

Tomato Pomace – An alternative feed for poultry



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- Feed cost accounts for 70-75 % of total cost of production.
- Availability and cost of feed ingredients for poultry diets are the major problems, has prompted the need for seeking other feed resources, especially agricultural and industrial by-products.
- In India a shortage of 25% concentrates constituting 32% of protein requirement has been estimated (FAO,2013).
- The wastes from fruit and vegetable industry can be used as a potential source of newer cheap feed resources.

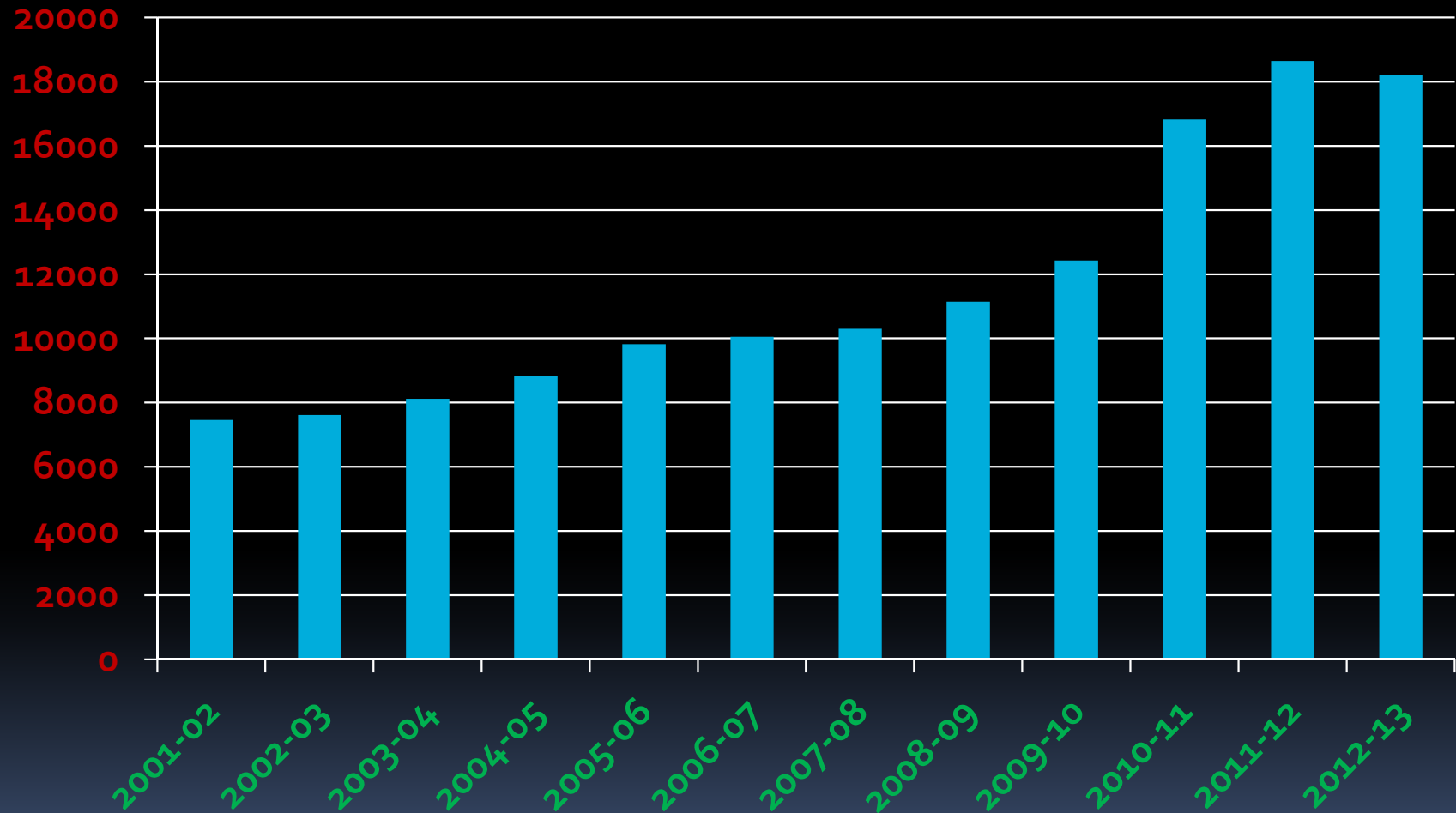
- Tomato is one of the most important protective food crops of India. It is grown in **0.879 M ha** area with **18.227 M MT** production and **20.7 MT/ha** productivity.
- The major tomato producing states are Bihar, Karnataka, Uttar Pradesh, Orissa, Andhra Pradesh, Maharashtra, Madhya Pradesh and West Bengal.
- 29% of total national production is from Andhra Pradesh.

Tomato Production in India

(Source: Indian horticultural data base-2013)

Year	Area (‘000 HA)	% of total veg. area	Production (‘000 MT)	% of total veg. production	Productivity (MT/HA)
2001-02	458.1	7.4	7462.3	8.0	16.3
2002-03	478.8	7.9	7616.7	9.0	15.9
2003-04	502.8	8.0	8125.6	8.7	16.2
2004-05	505.4	7.5	8825.4	8.7	17.5
2005-06	546.1	7.6	9820.4	8.9	18.0
2006-07	596.0	7.9	10055.0	8.7	16.9
2007-08	566.0	7.2	10303.0	8.0	18.2
2008-09	599.0	7.5	11149.0	8.6	18.6
2009-10	634.4	7.9	12433.2	9.3	19.6
2010-11	865.0	10.2	16826.0	11.5	19.5
2011-12	907.1	10.1	18653.3	11.9	20.6
2012-13	879.6	9.6	18226.6	11.2	20.7

