

Efficacy of *Pseuderanthemum Palatiferum* Powder against Diarrhea of Piglets

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Abstract

To determine the efficacy of *Pseuderanthemum palatiferum* powder, a processed Vietnamese medicinal plant, on treating diarrhea in piglets comparing with two prevalent effective antibiotics against piglets' diarrhea: Coli-norgen and Cotrimxazol. The experiment including three treatments was carried out in the pig householders in My Thuan and Thuan An village . The results showed that:

The recovered rate after three days of treatment of *pseuderanthemum palatiferum* powder, Coli- norgen and Cotrimxazol were 92.86 %, 90.48% and 83.33 % respectively; the relapsed rate :7.14%, 9.52% and 14.29%; the duration of diarrhea : 2.16 days, 2.24 days and 2.03 days respectively. There were no significant difference between treatments on these parameters.

The diarrhea causative agent was *E.coli* (100%). Population of *E.coli* in diarrheic piglets'feces after 3 days of treatment was reduced: with *pseuderanthemum palatiferum* powder: 88.06%,Coli- norgen : 66.41% and Cotrimxazol: 97.28%

Introduction

Diarrhea in piglets causes considerable economic losses. Practitioner has used antibiotics to treat diarrhea, but diarrhea has not been controlled and the emergence of resistance of the bacteria to many drugs has been reported . This event causes damage not only in veterinary but also in human treatment .

As the spread rumor of folks, *Pseuderanthemum Palatiferum* (a VietNameese medicinal plant) has been used to treat diarrhea in people and got good result. Basing on this folks' experience we used this medicinal plant to treat diarrhea in piglets and got good result, too. For more convenience, we processed the fresh leaves into powder and used this powder to treat diarrhea in piglets.

The objective of this study is aimed to investigate the efficacy of *Pseuderanthemum Palatiferum* powder against diarrhea in piglets.

Materials and Methods

The experiment was carried out in the pig householders in My Thuan village and Thuan An villages (Binh Minh district, Vinh Long province) ,from July to October of 2003. Piglets during suckling period contracted diarrhea of the same litter were separated into three treatments . The design of experiment is showed in table 1

Table 1: The design of experiment:

Treatment	No of piglets	Medicine	Dose	Route	Period
1	42	Coli-norgent	0.1g/KgBW	oral	Twice/day
2	42	P. powder	1g/KgBW	oral	Twice/day
3	42	Cotrimxazol	0.1g/KgBW	oral	Twice/day

The composition of medicine:

- Coli –Norgent: Colistine Sulfate 125,000,000 UI
- Norfloxacin 2,000 mg
- Gentamicin Sulfate 1,000 mg
- Trimethoprim 1,000 mg
- Excipient q.s 100g

- P. powder (*Pseuderanthemum Palatiferum* powder): fresh *Pseuderanthemum Palatiferum* leaves were dried out into powder form with humidity of 6.83%. *Pseuderanthemum Palatiferum* contains two antibacterial agents having good effect on many bacteria , especially E.coli

- Cotrimxazol: Trimethoprim 160mg
- Sulfamethoxazol 800 mg

•The treatment was carried out 3 days

Observed parameters:

- 1/ Recovered rate of piglets from diarrhea after one, two and three days of treatment
- 2/ Relapsed rate of piglets after treatment
- 3/ Mortality
- 4/ Duration of diarrhea course

• Rectal feces were sampled before treatment and 3 days after treatment. The samples were cooled in an icebox and immediately transferred to the laboratory for isolating causative bacteria and counting the population of bacteria.

The surface plate method was used:

One gram sample of feces was diluted in NaCl 0.9% until got the concentration up to 10^{-6} , then spread this solution onto agar plates for identifying the bacteria: Trypticase soy agar (TSA) for aecrobic bacteria; the MacConkey agar (Merck, Germany)for *E. coli* ; Brilliant green agar for *Salmonella*, *Pseudomonas* and *Proteus*

then incubated at 37°C in 24 hs. All colonies appearing on the plates were counted and evaluated in 10-300 cfu/plate.

