



## Trial Study Comparing Effect of Cholmax (HERBAL CHOLINE) and Synthetic Choline Chloride on Growth Performance in Broiler Chicken

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### ABSTRACT

The poultry industry produces generally two main products i.e. eggs and broilers (meat birds). Among these broilers are the most efficient converters of feed to protein and with advancement in technology in past decade the parameters such as FCR has improved a lot. Choline is present in all living cells and facilitates the movement of fats into the cells. It combines with fatty acids and phosphoric acid in the liver to form lecithin. Choline is required for the production of acetylcholine, a neurotransmitter. Choline is found in most animal tissue and is necessary for nerve function, fat metabolism, protects against poor growth and a fatty liver syndrome. Recently lot of studies have come up showing excellent effect of herbs having similar effects as shown by synthetic choline chloride. In addition herbs have shown effective results against various disease condition such as coccidiosis, necrotic enteritis etc. Some studies have shown that even half a dose of Herbal Choline have same effect as shown by synthetic choline chloride. So to further substantiate this claim present study was planned to compare herbal choline ( Cholmax of Alphafacts Health Solutions) with synthetic choline chloride. The key parameters observed during this study were weekly weight gain, weekly Feed Conversion ratio, final body weight comparison and final FCR.

### KEYWORDS

Herbal choline, Cholmax, Choline Chloride, Alphafacts

### INTRODUCTION

Choline and its metabolite like betaine able to improve broiler production efficiency as well as aid in improving animal welfare. Choline plays a very important role in several biological processes within the body. These role includes building and maintaining cell structure because choline is a structural component of phospholipids. Choline has also role in lipid metabolism in the liver thereby preventing abnormal accumulation of fat. Acetylcholine, a substance which is responsible for the transmission of nerve impulses, could not be formed inside body if there is no choline. In addition choline is very important to the poultry species as it provides the methyl groups necessary for the formation of methionine from homocysteine, by process of being oxidized to betaine. These point proves the importance of this molecule in poultry production.

While choline has been known to be an essential nutrient from long, recently various studies have found out additional or partial replacement of methionine with choline in poultry diets. Choline has been included in poultry diets for many years, but its value as a supplement has not been fully explored.

Many studies done on poultry have examined choline effect on growth, feed conversion efficiency, during coccidiosis, and other production parameters. Number of these studies has looked at choline as a methionine-sparing nutrient. However choline is essential & also beneficial because it can easily be oxidized to betaine, which functions as a methyl donor and an osmolyte.

Not only have benefits been shown in poultry but humans as well, where an inverse relationship has been shown between choline consumption and breast cancer rates.

Even though number of studies done for choline on broilers, however choline metabolism is still not fully understood in the chicken especially during under heat stress

Biotin plays an important role in fat metabolism and is absolutely

necessary in the prevention of fatty liver syndrome. Biotin deficiency in poultry affects the specific activities of the biotin-dependent enzymes such as pyruvate carboxylase and acetyl Co-A carboxylase. Pyruvate carboxylase controls the conversion of excess energy into glucose in the gluconeogenesis pathway instead of lipid through liponeogenesis. It has been reported that fatty liver syndrome occurs in birds with impaired hepatic gluconeogenic capacity as a result of dietary insufficiency of biotin.

The important fact that remains unnoticed is the interdependence of choline and biotin for fat metabolism. It has been found out in various studies that fatty liver syndrome due to biotin deficiency is more aggravated by dietary supplementation of choline. Addition of supplemental choline to a biotin-deficient diet decreases the biotin status of chicks and increases mortality due to fatty liver syndrome

Various researchers have reported that the presence of minerals in the premix or diets can increase oxidative destruction of Vitamins. This can be further enhanced by the presence of highly hygroscopic compounds, such as choline chloride. For this important reason choline chloride is not included in vitamin premixes of poultry diet.

choline chloride have Obnoxious odour which is a matter of practical concern in processing units and feed mills. Conversion of choline into betaine do get compromised in case of mitochondrial insufficiency. More than that choline is not fully effective when Fatty liver syndrome is associated with impaired liver function. Herbal Choline (Cholmax) is free from all these drawbacks. Moreover, it is very compatible with short time high temperature processing for pelleting/extrusion which is very common in feed manufacturing plants.

It is very clear from various studies that herbal choline can prevent Fatty Liver Syndrome, whether it's because of deficiency of choline or biotin. Experimental studies also support facts that complete replacement of choline chloride from poultry feed by herbal Choline is very safe and effective along with optimum performance and FCR of the birds.

Herbal Choline is a herbal poultry feed supplement that contains selected herbs which are rich in natural choline as well as conjugated choline in the stable and highly bioavailable form. These herbs also contain small quantities of methionine, betaine and traces of chromium also. These small quantities of methionine and betaine supply readily available methyl groups for required methylation reactions in the system. Since choline is utilized in the biological system in conjugated i.e. esterified form (Phosphatidyl choline), it is vital and important that herbal Choline contains readily available esterified form of choline besides choline in natural form.

Herbal ingredients of Cholmax ( Herbal Choline) help maintain liver function and adequate synthesis of choline in the liver. With unique combination of natural and esterified form of choline, highly bioavailable natural and protected biotin, small quantities of methionine and chromium Cholmax exerts better physiological effects than synthetic choline chloride for optimum energy metabolism and utilization of nutrients preventing conversion of energy to lipids and prevent fatty liver syndrome.