Tomato Production('000MT) Trend in India

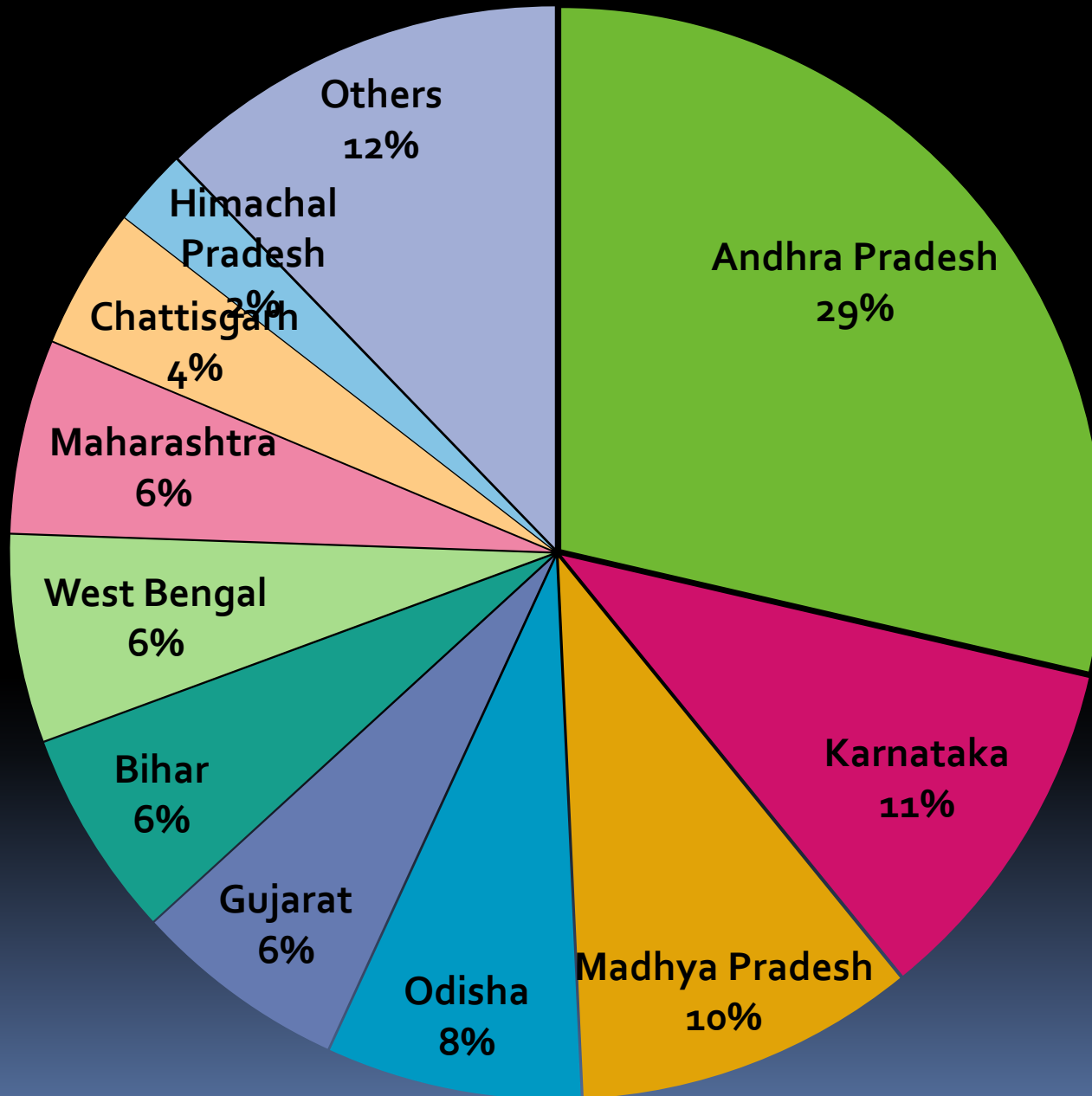


Source: Indian Horticulture data base-2013

State wise production('000MT) of Tomato in India

State	2012-13
Andhra Pradesh	5218.1
Karnataka	1916.6
Madhya Pradesh	1845.0
Odisha	1382.78
Gujarat	1156.72
Bihar	1126.25
West Bengal	1125.6
Maharashtra	1050.0
Chhattisgarh	762.22
Himachal Pradesh	413.71
Others	2229.7
Total	18226.6

Tomato Production('000 MT)



Tomato Pomace

- The tomato pomace is a by-product obtained from the processing of tomatoes for concentrated paste, juice, puree, sauce and ketchup. The solid waste which remains after extraction process consists of peels, cores, seeds, trimmings and cull tomatoes.
- About 2% of tomatoes are processed for value added products in India. When tomatoes are processed into products, 10% to 30% of their weight becomes waste or “pomace”.
- According to Safamehr et al(2011)tomato pomace contains 90% DM, 8.1% fat, **19.68% protein** and 29.75% crude fiber. Moreover, it contains 13% more lysine than soybean protein (AL-Betawi, 2005), a good source of vitamin B, fair source of vitamin A and no known antinutritive factors, and 2130 kcal/kg metabolizable energy (NRC, 1988).

Chemical composition of DTP

Nutrient	DTP
Dry Matter (DM)	89.56
Organic Matter (OM)	90.99
Crude Protein (CP)	22.39
Ether Extract (EE)	12.23
Crude Fibre (CF)	40.10
Total Ash (TA)	9.01
Nitrogen Free Extract (NFE)	16.27
Acid Insoluble Ash (AIA)	3.63
Calcium (Ca)	0.56
Phosphorus (P)	0.48

*On dry matter basis except for DM

Ingredient composition (%) of broiler starter diets (BIS,1992)

Ingredient	T ₁ &T ₂	T ₃ & T ₄	T ₅ & T ₆	T ₇ & T ₈
Maize	52	51	49.5	48
Dried tomato pomace	0	5	10	15
Soybean meal	30	28	26	24
Fish meal	10	10	10	10
Mineral mixture with salt	3	3	3	3
Saw dust	5	3	1.5	0
Feed additives	+	+	+	+
Total	100	100	100	100

Chemical composition* (%) of broiler starter diets

Constituents	T ₁ &T ₂	T ₃ & T ₄	T ₅ & T ₆	T ₇ & T ₈
Dry matter	90.96	90.49	90.37	90.25
Organic matter	89.74	89.55	89.23	89.20
Crude protein	23.25	23.53	23.46	23.62
Ether extract	1.86	2.31	2.92	3.46
Crude fibre	6.81	7.43	8.36	9.21
Total ash	10.26	10.45	10.77	10.80
Nitrogen free extract	57.82	56.28	54.49	52.91
Acid insoluble ash	3.07	3.11	3.19	3.14
ME kcal / kg (calculated)	2712	2733	2738	2744
Protein : Energy ratio	1 : 116	1 : 116	1 : 116	1 : 116
Calcium	1.67	1.70	1.69	1.69
Phosphorus	1.02	1.04	1.01	1.00

Ingredient composition (%) of broiler finisher diets

Ingredient	T ₁ &T ₂	T ₃ & T ₄	T ₅ & T ₆	T ₇ & T ₈
Maize	61	59.5	58	56.5
Dried tomato pomace	0	5	10	15
Soybean meal	21.5	19.5	17.5	15.5
Fish meal	10	10	10	10
Mineral mixture with salt	3	3	3	3
Saw dust	4.5	3	1.5	0
* Feed additives	+	+	+	+
Total	100	100	100	100

Chemical composition* (%) of broiler finisher

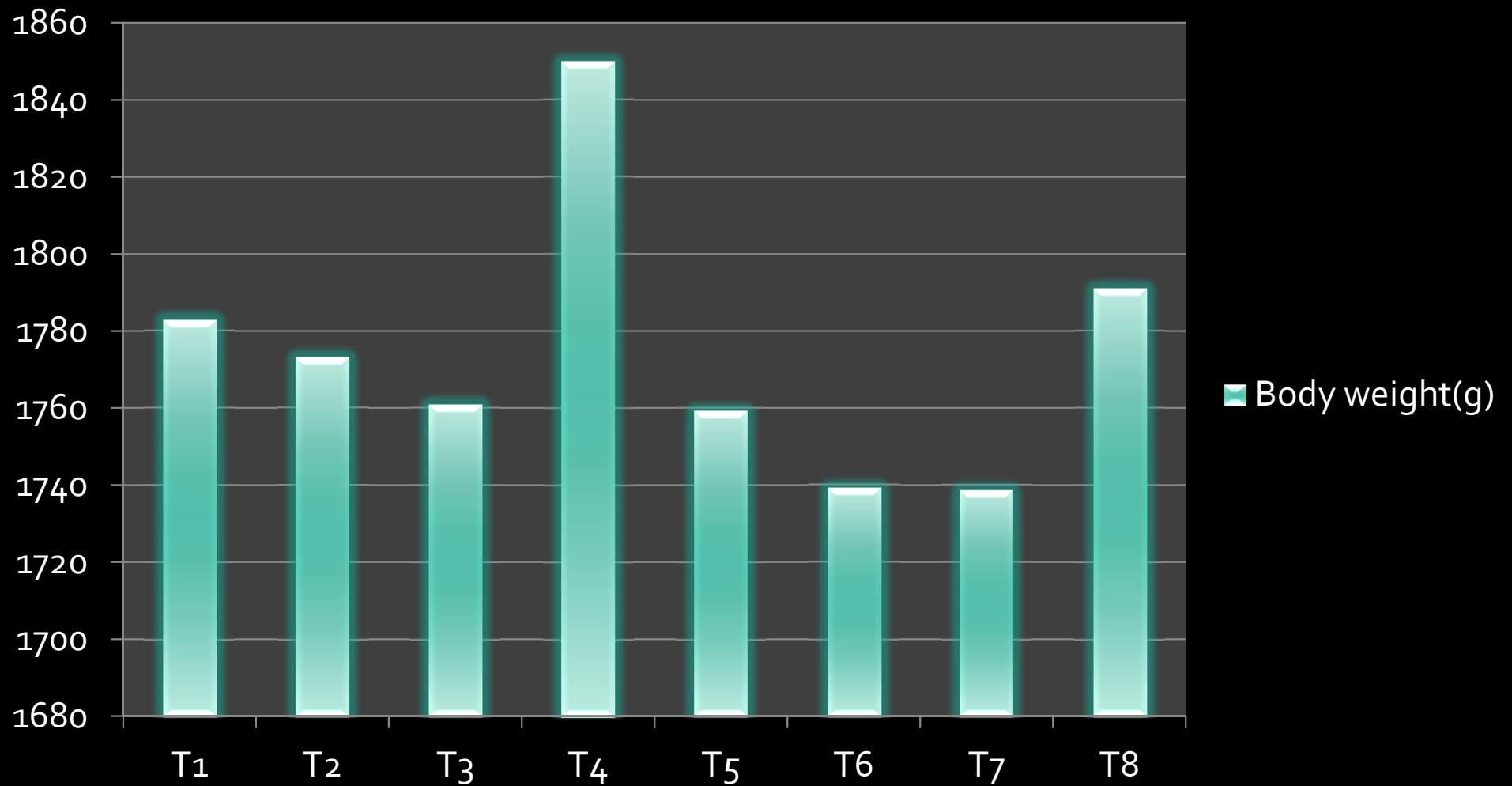
Constituents	T ₁ &T ₂	T ₃ & T ₄	T ₅ & T ₆	T ₇ & T ₈
Dry matter	90.38	90.43	90.47	90.45
Organic matter	90.27	90.08	89.95	89.79
Crude protein	20.28	20.33	20.32	20.34
Ether extract	1.81	2.56	3.01	3.55
Crude fibre	6.37	6.99	8.01	8.91
Total ash	9.73	9.92	10.05	10.21
Nitrogen free extract	61.81	60.20	58.61	56.99
Acid insoluble ash	3.04	3.14	3.18	3.15
ME kcal / kg (calculated)	2781	2786	2791	2796
Protein : Energy ratio	1 : 137	1 : 137	1 : 137	1 : 137
Calcium	1.66	1.67	1.67	1.66
Phosphorus	0.99	0.98	0.97	0.98

