



# IMPROVING GROWTH INDICES AND PERFORMANCE IN WEANED PIGS UPTO GROWER STAGE WITH HERBAL ANTISTRESS SUPPLEMENT

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## ABSTRACT

**Objective:** Studying the growth promoting and performance enhancing activity of Stresomix in weaned pigs up to grower stage. 12 weaned pigs (Tamworth × Desi breed) of almost same age group (2-3month) and body weight were procured. All the 12 experimental piglets were randomly divided into 2 groups- group T<sub>1</sub> and group T<sub>2</sub> maintaining similar male: female ratio (n=6). Each group was allotted to different dietary treatments. Group T<sub>1</sub> served as no treatment control group fed with basal ration only and group T<sub>2</sub> piglets were supplemented with Stresomix (1kg/tonne of feed) (M/S Ayurvet Limited, Baddi, India). Growth and haemato biochemical parameter were studied for 90 days on fortnightly basis. Daily body weight gain and linear body measurements were high in Stresomix supplemented group T<sub>2</sub>. Feed conversion efficiency was significantly improved in Stresomix supplemented group T<sub>2</sub>. Haemato biochemical parameters were normal in Stresomix supplemented group T<sub>2</sub>. Stresomix improved the growth parameters and enhanced the feed efficiency in the piglets.

**Key Words:** Stress, Growth rate, Haemato biochemical parameters

## INTRODUCTION

Immature immune system, hypothermia and immature gastrointestinal system at the time of birth are three important challenges for newborn piglets<sup>1</sup>. Chilling – or hypothermia – is a major problem for newborn piglets. Perinatal mortality in modern pig production herds is relatively high (15 to 25%) compared with values for other production animal species<sup>2</sup>. High variation in birth weight contributes to reduced survival, at least for litters of low mean birth weight, and to variable weaning weights<sup>3,4,5</sup>. Survival rate for the first seven days of life was 32% for piglets weighing less than 0.8 kg, compared to 97% for piglets weighing more than 2.0 kg, meaning that the piglets' birth weight affects its chances for survival<sup>6</sup>. At weaning, piglets are exposed to a range of stressors, including changes in diet composition, environment and bacterial challenges, contributing to digestive upsets and depressions in growth rate<sup>7,8,9,10</sup>. Number of piglets produced per sow per year is the most important trait affecting the financial results<sup>11</sup>, so it is of great

importance to reduce stress induced mortality in piglets and increase the body weight of the piglets by using a natural antistressor. The current study was designed to study the effect of Stresomix, a natural antistress agent (M/S Ayurvet Limited, India) on growth and performance in piglets.

## MATERIAL AND METHODS

### Experimental design

12 weaned piglets (Tamworth × Desi breed) of almost same age group (2-3monthes) and body weight were procured for the experiment from instructional pig farm, R.V.C. Two weeks before starting of experiment piglets were maintained on balanced ration. 15 day before start of the experiment all the piglets were dewormed with Albendazole. All animals were vaccinated against FMD and swine fever. Thereafter, all the 12 experimental piglets were randomly divided into 2 groups- group T<sub>1</sub> and

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**Received:** 15.01.2015 **Revised:** 09.02.2015 **Accepted:** 28.02.2015

group T<sub>2</sub> maintaining similar male: female ratio (n=6). Each group was allotted to different dietary treatments. Group T<sub>1</sub> served as no treatment control group fed with basal ration only and group T<sub>2</sub> piglets were supplemented with Stresomix (1kg/tonne of feed) along with basal ration. Basal ration formula given in table 1 and table 2.

**Table 1: Percent ingredient composition of basal ration (parts/100 kg)**

| Ingredients     | Parts |
|-----------------|-------|
| Crushed maize   | 61    |
| GNC             | 14    |
| Wheat bran      | 16    |
| Fish meal       | 7.5   |
| Mineral mixture | 1     |
| Common salt     | 0.5   |

**Table 2: Chemical composition of basal ration**

| Particulars | Basal ration |
|-------------|--------------|
| DM          | 90.80        |
| CP          | 18.30        |
| EE          | 3.68         |
| CF          | 4.80         |
| NFE         | 64.42        |
| Total ash   | 8.80         |
| Ca          | 0.49         |
| P           | 1.27         |

The experiment was carried in weaned piglets upto grower stage. For 2 months experimental feeding was done followed by post treatment period of one month. Growth performance parameters viz. fortnightly body measurement, fortnightly body weight gain, Daily feed consumption and fortnightly feed conversion efficiency were recorded. Haematobiochemical parameters were also recorded during the study period on 0day, 45<sup>th</sup> day and on 90<sup>th</sup> day. Comparative economic of feeding was calculated on the basis of total feed consumption during experiment and total body weight gain in same period.

