

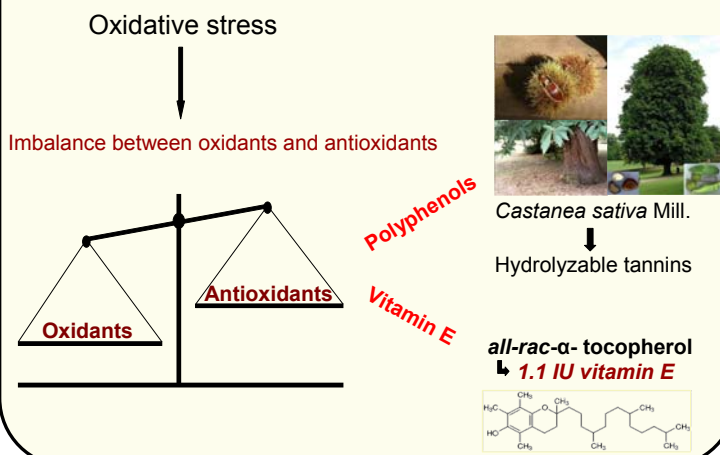
Effect of chestnut tannins and vitamin E on oxidative status in broiler chickens

Voljč M., Nemec M., Frankič T., Trebušak T., Salobir J.

University of Ljubljana, Biotechnical faculty, Department of Animal Science, Chair of Nutrition

mojca.voljc@bf.uni-lj.si

INTRODUCTION



OBJECTIVE

To establish the effect of chestnut tannins (Farmatan) and vitamin E on oxidative stress in broiler chickens.

MATERIAL AND METHODS

Five groups → 10 × per group

Experimental diets: broiler specifications ROSS 308

ContPalm	supplementation	7.5 % palm fat
ContLin		7.5 % linseed oil
VitE		7.5 % linseed oil, 85 IU vitamin E as all-rac-α-tocopherol
TAN		7.5 % linseed oil, 3 g Farmatan/kg
VitE+TAN		7.5 % linseed oil, 85 IU vitamin E as all-rac-α-tocopherol, 3 g Farmatan/kg

Analyses:

- **HPLC**: MDA and vitamin E in blood plasma, liver and breast muscle
- **RANDOX**: TAS (total antioxidant status), SOD (superoxid dismutase), GPx (glutathione peroxidase), GR (glutathione reductase)
- **Comet** assay: lymphocyte DNA damage

RESULTS

Table 1: Markers of oxidative stress

	ContPalm	ContLin	VitE	TAN	VitE+TAN	S.E.M.	P
MDA							
Plasma (nmol/ml)	0.13 ^a	0.65 ^b	0.43 ^{bc}	0.47 ^{bc}	0.37 ^{ac}	0.07	<0.0001
Liver (nmol/g)	0.21 ^a	0.41 ^b	0.42 ^b	0.37 ^b	0.38 ^b	0.04	0.0011
Breast muscle (nmol/g)	0.32 ^a	1.88 ^b	0.78 ^a	1.85 ^b	0.71 ^a	0.17	<0.0001
TAS (mmol/ml)	1.49	1.46	1.45	1.40	1.44	0.07	0.8969
Antioxidant enzymes							
SOD (U/g HB)	537.75	541.26	586.63	532.48	556.96	35.31	0.8184
GPx (U/g HB)	129.07	146.12	144.36	140.94	127.58	7.45	0.2620
GR (U/l)	27.05	27.07	26.35	26.35	24.33	1.26	0.4964

Table 2: Concentrations of α-tocopherol in blood plasma, liver and breast muscle

Vitamin E (α-tocopherol)							
Plasma (μg/ml)	6.77 ^a	4.45 ^a	15.65 ^b	4.84 ^a	18.54 ^c	0.71	<0.0001
Liver (μg/g)	4.83 ^a	3.86 ^a	13.91 ^b	4.04 ^a	16.96 ^c	0.12	<0.0001
Breast muscle (μg/g)	3.79 ^a	2.83 ^a	7.53 ^b	3.09 ^a	9.64 ^c	0.43	<0.0001

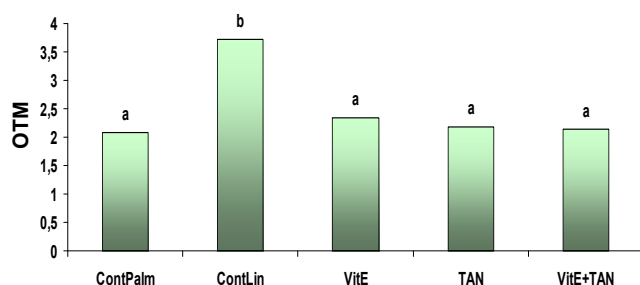


Fig.: Lymphocyte DNA damage presented as OTM (Olive Tail Moment)

CONCLUSIONS

- High PUFA intake increased MDA formation and DNA fragmentation.
- Addition of 85 IU of vitamin E reduced MDA content only in breast muscle. Tannins had no effect on MDA content.
- Vitamin E and tannins together (group VitE+TAN) reduced MDA in plasma and breast muscle.
- Vitamin E and tannins had no effect on TAS, SOD, GPx and GP values.
- Vitamin E and tannins reduced DNA damage of blood lymphocytes.
- Concentrations of vitamin E increased when diets were supplemented with vitamin E, to greater extent in VitE+TAN group.
- Combination of both supplements is more effective than the sole use.