Composition of Polyzyme

Name of the enzyme		<i>IU / gm</i>
Xylanase	:	8000
Phytase	:	100
Cellulase	:	35
Beta glucanase	:	150
Pectinase	:	100
Alpha – amylase	:	1500
Protease	:	500
Alpha-galactosidase	:	800
Beta-galactosidase	:	450

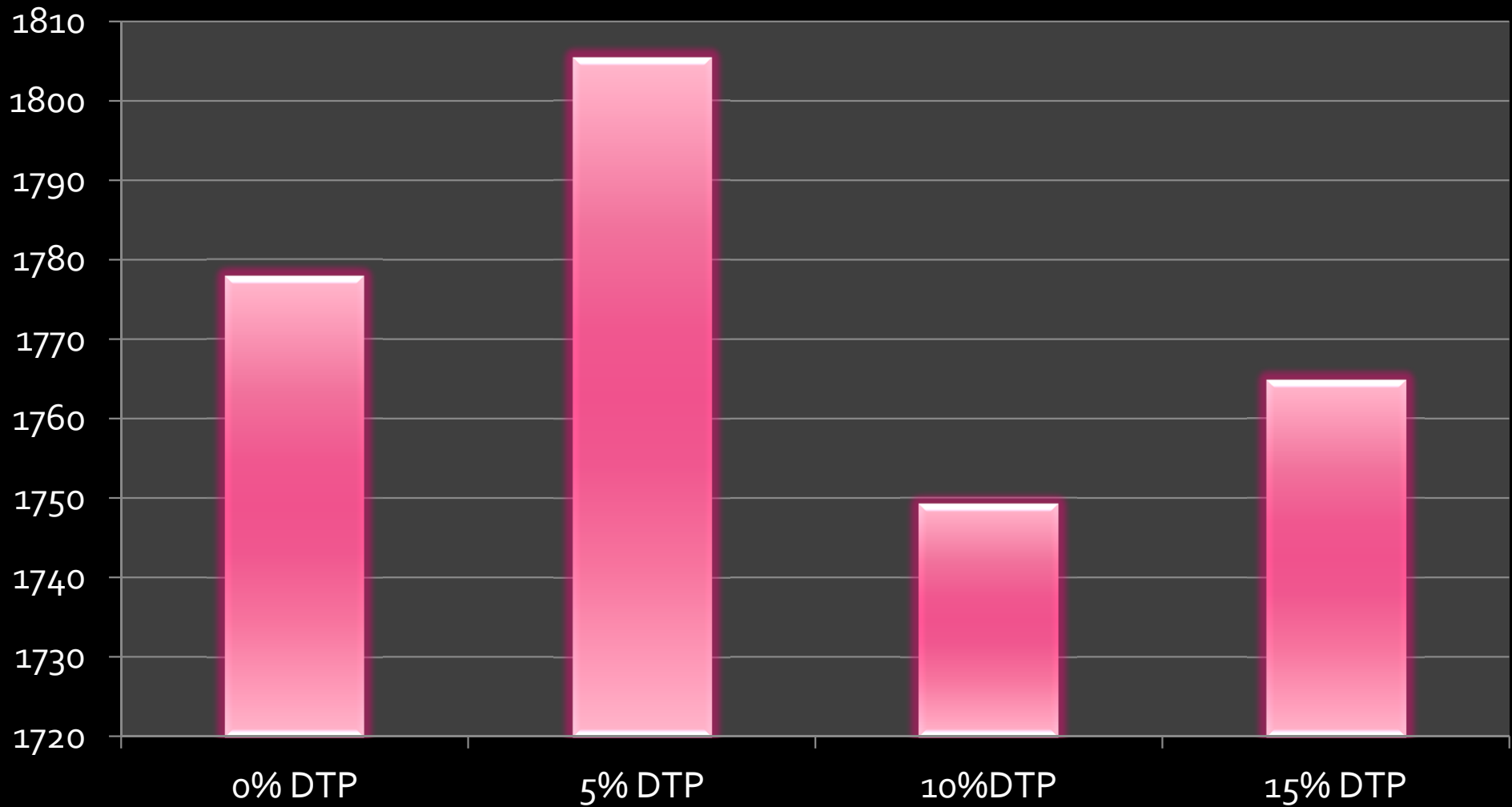
Effect of level of DTP inclusion in broiler diets with or without enzyme

Body weight(g)



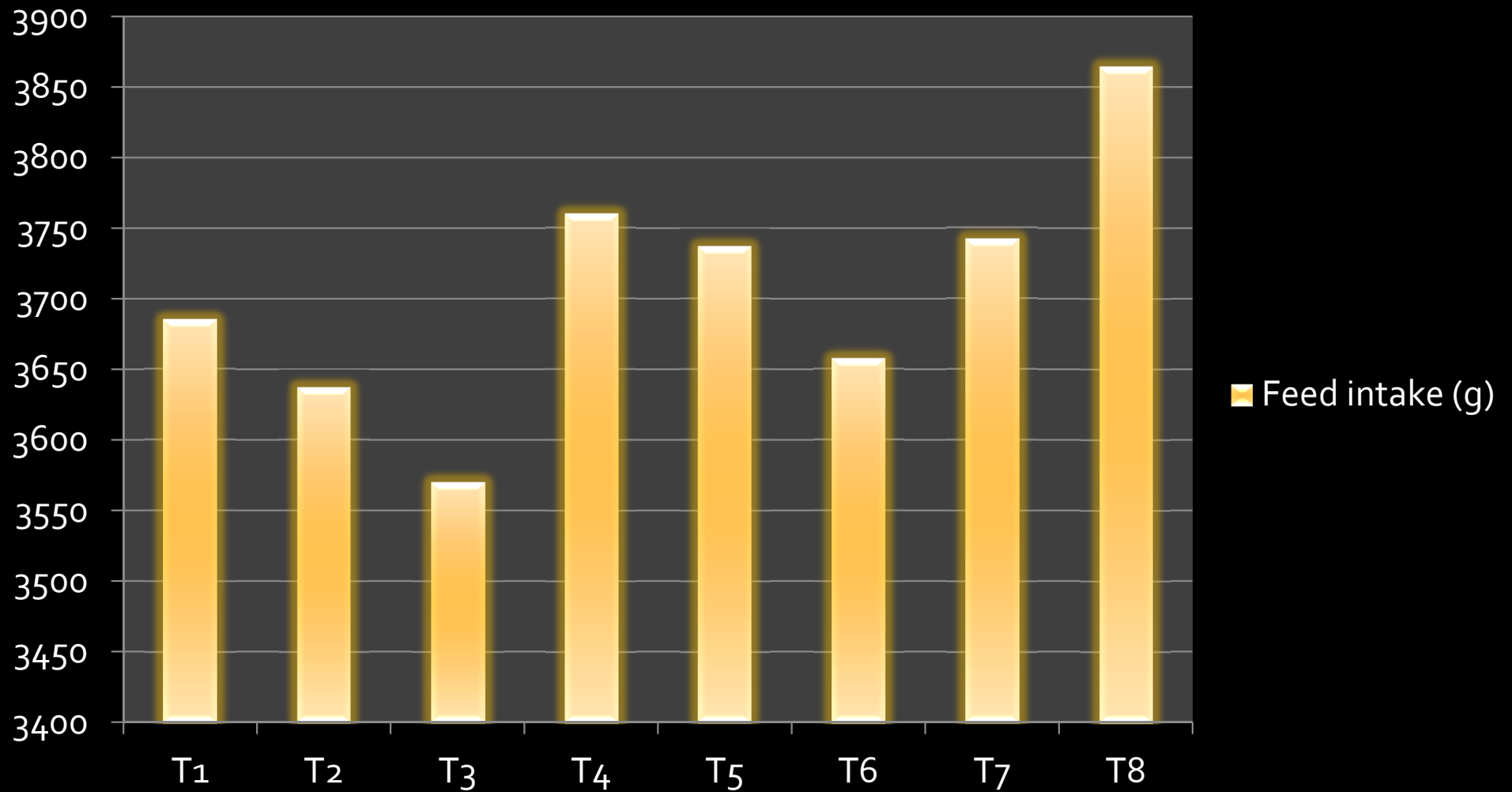
Effect of inclusion of different levels of DTP on body weight gain of broilers