### Statistical analysis

All the results were analyzed statistically by analysis of variance to determine the means and standard error as per the methods described by Snedecor and Cochran<sup>12</sup>.

## RESULTS

Feed Consumption per pig per fortnight (0-90 days/ 6 fortnights)

Total feed consumption per pig was 121.63 kg/pig (table 3) in Stresomix supplemented piglets of group T<sub>2</sub>. The increase in feed consumption may be increased because of improvement in appetite and reduction in stress. Wide variety of herbal constituents improve appetite by stimulation of saliva secretion, enhance the synthesis of bile acids in the liver, helps in digestion and absorption of lipids and some also increase the activity of digestive enzymes of gastric mucosa<sup>13</sup>. Stresomix contain herbs like *Withania somnifera*, *Ocimum sanctum* which are reported to possess appetite stimulatory and antistress activity<sup>14,15,16,17</sup>.

**Table 3: Feed Consumption per pig per fortnight (kg/pig) from 1<sup>st</sup> – 6<sup>th</sup> fortnight**

| Fortnights                                   | T <sub>1</sub> | T <sub>2</sub> |
|--|----------------|----------------|
| 1 <sup>st</sup>                              | 13.18±0.05     | 13.15±0.04     |
| 2 <sup>nd</sup>                              | 17.43±0.10     | 17.48±0.08     |
| 3 <sup>rd</sup>                              | 20.08±0.05     | 20.20±0.03     |
| 4 <sup>th</sup>                              | 22.47±0.03     | 22.68±0.03     |
| 5 <sup>th</sup>                              | 23.53±0.03     | 23.60±0.05     |
| 6 <sup>th</sup>                              | 24.37±0.05     | 24.52±0.06     |
| Total feed consumption/<br>pig<br>(0-90days) | 121.06 kg      | 121.63 kg      |

### Body weight (g) daily change

The daily weight was significantly (P<0.05) higher in (498.89±2.68 g) Stresomix supplemented piglets of group T<sub>2</sub> (table 4). Since the age of pigs at the fixed slaughter weight or days required to reach the fixed slaughter weight are more favourable from the statistical point of view than the growth rate, these traits were used for the estimation of breeding value of the growth potential<sup>18</sup>. More daily weight gain adds economic value.

**Table 4: Daily change in body weight (g) from 1<sup>st</sup> – 6<sup>th</sup> fortnight**

| Fortnights      | T <sub>1</sub>            | T <sub>2</sub>           |
|-----------------|---------------------------|--------------------------|
| 1 <sup>st</sup> | 333.33±5.71 <sup>a</sup>  | 378.89±1.11 <sup>b</sup> |
| 2 <sup>nd</sup> | 427.78±3.18 <sup>a</sup>  | 456.67±1.49 <sup>b</sup> |
| 3 <sup>rd</sup> | 474.44±2.68 <sup>ab</sup> | 482.22±1.41 <sup>b</sup> |
| 4 <sup>th</sup> | 542.22±1.41               | 550.00±1.49 <sup>b</sup> |
| 5 <sup>th</sup> | 440.00±1.72 <sup>a</sup>  | 505.56±2.05 <sup>b</sup> |
| 6 <sup>th</sup> | 472.22±3.18 <sup>a</sup>  | 498.89±2.68 <sup>b</sup> |

Means with different superscripts differ significantly (P<0.05)  
Mean Cumulative Body Weight

Initially the cumulative body weight (Kg) of both groups was varied non significantly. But at the end of experiment (6<sup>th</sup> fortnight) the cumulative body weight was higher in Stresomix supplemented group T<sub>2</sub> (58.08±0.03) varied significantly (P < 0.05) from the unsupplemented group T<sub>1</sub> (55.35±0.11) (table 5). Increase in body weight in Stresomix supplemented group may be because of its ingredient herbs viz. *Mangifera indica* reported to possess growth promoting activity<sup>19</sup>. Mean body weight gain was also significantly (P < 0.05) maximum in Stresomix supplemented group T<sub>2</sub> (7.48±0.04) (table 6).

