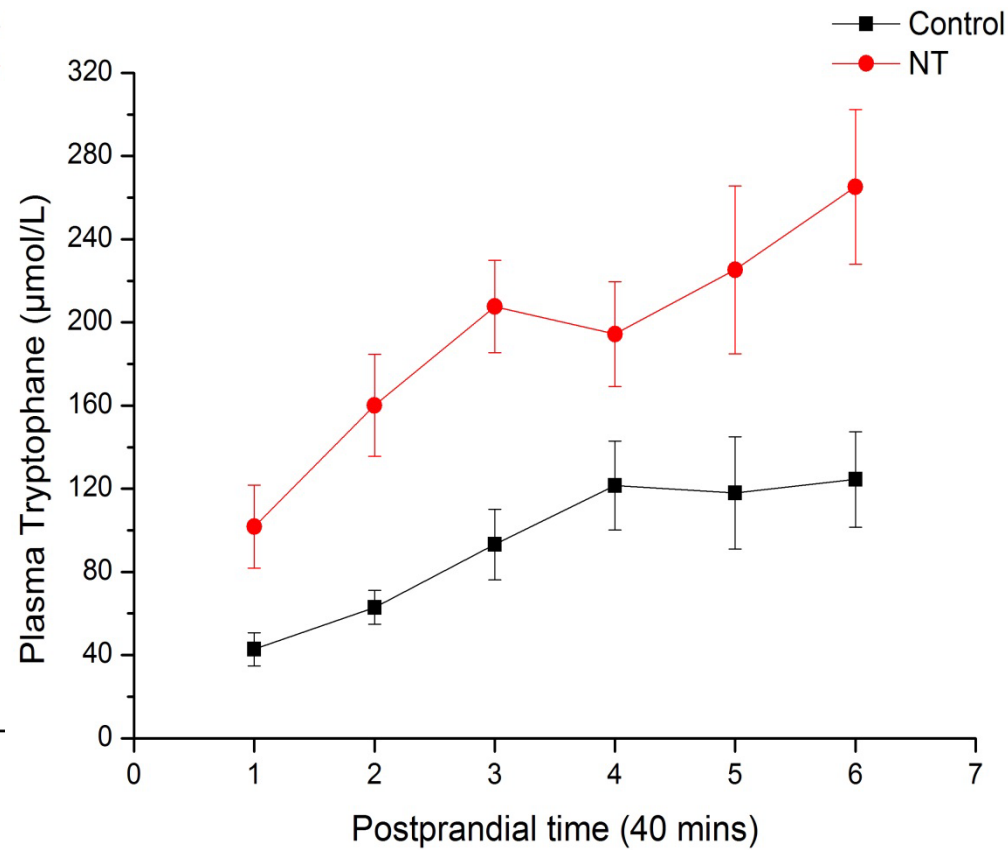
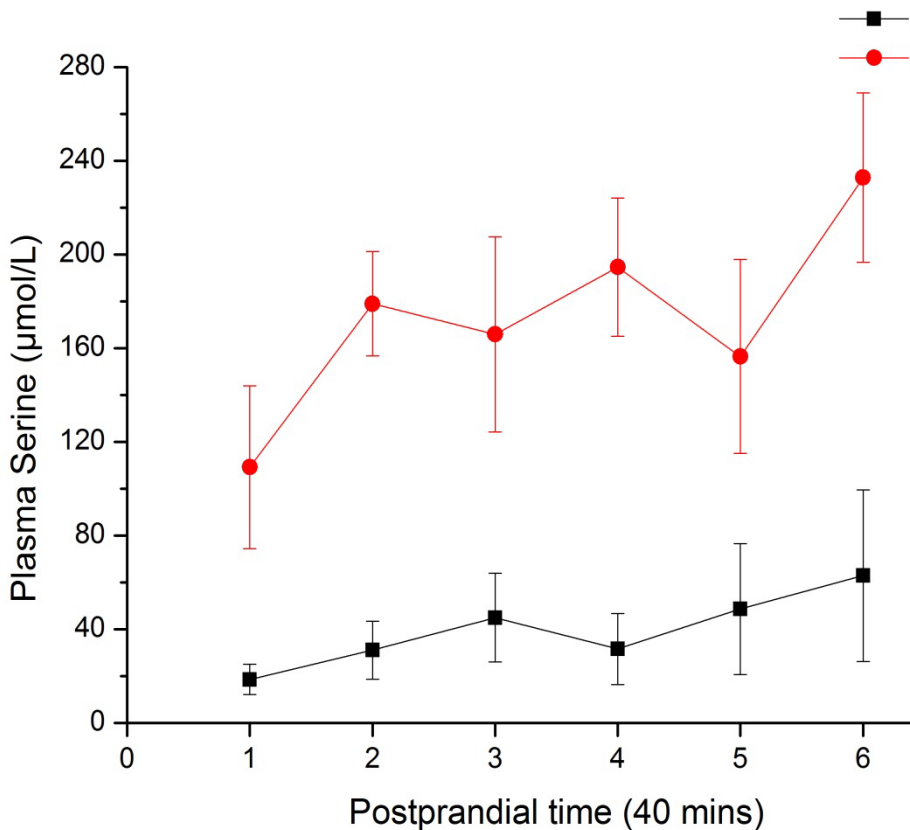