Body weight(g)



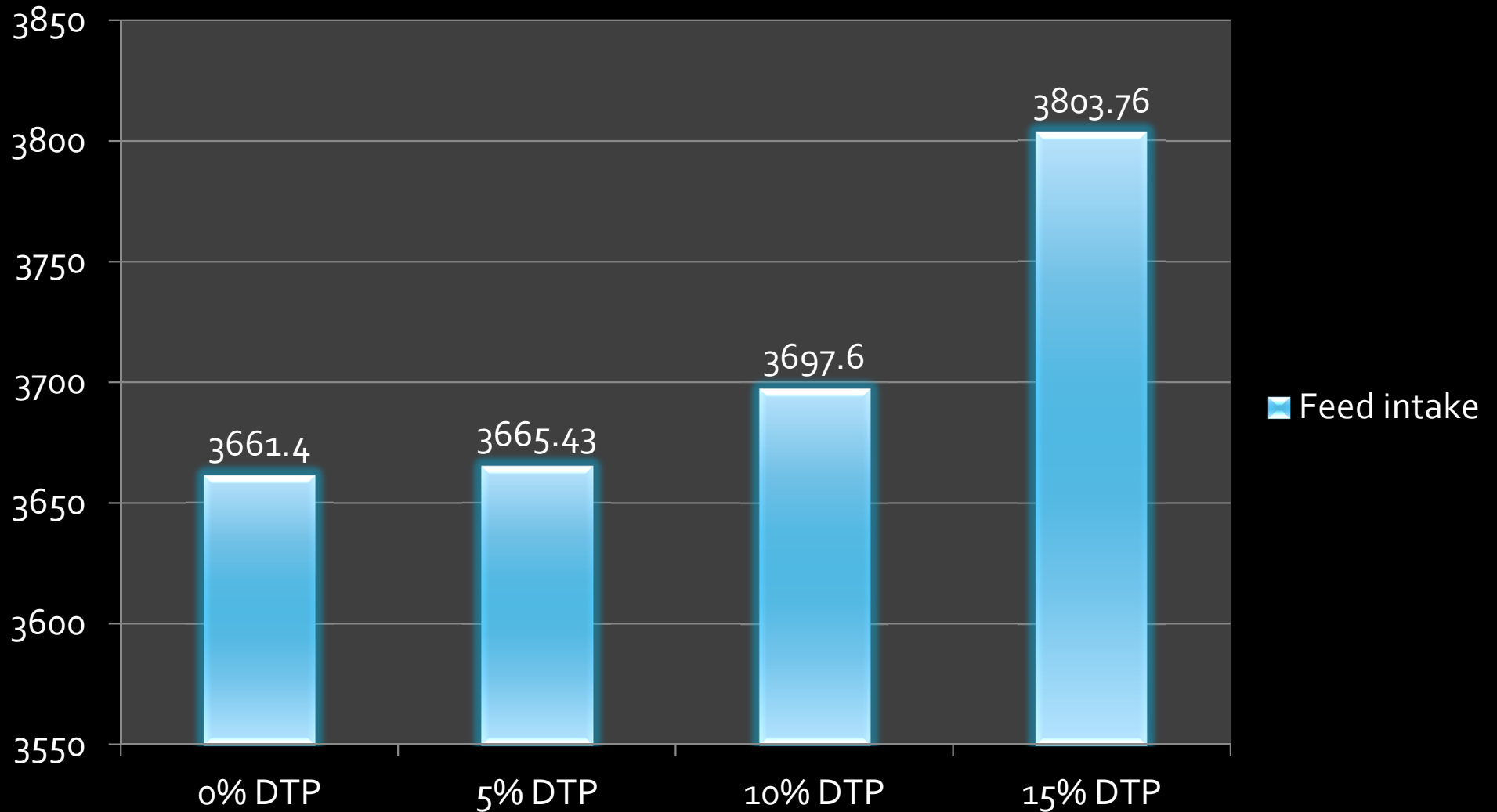
Effect of level of DTP inclusion in broiler diets with or without enzyme

Feed intake (g)



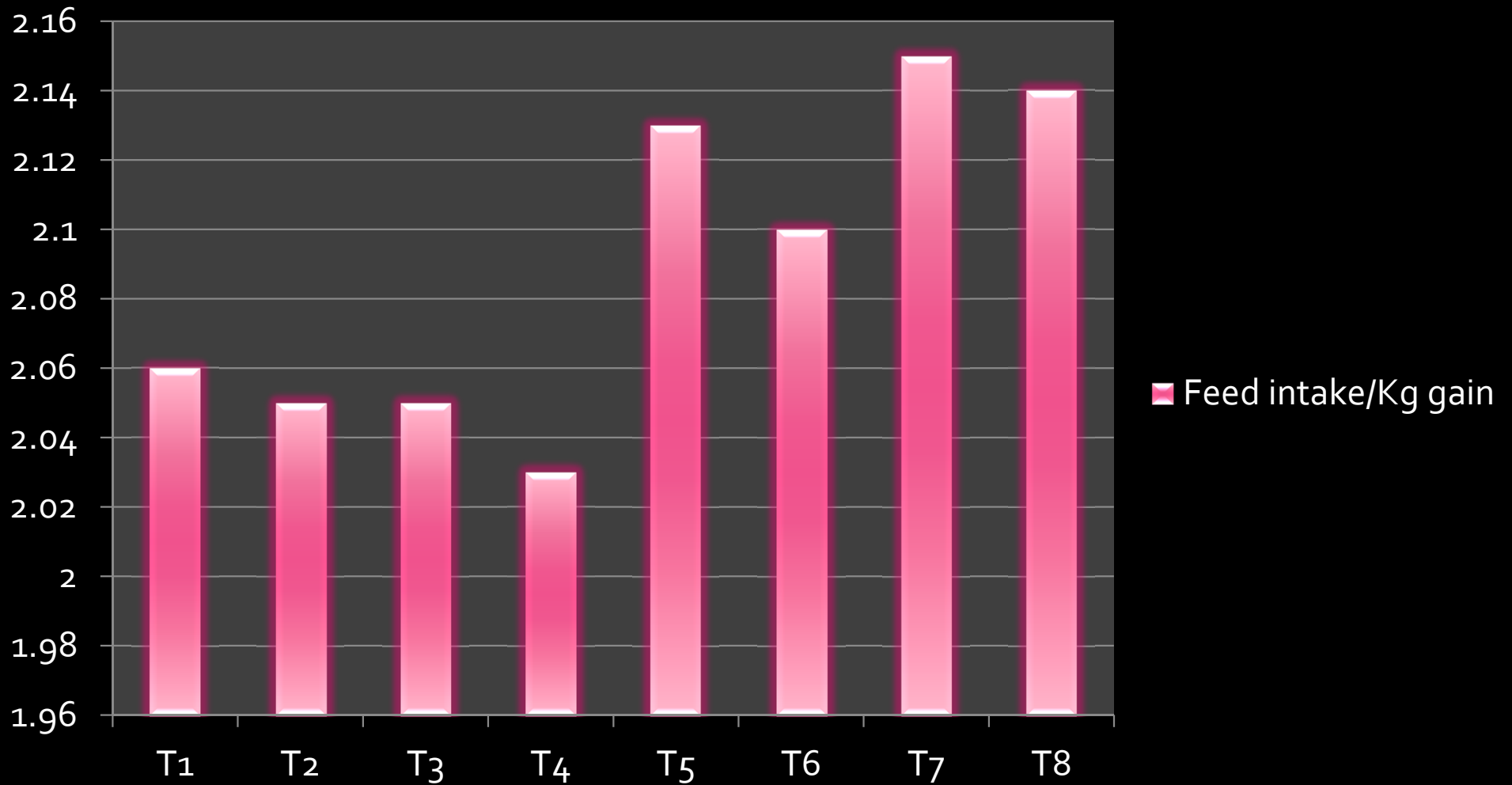
Effect of inclusion of different levels of DTP on feed intake(g) of broilers