**Table 5: Mean Cumulative Body Weight from 1<sup>st</sup> – 6<sup>th</sup> fortnight**

| Fortnights      | T <sub>1</sub>          | T <sub>2</sub>          |
|-----------------|-------------------------|-------------------------|
| 0               | 14.87±0.04              | 14.78±0.04              |
| 1 <sup>st</sup> | 20.00±0.10 <sup>a</sup> | 20.68±0.03 <sup>a</sup> |
| 2 <sup>nd</sup> | 26.42±0.08 <sup>a</sup> | 27.53±0.02 <sup>b</sup> |
| 3 <sup>rd</sup> | 33.53±0.09 <sup>a</sup> | 34.77±0.03 <sup>b</sup> |
| 4 <sup>th</sup> | 41.67±0.11 <sup>a</sup> | 43.02±0.04 <sup>b</sup> |
| 5 <sup>th</sup> | 48.27±0.08 <sup>a</sup> | 50.60±0.07 <sup>b</sup> |
| 6 <sup>th</sup> | 55.35±0.11 <sup>a</sup> | 58.08±0.03 <sup>b</sup> |

Means with different superscripts differ significantly (P<0.05)

**Table 6: Mean Body weight gain from 1<sup>st</sup> – 6<sup>th</sup> fortnight (0-90 days)**

| Fortnights      | T <sub>1</sub>         | T <sub>2</sub>         |
|-----------------|------------------------|------------------------|
| 1 <sup>st</sup> | 5.00±0.09 <sup>a</sup> | 5.68±0.02 <sup>b</sup> |
| 2 <sup>nd</sup> | 6.42±0.05 <sup>a</sup> | 6.85±0.02 <sup>b</sup> |
| 3 <sup>rd</sup> | 7.12±0.10 <sup>a</sup> | 7.23±0.02 <sup>a</sup> |
| 4 <sup>th</sup> | 8.13±0.02              | 8.25±0.02              |
| 5 <sup>th</sup> | 6.60±0.03 <sup>a</sup> | 7.58±0.03 <sup>b</sup> |
| 6 <sup>th</sup> | 7.08±0.05 <sup>a</sup> | 7.48±0.04 <sup>b</sup> |

Means with different superscripts differ significantly (P<0.05)

### Feed conversion ratio

FCR is a measure of an animal's efficiency in converting feed mass into increases of the desired output. Feed Conversion Ratio (kg feed/kg gain) was calculated by dividing feed intake with body weight gain<sup>20</sup>. During the entire study period FCR values were significantly (P < 0.05) less in Stresomix supplemented group T<sub>2</sub> (table 7).

Mean FCR was also significantly (P < 0.05) less (table 8) in Stresomix supplemented group T<sub>2</sub> (2.80) in comparison of untreated group T<sub>1</sub> (2.99) signify better feed utilization and weight gain in Stresomix supplemented group T<sub>2</sub>. The improvement in FCR in Stresomix supplemented group may be because of its herbs viz. *Ocimum sanctum*, *Phyllanthus emblica* and *Withania somnifera* reported to enhance feed utilization.<sup>21, 22</sup>

**Table 7: Fortnightly feed conversion ratio from 1<sup>st</sup> – 6<sup>th</sup> fortnight**

| Fortnights      | T <sub>1</sub>         | T <sub>2</sub>         |
|-----------------|------------------------|------------------------|
| 1 <sup>st</sup> | 2.64±0.04 <sup>a</sup> | 2.32±0.0 <sup>b</sup>  |
| 2 <sup>nd</sup> | 2.72±0.03 <sup>a</sup> | 2.55±0.01 <sup>b</sup> |
| 3 <sup>rd</sup> | 2.82±0.02 <sup>a</sup> | 2.80±0.01 <sup>b</sup> |
| 4 <sup>th</sup> | 2.76±0.01              | 2.75±0.01              |
| 5 <sup>th</sup> | 3.57±0.01 <sup>a</sup> | 3.11±0.01 <sup>b</sup> |
| 6 <sup>th</sup> | 3.44±0.03 <sup>a</sup> | 3.28±0.02 <sup>b</sup> |

Means with different superscripts differ significantly (P<0.05)

**Table 8: Mean feed conversion efficiency (FCR) of group T<sub>1</sub> and T<sub>2</sub>**

| Mean FCR | Groups/Treatments |                   |
|----------|-------------------|-------------------|
|          | T <sub>1</sub>    | T <sub>2</sub>    |
|          | 2.99 <sup>a</sup> | 2.80 <sup>b</sup> |