So further substantiate these claims of replacement of synthetic choline chloride this study was planned to observe broiler growth and other performance parameters for 42 days.

**MATERIAL AND METHOD**

The trial study was conducted at Ajay poultry Farm, Village and Post office Batamandi, Tehsil Poanta Sahib, Distt. Sirmour (H.P.) India in open farm so as results can be interpreted as close to actual farm conditions. The birds used in this trial were Cobb-400 and procured day old chicks from a hatchery in nearby state. The birds divided into two groups 1 & 2 of 500 birds each. The diet for two groups were remained the same i.e. corn soya based diet. For this trial ingredients were purchased and mixing is done in simple mixture making the diet a complete mash. Group 1 was supplemented with 1 Kg of Choline chloride(60%) while Group 2 was supplemented with 500 gm of Cholmax.

The bird's performance parameters like weekly body weight, Feed intake, FCR, Mortality and final profitability were subjected for keen observation.

**RESULT AND DISCUSSION**

Birds which were supplemented with Cholmax have shown significant lower feed intake as compare to which were on synthetic choline chloride. The weekly feed intake for both groups has been illustrated in figure 2. At end of trial the feed intake with group 2 is around 60 gm per

bird lower than group 1. The difference in feed intake up to 5<sup>th</sup> week was not that significant but after 6<sup>th</sup> it starts showing the difference. This can be attributed to beneficial effect of Cholmax on liver functioning and effective detoxification.

When body weight for both groups has been compared the body weight with birds supplemented with synthetic Choline Chloride (60%) found lower than with birds supplemented with Cholmax. The weight difference at end of starter age was quite significant which means birds able to achieve initial body weight at faster rate with Cholmax.

The body weight on weekly basis has been mentioned in figure-3. The significant difference of body weight started from day 7 itself. In broiler early increase in body weight significantly influence the body weight at day 42. During the study the birds supplemented with Cholmax have around 110 gm more body weight as compare to bird with synthetic choline chloride. This difference signifies the greater efficacy of herbal choline as compare to synthetic one on broiler production.

When Feed conversion ratio of both the group is compared than the group supplemented with Cholmax found to be significantly lower as compare to the group supplemented with synthetic choline. At the end of 6<sup>th</sup> week the FCR for group

1 was 1.83 with average body weight per bird of 2.08 Kg. On contrary group 2 having per bird body weight of 2.12 kg and have very good FCR of 1.71. One key difference observed during the study was that the mortality level was significantly lower in group 2 as compare to group 1.

5 birds from each of group 1 and 2 were observed for internal organ changes. Liver of birds having Cholmax in diet have normal size while with synthetic Choline there were few having enlarged and discoloration present. Abdominal fat was considerably lower in the birds fed Cholmax when compared to birds fed synthetic Choline Chloride (60%).

All these benefits can be attributed to Cholmax containing highly bioavailable biotin and esterified form of choline which facilitates efficient fat metabolism and transportation of fat from the liver and hence prevents the incidence of fatty liver syndrome in broiler chickens. This further promotes the precise role of Cholmax in lipid metabolism and for preventing Fatty Liver Syndrome.

**CONCLUSION**

Results of the study indicate better efficacy of Cholmax @0.5 kg/ton as compared to synthetic Choline Chloride (60%) @ 1kg/ton in improving broiler performance with higher weight gain and lower feed conversion ratio. Overall Cholmax having herbal and natural product does not impart any harmful effect on the birds body and also very economical. Hence with many benefits & overall improvement it should be used in broiler diet in replacement of synthetic choline chloride.

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Figure-1. Diet Composition for different group during trial at broiler farm

Ingredients	Group-1 Starter (0-25 Days)	Group- 1 Finisher (26-42 Days)	Group-2 Starter (0-25 Days)	Group-2 Finisher (26-42 Days)
Maize	63.31	65	63.31	65
Soya Meal(46 %)	31.67	30	31.67	30
Rice Bran oil	2	2.2	2	2.2
DL-Methionine	0.14	0.13	0.14	0.13
Lysine-HCL	0.33	0.31	0.33	0.31
Threonine	0.05	0.05	0.05	0.05
Salt	0.3	0.25	0.3	0.25
DCP	0.6	0.5	0.6	0.5
LSP	0.6	0.615	0.6	0.615
CHOLMAX	0	0	0.05	0.05
Choline Chloride	0.1	0.1	0	0
Premix	0.9	0.845	0.95	0.895
Total	100	100	100	100

Figure-2. Weekly comparison of Feed Intake for both group during the trial

Weeks	Group-1	Group-2
1	155	154
2	480	475
3	1109	1101
4	1915	1903
5	2810	2800
6	3690	3625

Figure-3. The effect of supplementation of Cholmax on average body weight gain of broiler chickens (0-42d)

Days	Group-1	Group-2 (with Cholmax)
0	47	48
7	161	178
14	384	450
21	725	790

28	1126	1211
35	1640	1741
42	2008	2121

Figure-4. The effect of supplementation of Cholmax on Feed Conversion ratio of broiler chickens (0-42d)

Week	Group-1	Group-2 (with Cholmax)
1	0.96	0.86
2	1.25	1.05
3	1.52	1.39
4	1.70	1.57
5	1.71	1.61
6	1.83	1.71