Feed intake (g)

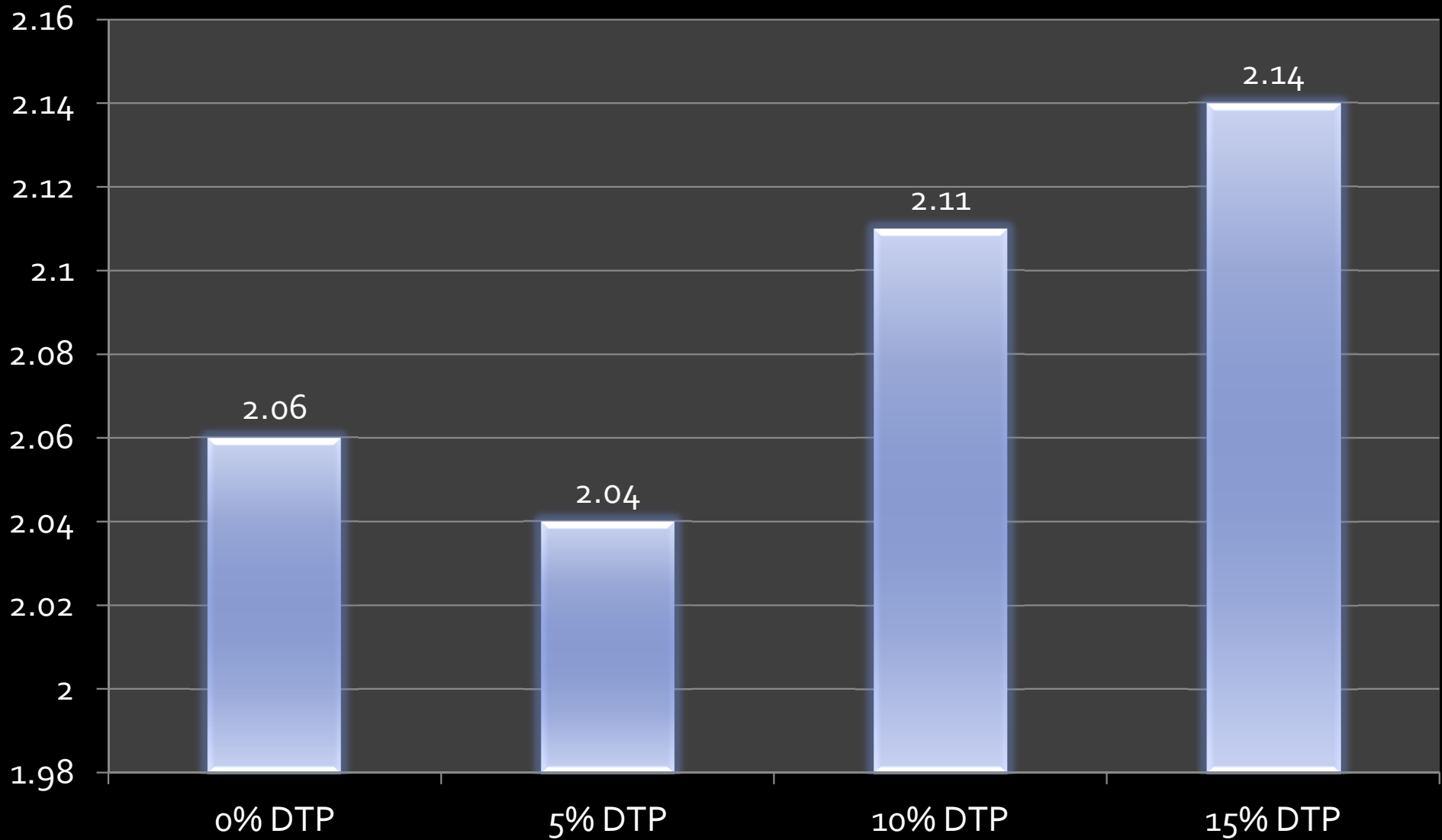


Effect of level of DTP inclusion in broiler diets with or without enzyme supplementation on feed efficiency