Results and Discussions

1. Result of diarrhea treatment

The result of treatment are shown in table 2

Table 2: Result of diarrhea treatment

Treatment	No. of piglets	No. of recovered piglets after treatment					
		1 st day		2 nd day		3 rd day	
		No.	%	No.	%	No.	%
P. powder	42	10	23.81 ^a	29	69.05 ^a	39	92.86 ^a
Coli norgent	42	10	23.81 ^a	25	59.52 ^a	38	90.48 ^a
Cotrimxazol	42	15	35.71 ^a	28	66.67 ^a	35	83.33 ^a

The study showed that *Pseuderanthemum Palatiferum* powder, Coli – norgent and Cotrimxazol were very effective to diarrheal piglets . After three days of treatment the recovered rate of piglets treated with *Pseuderanthemum Palatiferum* powder was the highest (92.86 %) , Coli norgent came after *Pseuderanthemum Palatiferum* powder (90.48 %) and the lowest was Cotrimxazol (83.33 %) But there were no significant difference between them.

The result of relapsed rate and diarrhea duration were showed in table 3.

Table 3: Result of relapsed rate and duration of diarrhea course of treated piglets

Treatment	No. of piglets	Relapsed rate		Duration of diarrhea (day)
		No. of piglets	%	
P. powder	42	3	7.14 ^a	2.16 ± 0.86 ^a
Coli norgent	42	4	9.52 ^a	2.24 ± 0.94 ^a
Cotrimxazol	42	6	14.29 ^a	2.03 ± 1.09 ^a

a: means not significant difference

The result from table 3 indicated that the relapsed rate of piglets treated with Cotrimxazol was the highest (14.29 %),the lowest was *Pseuderanthemum Palatiferum* powder (7.14 %); the scour duration of piglets treated with Coli norgent was the longest(2.24 days) , *Pseuderanthemum Palatiferum* powder came after that (2.16 days) and the shortest was Cotrimxazol (2.03 days). There were no significant difference between them

2. Result of isolation of bacteria and population of bacteria in treated piglets' feces

- The result of isolation of the agent causing diarrhea in feces showed that all feces' samples from treatment piglets infected *E.coli* (100%) and free of other diarrhea causative agents: *Salmonella*, *Proteus* and *Pseudomonas*
- In general, after 3 days of treatment the population of aerobic bacteria in feces decreased in piglets treated with *Pseuderanthemum Palatiferum* powder and increased in piglets treated with Coli norgent and Cotrimxazol, but there were no significant difference. The result was presented in table 4

Table 4: Aerobic bacteria population in treated piglets' feces before treatment and 3 days after treatment

Treatment	No. of sampled diarrheic piglets	Population of aerobic bacteria in treated piglets' feces			
		Before treatment(CFU/g)	3 days after treatment(CFU/g)	Decreased number(CFU/g)	Decrease rate(%)
P. powder	5	8.15×10^8	1.93×10^8	$-6.22 \times 10^8 \pm 2.71 \times 10^9$ ^a	-76.32
Coli norgent	5	3.68×10^8	1.7×10^9	$+1.33 \times 10^9 \pm 1.47 \times 10^9$ ^a	+362.23
Cotrimxazol	5	2.2×10^8	3.76×10^8	$+1.56 \times 10^8 \pm 1.70 \times 10^9$ ^a	+70.91

a: no significant difference

- After 3 days of treatment the population of *E.coli* in the feces of treated piglets in all treatments was decreased. There were no significant differences. The result was presented in table 5

Table 5: *E.coli* population in treated piglets' feces before treatment and 3 days after treatment

Treatment	No. of sampled diarrheic piglets	Population of <i>E.coli</i> in treated piglets' feces			
		Before treatment(CFU/g)	3 days after treatment(CFU/g)	Decreased number (CFU/g)	Decrease rate(%)
P. powder	5	1.34×10^7	1.6×10^6	$1.18 \times 10^7 \pm 1.33 \times 10^7$ ^a	88.06
Coli norgent	5	2.56×10^7	8.6×10^6	$1.7 \times 10^7 \pm 2.38 \times 10^7$ ^a	66.41
Cotrimxazol	5	1.47×10^8	3.84×10^6	$1.43 \times 10^8 \pm 2.53 \times 10^8$ ^a	97.28

a: no significant difference

Pseuderanthemum palatiferum powder, Coli – norgent and Cotrimxazol all demonstrated high efficacy against diarrhea in piglets because :