Discussion

- **Epithelial cells in gastrointestinal tract turnover rapidly. Nucleotides have important effects on intestinal morphology**
- **In the present study, dietary YE supplementation before weaning can improve the adaptive capabilities of weaned piglets to the stressors, enhancing the growth performance**

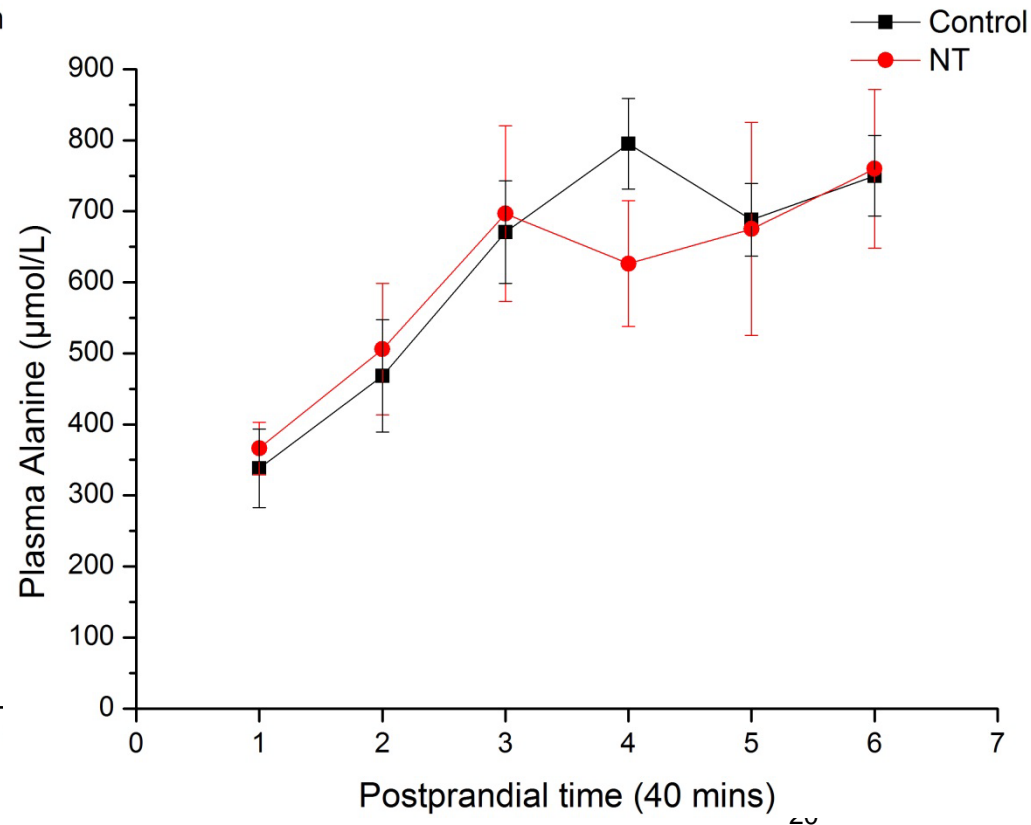
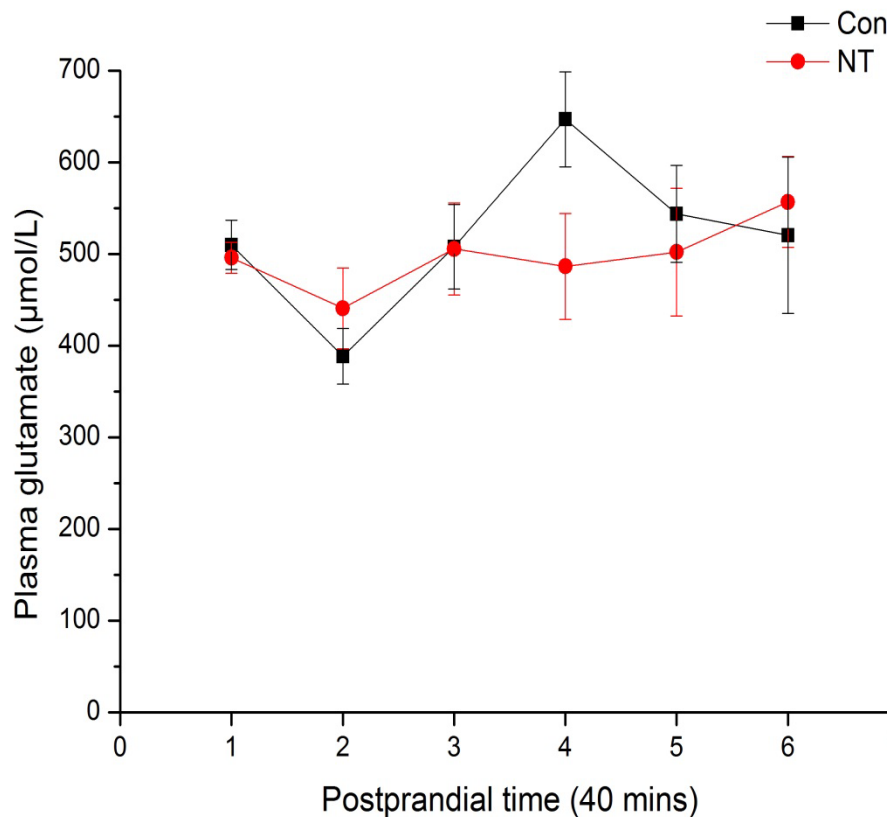
Dynamic changes of plasma amino acids