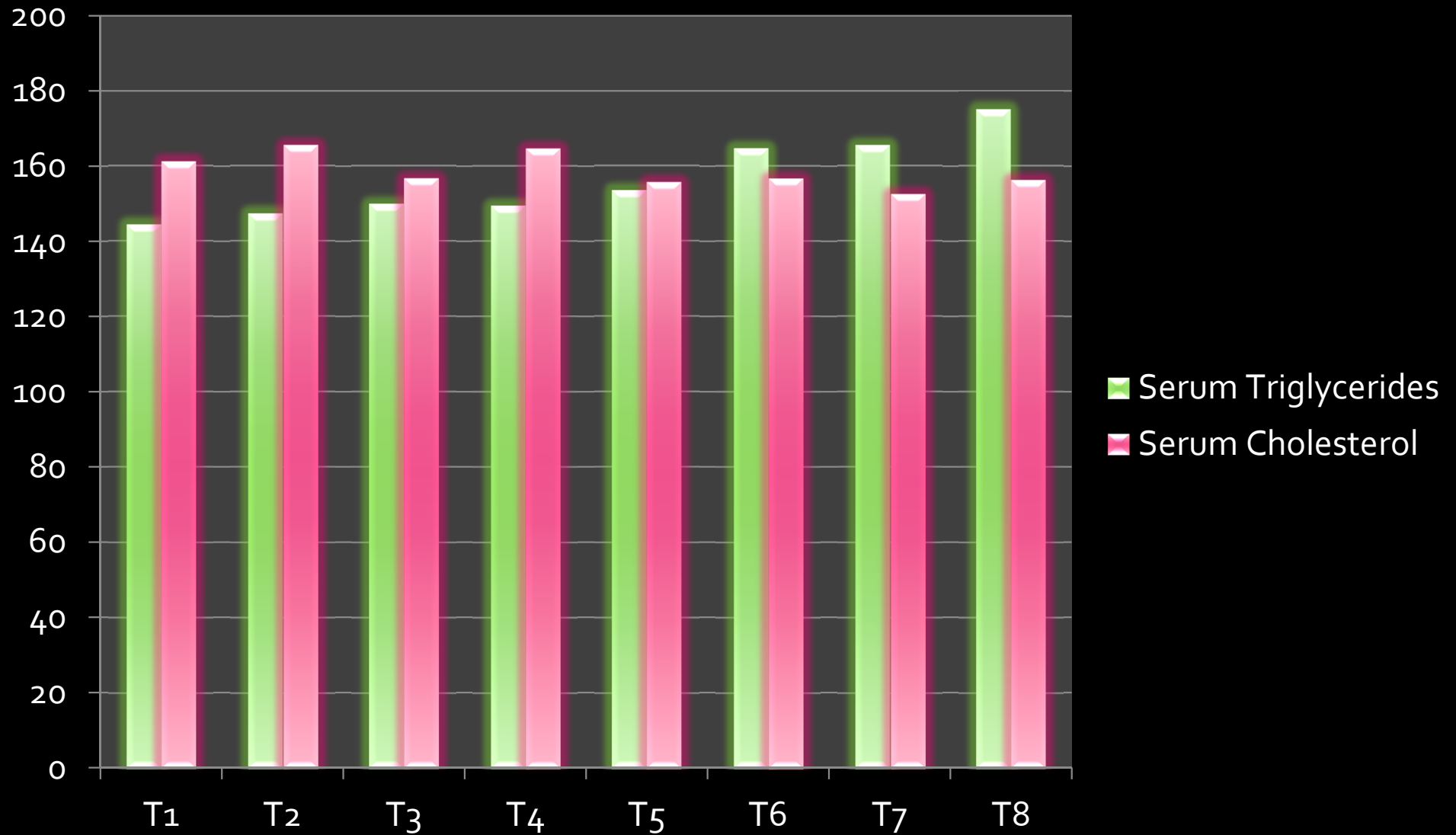
Feed intake/Kg gain



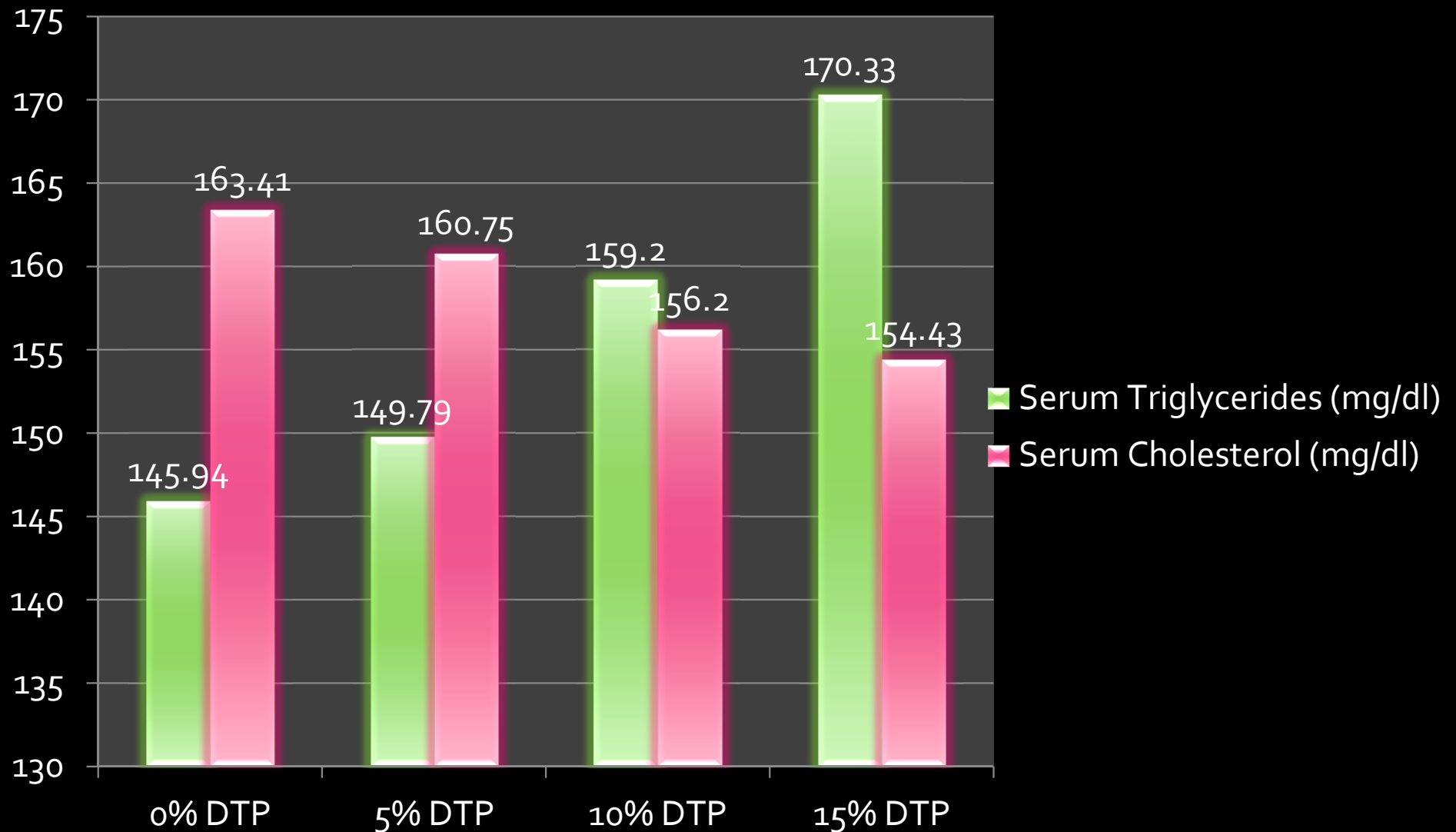
Effect of inclusion of different levels of DTP on feed intake/kg gain in broilers



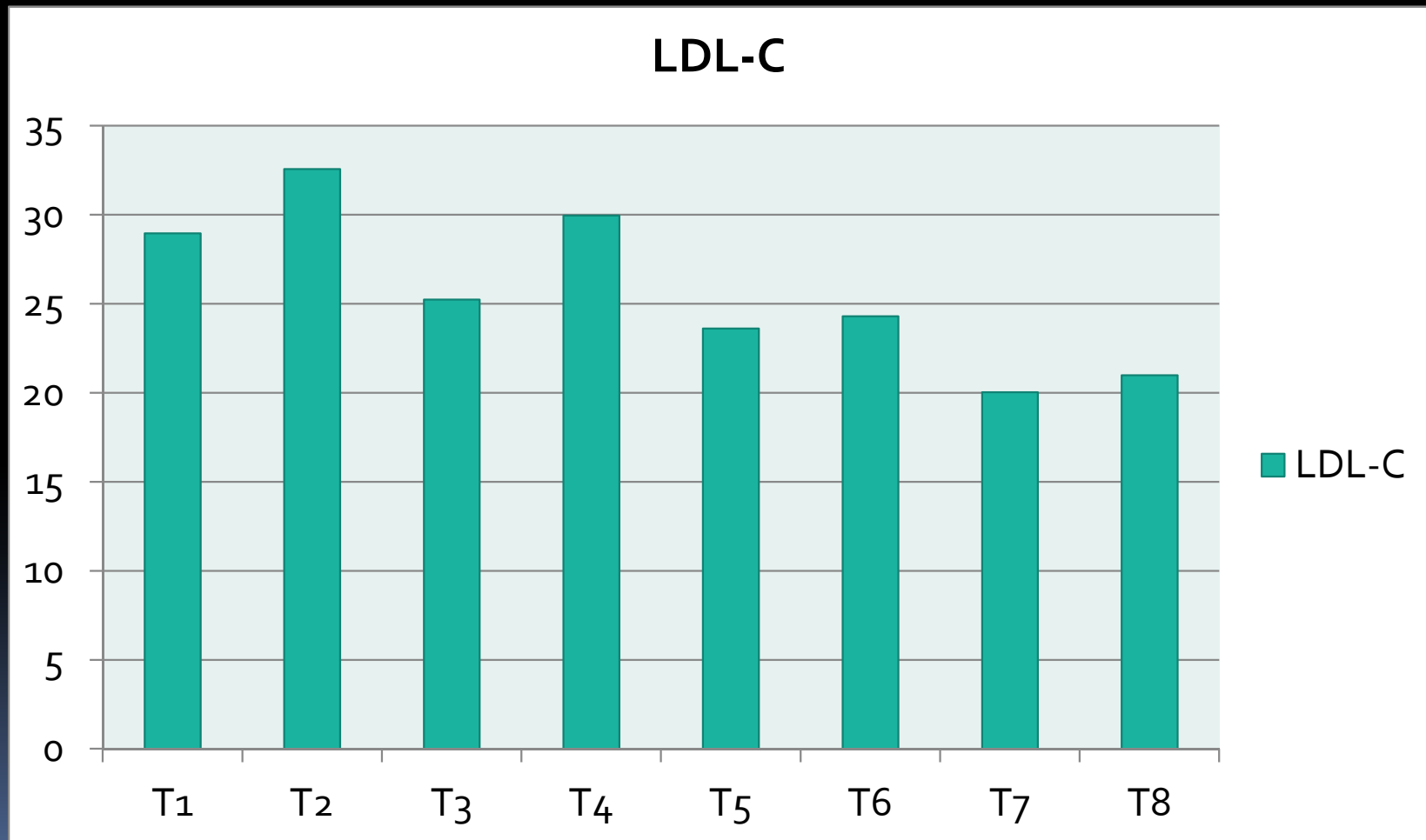
Effect of level of DTP inclusion in broiler diets with or without enzyme supplementation on level of serum triglycerides and serum cholesterol