- *Pseuderanthemum palatiferum* leaves contain two antibacterial agents which have good effect on bacteria causing diarrhea, especially *E.coli*

- Coli – norgent contains 3 kinds of antibiotics: Gentamicin, Norfloxacin and Colistin: Norfloxacin a fluorinated quinolone, has high antibacterial activity against both gram negative and gram positive bacteria infecting in pigs; Colistin has antibacterial activity, it is rapidly bactericidal and highly active against many species of gram negative organisms such as *Escherichia coli*, *Salmonella* and *P. aeruginosa* and Gentamicin is generally the most active of the aminoglycosides, its susceptible bacteria are most Enterobacteriaceae including *Enterobacter sp*, *E.coli*, *proteus spp*, *Brucella*...

This drug also contains Trimthoprim being an inhibitor, effective and free from side effects and to have a reasonable antibacterial spectrum: against both Gram positive and Gram negative bacteria. The combination of this drug gave good effect on bacteria causing diarrhea in piglets.

- Cotrimxazol contains Trimethoprim and Sulfamethoxazol: they are broad spectrum antimicrobial agents. Both of them have good action on pathogenic diarrhea agents: *E.coli*, *Clostridia*, *Pasteurella spp*, *Salmonella spp*... . This combination has greatly enhanced in their antibacterial effects: The action of the combination proved to be bactericidal, whereas the components separately were bacteriostatic in action.

3. Calculating the price:

Comparing with Coli – norgent and Cotrimxazol, *Pseuderanthemum palatiferum* powder is the cheapest. The calculation of the price was presented in table 5

Table 5: Cost of the drugs used for 1 dose of 1Kg body weight

Treatment	Price/dose of 1KgB.W (VN dong)	Comparing to <i>P. powder</i>	
		(VN dong)	%
<i>P. powder</i>	35		
Coli – norgent	600	+565	1614.29
Cotrimxazol	100	+65	185.71

Conclusion

Pseuderanthemum palatiferum powder had good effect on treating diarrhea in piglets. The efficacy was the same Coli – norgent and Cotrimxazol which are the best prevalent drugs used in treating diarrhea. Thus *Pseuderanthemum palatiferum* powder could replace the antibiotics in treating piglets' diarrhea.

Acknowledgement

This study was financed by Japan International Research Cooperation Center for Agricultural Sciences (JIRCAS), the authors express a gratefully acknowledgement

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Tóm lược

Để xác định hiệu quả của bột Xuân Hoa , chế phẩm từ lá Xuân Hoa (*Pseuderanthemum palatiferum*), một cây thuốc Việt Nam, trên trị bệnh tiêu chảy heo con theo mẹ, so sánh với hai loại kháng sinh đang được sử dụng trị bệnh tiêu chảy heo con rất hiệu quả:Coli- norgen và Cotrimxazol. Thí nghiệm được thực hiện tại các hộ chăn nuôi cá thể thuộc xã Mỹ Thuận và Thuận An(huyện Bình Minh, tỉnh Vĩnh Long). Sau 4 tháng thực hiện chúng tôi có được kết quả sau:

Tỉ lệ khỏi bệnh của heo sau 3 ngày điều trị của nghiệm thức điều trị bằng bột Xuân Hoa là 92.86%, của nghiệm thức điều trị bằng Coli- norgen là 90.48% và Cotrimxazol là 83.33%.Tỉ lệ tái phát theo thứ tự là:7.14%,9.52% và 14.29% . Số ngày tiêu chảy trung bình theo thứ tự là : 2.16 ngày,2.24ngày và 2.03 ngày.Nhưng sai khác đều không có ý nghĩa thống kê.

Kết quả phân lập vi khuẩn từ phân heo bệnh cho thấy tác nhân gây bệnh là *E.coli*, không tìm thấy các tác nhân gây bệnh khác.

Số lượng *E.coli* trong phân heo tiêu chảy sau 3 ngày điều trị đều giảm: trị bằng bột Xuân Hoa giảm 88.06%, trị bằngColi- norgen giảm 66.41% và trị bằng Cotrimxazol giảm 97.28%