Means with different superscripts differ significantly (P<0.05)

### Fortnightly change in linear body parameters

Body length changes, chest girth and height at withers were significantly (P<0.05) affected by Stresomix treatment. Initially the body length in both groups varied non significantly but at the end of the study i.e on 6<sup>th</sup> fortnight a (P<0.05) significant difference in body length was observed in Stresomix supplemented group T<sub>2</sub>. An increase of 2.78 cm (table 9) was recorded in Stresomix supplemented group T<sub>2</sub> on 6<sup>th</sup> fortnight in comparison to untreated group T<sub>1</sub>. On 6<sup>th</sup> fortnight in Stresomix supplemented group T<sub>2</sub> girth length (cm) and height (cm) at withers i.e. 84.33±0.17 and 55.67±0.11 respectively varied significantly (table 9) from untreated group T<sub>1</sub>. The changes in linear body measurements are indicator of tissue growth and tend to increase as the animal grows<sup>23,24,25</sup>. The results implies that supplementation of Stresomix is efficacious to improve tissue growth in the piglets.

### Haemato-biochemical parameters

Haematological parameters are good indicators of the physiological status of farm animals<sup>26,27</sup>. Various environmental stresses like thermal stress affects the homeostasis include erythropoiesis in piglets<sup>28</sup>. At the start of the study haemoglobin count and packed cell volume in both groups varies non significantly. On 45<sup>th</sup> and 90<sup>th</sup> day the haemoglobin count and packed cell volume i.e.  $13.03 \pm 0.10$  and  $37.97 \pm 0.14$  in Stresomix supplemented group T<sub>2</sub> was significantly ( $P < 0.05$ ) high but within the normal range in comparison of untreated control group (table 10). Oxidative stress also affects the haemato biochemical parameters<sup>29,30</sup>. The variation in blood biochemical parameter alanine transaminase (ALT) was significant ( $P < 0.05$ ) at 45<sup>th</sup> day but was in normal range

in both the groups (table 10). On 90<sup>th</sup> day ALT values varied non significantly in both groups. On 90<sup>th</sup> day aspartate aminotransferase (AST) values in both group varied significantly ( $P < 0.05$ ) but were in normal range. No significant difference in blood glucose level was observed in both groups. On day 45<sup>th</sup> and 90<sup>th</sup> non significantly high plasma protein concentration was observed in Stresomix supplemented group T<sub>2</sub> ( $6.57 \pm 0.03$  and  $6.92 \pm 0.04$  respectively) in comparison of untreated control group T<sub>1</sub> ( $6.35 \pm 0.04$  and  $6.55 \pm 0.08$  respectively) (table 10) but values were in normal range. The results showed that Stresomix supplementation had improved the haemato biochemical parameters and maintained the levels in normal range.

**Table 9: Linear body measurements of pigs from 1<sup>st</sup> – 6<sup>th</sup> fortnight**

| Parameters                       | Group          | Fortnights  |                         |                         |                         |                         |                         |                         |
|----------------------------------|----------------|-------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
|                                  |                | 0           | 1 <sup>st</sup>         | 2 <sup>nd</sup>         | 3 <sup>rd</sup>         | 4 <sup>th</sup>         | 5 <sup>th</sup>         | 6 <sup>th</sup>         |
| Body length change (cm)          | T <sub>1</sub> | 58.92±0.24  | 64.42±0.24              | 69.75±0.24 <sup>a</sup> | 75.33±0.25 <sup>a</sup> | 81.92±0.44 <sup>a</sup> | 89.75±0.42 <sup>a</sup> | 94.8±0.380 <sup>a</sup> |
|                                  | T <sub>2</sub> | 59.08±0.15  | 64.92±0.15              | 70.42±0.24 <sup>b</sup> | 76.08±0.15 <sup>b</sup> | 83.08±0.15 <sup>b</sup> | 91.58±0.15 <sup>b</sup> | 97.58±0.24 <sup>b</sup> |
| Change in chest girth (cm)       | T <sub>1</sub> | 53.25± 0.21 | 57.08±0.15 <sup>a</sup> | 62.08±0.15 <sup>a</sup> | 67.25±0.11 <sup>a</sup> | 71.67±0.21 <sup>a</sup> | 76.67±0.21 <sup>a</sup> | 83.58±0.24 <sup>a</sup> |
|                                  | T <sub>2</sub> | 53.25± 0.21 | 57.75±0.21 <sup>b</sup> | 62.75±0.11 <sup>b</sup> | 67.83±0.11 <sup>b</sup> | 72.33±0.17 <sup>b</sup> | 78.00±0.18 <sup>b</sup> | 84.33±0.17 <sup>b</sup> |
| Change in height at withers (cm) | T <sub>1</sub> | 41.25±0.11  | 43.42±0.15              | 45.50±0.18              | 47.50±0.18              | 50.58±0.15              | 53.17±0.11 <sup>a</sup> | 55.00±0.13 <sup>a</sup> |
|                                  | T <sub>2</sub> | 41.33±0.11  | 43.50±0.13              | 45.67±0.17              | 47.75±0.28              | 50.83±0.11              | 53.50±0.13 <sup>b</sup> | 55.67±0.11 <sup>b</sup> |