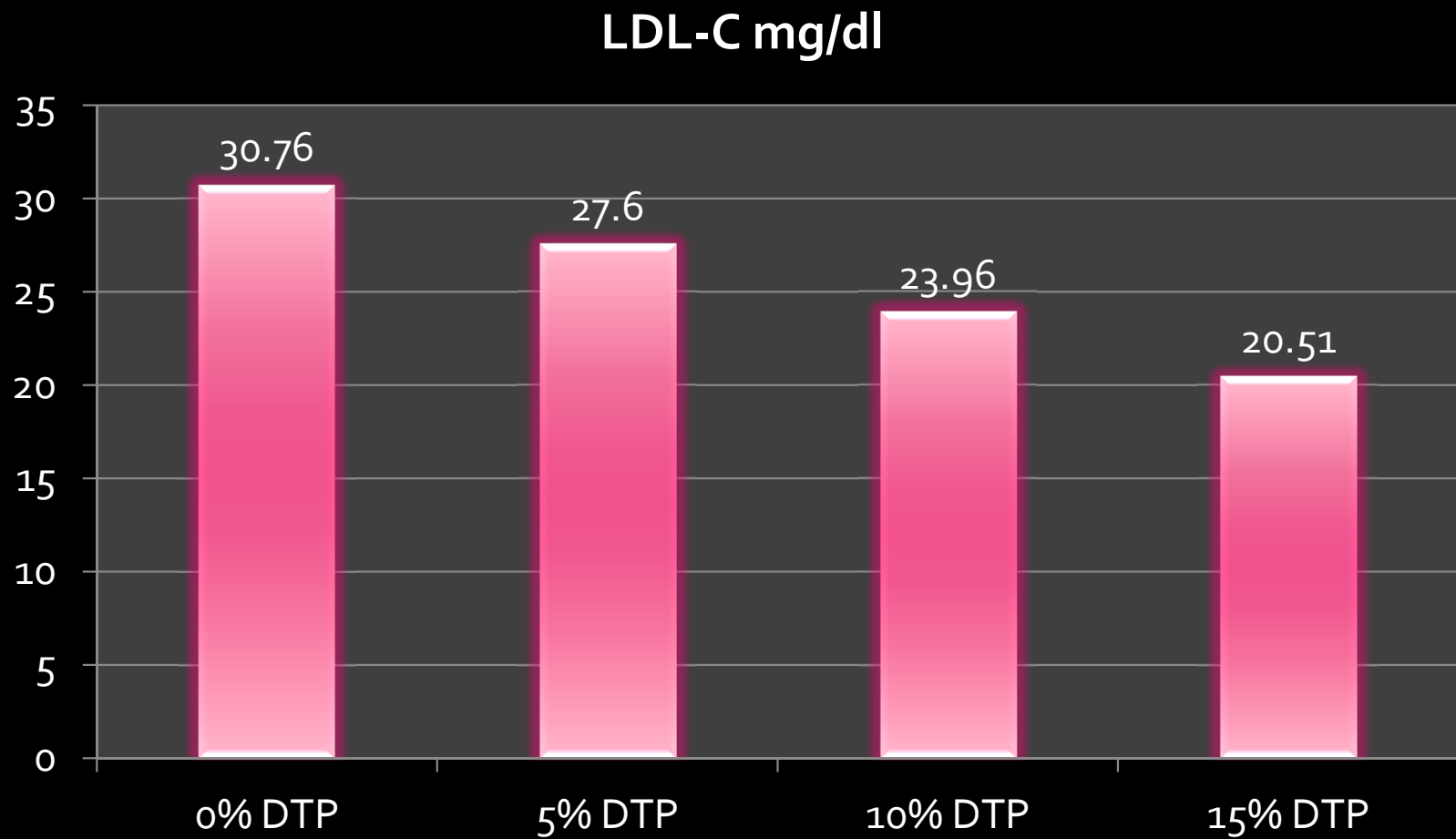
Effect of inclusion of different levels of DTP on the level of serum triglycerides and serum cholesterol



Effect of level of DTP inclusion in broiler diets with or without enzyme supplementation on LDL-C (mg/dl)



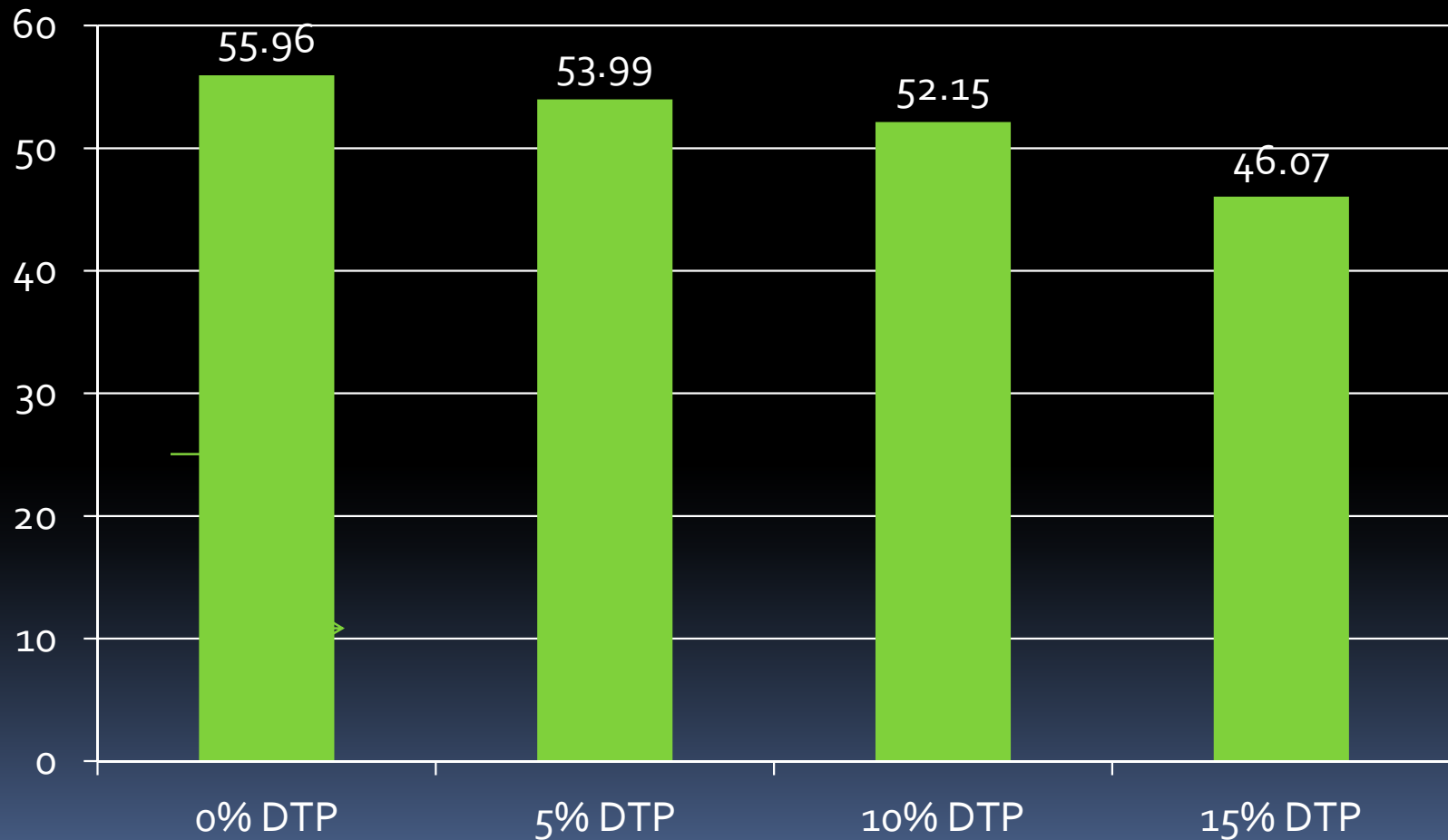
Effect of inclusion of different levels of DTP on the level of serum LDL-C