- NT increased most kinds of plasma amino acids, eg. Ser and Try



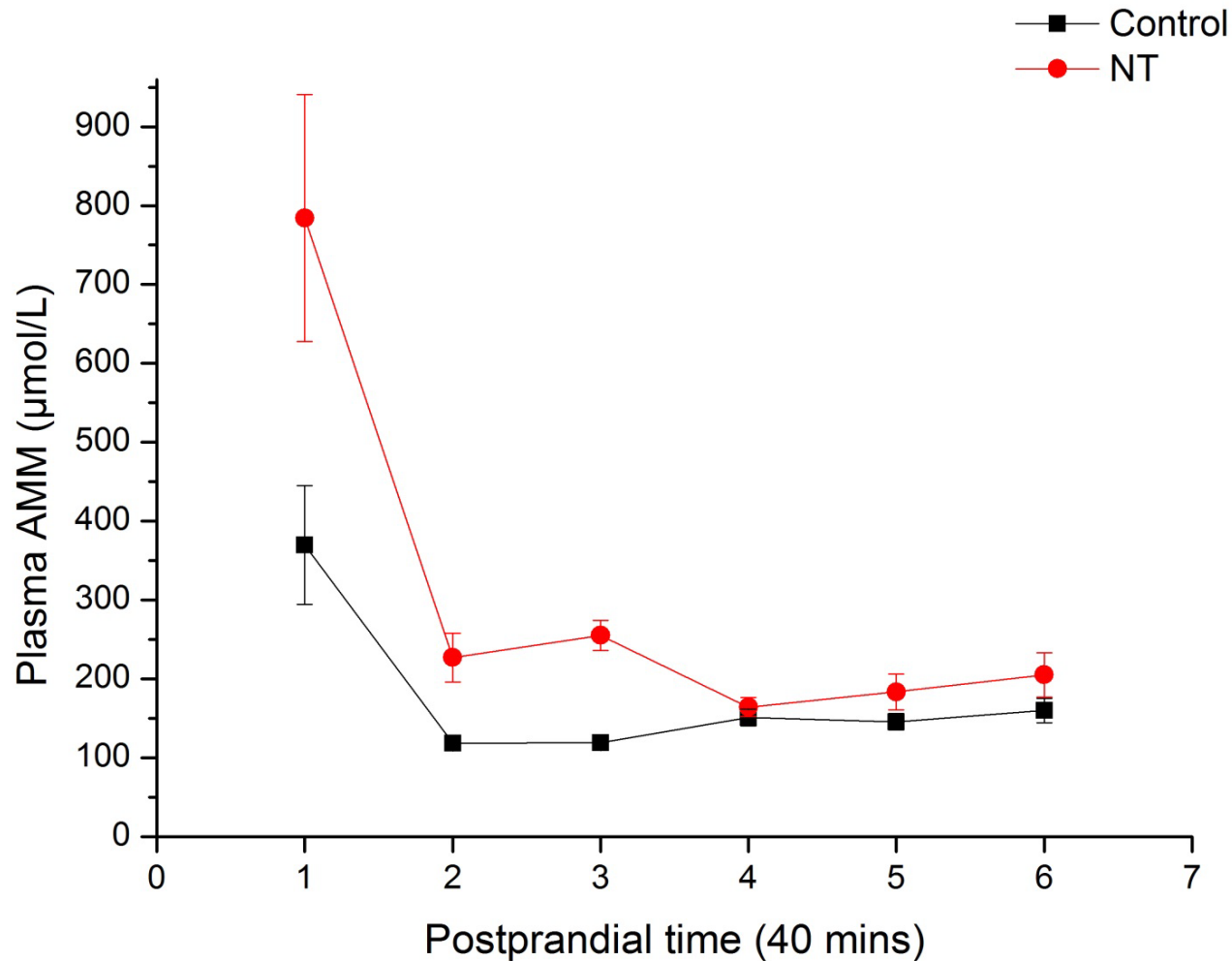
Dynamic changes of plasma amino acids

- Dietary supplement with NT may regulation metabolism of Glu/Gln
- Alanine is the only one was not increase.



Effect of NT on dynamic changes of plasma NH₃

➤ NT might increase plasma AMM



Conclutions

- **These results indicated that SDPP can be replaced by YE without any detrimental effect**
- **YE could improve growth performance, stimulate intestinal growth and prevent intestinal mucosa dysfunction in early weaned piglets.**

In the farm



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Email: w.xin@foxmail.com

