

Supplementary Table S1. Composition and nutrient content of basal diets of broilers (air-dry basis, %)

| Item | Starter phase | Grower phase |
|------------------------------|---------------|--------------|
| | d 1 to 21 | d 22 to 51 |
| Ingredients, % | | |
| Corn | 56.49 | 63.45 |
| Soybean meal | 29.63 | 26.63 |
| Corn gluten meal | 0.70 | 0.32 |
| Wheat bran | 4.60 | 1.00 |
| Soybean oil | 4.40 | 4.00 |
| L-Lysine HCl | 0.26 | 0.26 |
| DL-methionine | 0.29 | 0.38 |
| Threonine | 0.09 | 0.10 |
| Calcium hydrogen phosphate | 1.70 | 2.00 |
| Limestone | 1.36 | 1.36 |
| Premix ¹ | 0.48 | 0.50 |
| Nutrients (calculated value) | | |
| ME, MJ/kg | 12.54 | 12.78 |
| Crude protein | 19.38 | 17.94 |
| Calcium | 1.00 | 1.05 |
| Total phosphorus | 0.66 | 0.68 |
| Lysine | 1.16 | 1.08 |
| Methionine | 0.59 | 0.66 |
| Methionine+cystine | 0.92 | 0.96 |

¹ The premix provided per kilogram of diet: Vitamin A 12,500 IU; Vitamin D₃ 2,500 IU; Vitamin E 18.75 mg; Vitamin K₃ 2.65 mg; Vitamin B₁ 2 mg; Vitamin B₂ 6 mg; Vitamin B₁₂ 25 µg; pantothenic acid 12 mg; nicotinic acid 50 mg; biotin 32.5 µg; folic acid 1.25 mg; iron 80 mg; zinc 75 mg; manganese 100 mg; iodine 0.35 mg; copper 8 mg; selenium 0.15 mg.

Supplementary Table S2. Effects of HMB on valid reads of microbiota.

| #Sample_name | Valid_reads(#) | AvgLen(nt) | Base(nt) | Q30 | Q20 |
|--------------|----------------|------------|----------|-------|-------|
| Con1 | 70489 | 420 | 29606576 | 94.13 | 98.01 |
| Con2 | 70011 | 413 | 28921786 | 93.55 | 97.76 |
| Con3 | 71824 | 413 | 29679463 | 93.43 | 97.70 |
| Con4 | 53713 | 414 | 22242389 | 93.55 | 97.78 |
| Con5 | 72155 | 420 | 30299565 | 93.53 | 97.60 |
| Con6 | 74971 | 420 | 31454006 | 93.14 | 97.58 |
| Con7 | 68861 | 417 | 28700631 | 93.55 | 97.74 |
| Con8 | 67461 | 417 | 28700631 | 93.55 | 97.74 |
| HMB0.5%-1 | 70726 | 420 | 29674818 | 93.98 | 97.92 |
| HMB0.5%-2 | 71196 | 419 | 29813809 | 93.37 | 97.53 |
| HMB0.5%-3 | 67251 | 418 | 28105361 | 93.72 | 97.85 |
| HMB0.5%-4 | 72625 | 415 | 30108802 | 93.65 | 97.80 |
| HMB0.5%-5 | 50638 | 416 | 21061527 | 93.69 | 97.86 |
| HMB0.5%-6 | 74950 | 419 | 31393628 | 93.38 | 97.66 |
| HMB0.5%-7 | 67898 | 418 | 28359658 | 93.63 | 97.77 |
| HMB0.5%-8 | 68938 | 418 | 28359658 | 93.63 | 97.77 |
| HMB1.0%-1 | 70774 | 417 | 29499725 | 93.52 | 97.56 |
| HMB1.0%-2 | 70217 | 418 | 29364633 | 93.36 | 97.66 |
| HMB1.0%-3 | 69565 | 418 | 29076645 | 93.95 | 97.89 |
| HMB1.0%-4 | 62434 | 416 | 25958340 | 93.12 | 97.60 |
| HMB1.0%-5 | 57158 | 415 | 23728143 | 93.51 | 97.75 |
| HMB1.0%-6 | 67953 | 419 | 28478148 | 93.04 | 97.55 |
| HMB1.0%-7 | 66350 | 417 | 27684272 | 93.42 | 97.67 |
| HMB1.0%-8 | 65010 | 417 | 27684272 | 93.42 | 97.67 |
| HMB1.5%-1 | 69271 | 412 | 28523691 | 93.94 | 97.96 |
| HMB1.5%-2 | 73600 | 420 | 30886020 | 94.35 | 98.09 |
| HMB1.5%-3 | 73707 | 418 | 30784718 | 93.42 | 97.73 |
| HMB1.5%-4 | 69653 | 418 | 29098458 | 93.15 | 97.44 |
| HMB1.5%-5 | 70540 | 414 | 29178205 | 93.30 | 97.66 |
| HMB1.5%-6 | 59876 | 414 | 24774283 | 93.89 | 97.93 |
| HMB1.5%-7 | 69441 | 416 | 28874229 | 93.67 | 97.80 |
| HMB1.5%-8 | 71145 | 416 | 28874229 | 93.67 | 97.80 |