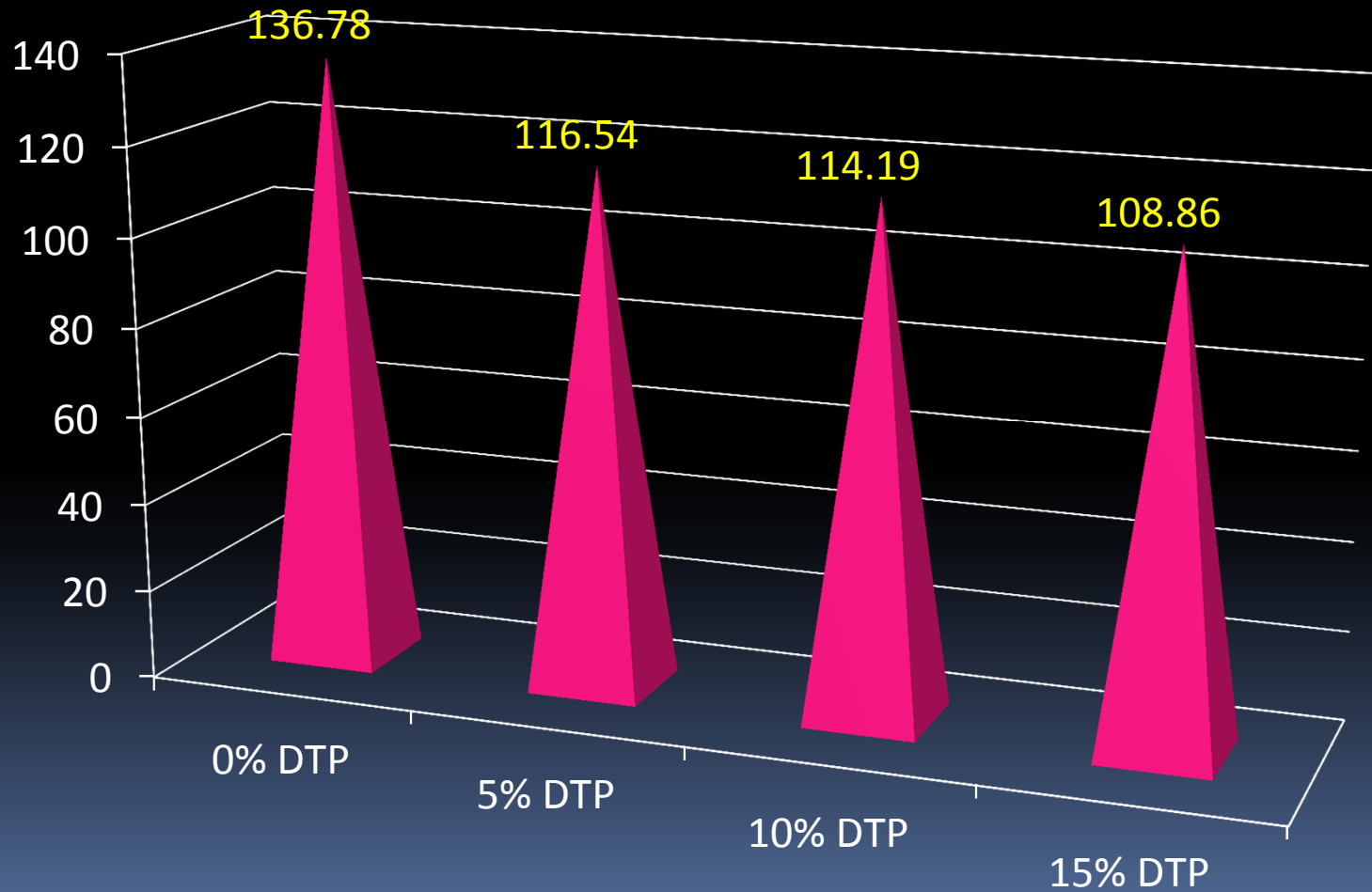
Effect of level of DTP inclusion in broiler diets with or without enzyme supplementation on breast muscle cholesterol (mg/100g of meat)



Effect of level of DTP inclusion in broiler diets on breast muscle cholesterol (mg/100g of meat)

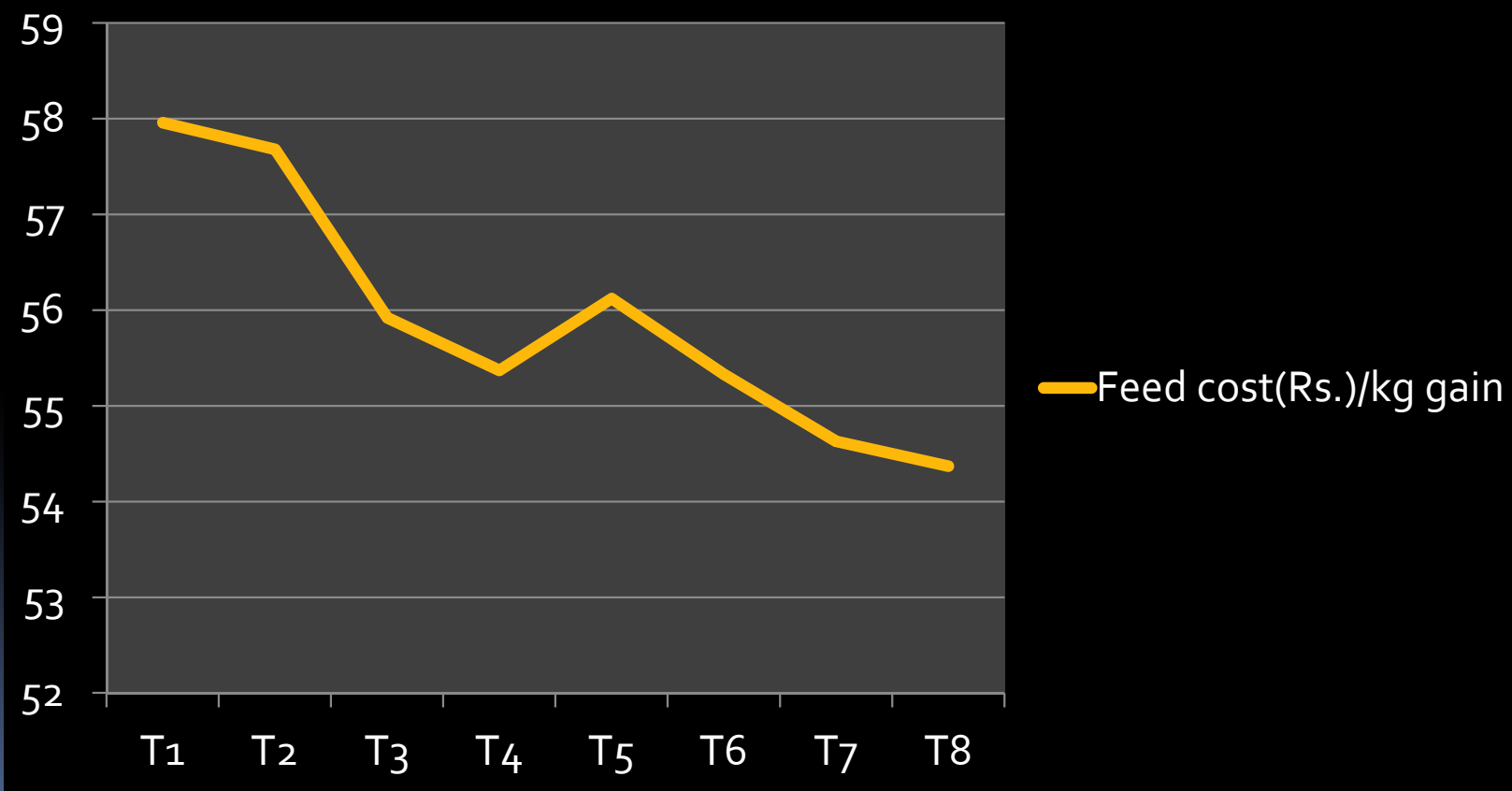


Effect of level of DTP inclusion in broiler diets on thigh muscle cholesterol (mg/100g of meat)



Effect of level of DTP inclusion in broiler diets on Feed cost/kg gain

Feed cost(Rs.)/kg gain





THANKYOU

- Veysel Ayhan and Sedat Aktan (2004) suggested that DTP can be used as a feed ingredient in broiler ration with a level of 5%.
- Melkamu Bezabih Yitbarek (2012) reported that weight gain and feed efficiency are higher at 5% DTP inclusion in Rhode Island Red grower chicks.
- Safamehr.et al .,2011 included DTP at 0,4,8 & 12 % levels with and without enzyme supplementation in layer rations and observed decreased serum cholesterol but had no effect on yolk cholesterol with increase in the DTP level and the better performance was observed at 8% level of inclusion. Enzyme supplementation increased egg weight, but did not affected the egg production.

- Jafari et al(2006) and Mansoori et al (2008) reported that feeding laying hens with diets containing DTP at inclusion rates upto 120g/kg did not effect egg production, food consumption and efficiency of the hen as well as egg weight and shell thickness.
- Md.Hamed Salajegheh et al (2012) reported DTP inclusion caused a significant increase in mean HDL cholesterol and decrease in serum LDL cholesterol content.