Means with different superscripts differ significantly ( $P < 0.05$ )

**Table 10: Haemato-biochemical parameters of both groups at 0 day, 45<sup>th</sup> day and on 90<sup>th</sup> day**

| Parameters                          | Group          | Duration   |                         |                         |
|-------------------------------------|----------------|------------|-------------------------|-------------------------|
|                                     |                | 0 day      | 45 <sup>th</sup> day    | 90 <sup>th</sup> day    |
| Haemoglobin (g/dl)                  | T <sub>1</sub> | 9.89±0.17  | 10.77±0.10 <sup>a</sup> | 12.27±0.10 <sup>a</sup> |
|                                     | T <sub>2</sub> | 10.00±0.07 | 11.30±0.09 <sup>b</sup> | 13.03±0.10 <sup>b</sup> |
| PCV (%)                             | T <sub>1</sub> | 30.80±0.19 | 31.93±0.08 <sup>a</sup> | 36.17±0.39 <sup>a</sup> |
|                                     | T <sub>2</sub> | 31.00±0.15 | 33.67±0.07 <sup>b</sup> | 37.97±0.14 <sup>b</sup> |
| ALT (IU/L)                          | T <sub>1</sub> | 21.98±0.06 | 24.08±0.06 <sup>a</sup> | 28.80±0.21              |
|                                     | T <sub>2</sub> | 22.05±0.06 | 24.55±0.15 <sup>b</sup> | 28.83±0.12              |
| AST (IU/L)                          | T <sub>1</sub> | 27.72±0.37 | 31.62±0.27              | 40.57±0.21 <sup>a</sup> |
|                                     | T <sub>2</sub> | 27.83±0.49 | 31.25±0.27              | 39.95±0.36 <sup>b</sup> |
| Blood glucose level (mg/dl)         | T <sub>1</sub> | 66.33±0.33 | 72.00±0.37              | 76.17±0.48              |
|                                     | T <sub>2</sub> | 66.50±0.43 | 72.17±0.31              | 77.00±0.45              |
| Plasma protein concentration (g/dl) | T <sub>1</sub> | 6.15±0.04  | 6.35±0.04 <sup>a</sup>  | 6.55±0.08 <sup>a</sup>  |
|                                     | T <sub>2</sub> | 6.10±0.04  | 6.57±0.03 <sup>b</sup>  | 6.92±0.04 <sup>b</sup>  |

Means with different superscripts differ significantly ( $P < 0.05$ )

## Relative economics

A cost-benefit ratio (CBR) is an indicator of cost-benefit analysis, this attempt to summarize the overall value for money of a project or proposal. On the basis of parameters like feed consumption/pig (kg), total feed cost, cost of product administered, total body weight gain /group and additional profit over control (Rs.) the resulted CBR value for Stresomix supplementation came out to be 3.96: 1.

## CONCLUSION

Stresomix, a herbal antistress agent had improved the body weight, feed consumption and linear body parameters in supplemented group T<sub>2</sub> piglets. Haemoglobin count and packed cell volume was significantly high in Stresomix supplemented group T<sub>2</sub> piglets. Overall Stresomix had improved the growth and performance indices with economic profitability in the weaned piglets upto grower stage.

## ACKNOWLEDGEMENT

The authors are thankful to Ayurved Limited, Baddi, India for providing necessary samples and guidance and Dept. of Veterinary Medicine, Ranchi Veterinary College, Kanke, Ranchi for providing the required facilities, guidance and support. Authors acknowledge the immense help received from the scholars whose articles are cited and included in references of this manuscript. The authors are also grateful to authors / editors / publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed.

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