Turkey as a viable source of the pluripotent wonder supplement: Carnosine

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Imizadole (Histidine containing) Dipeptides

Carnosine

Anserine

Baleneine

Glenys Jones
Carnosine

Carnosine:

- enzyme regulation (Johnson & Aldstadt, 1984)
- free radical quenching (Chasovnikova et al., 1990)
- physicochemical buffer within skeletal muscle (Bate-Smith, 1938)

Buffering:

- Imizadole ring of carnosine has a pKa of 6.83
Carnosine

Carnosine and anserine:

★ enzyme regulation (Johnson & Aldstadt, 1984)
★ physicochemical buffer within skeletal muscle (Suzuki et al., 2002)
★ free radical quenching (Chasovnikova et al., 1990)

Buffering:

★ Imizadole ring of anserine has a pKa of 7.04

★ 12-13% muscle buffering could account for by histidine and imizadole dipeptides (Okuma & Abe, 1992)
- Histidine + β-alanine = carnosine (in humans)

- Histidine – plentiful supply within the body

- β-alanine – small amounts produced from uracil in the liver ⇒ limiting factor

- Serum carnosinase breaks carnosine down into β-alanine and histidine & anserine into β-alanine and 1-methyl-histidine

(Chan et al., 1994)
Benefits to athletes

★ β-alanine supplementation:

>60% increase in muscle carnosine concentration  
(Harris et al 2006, Hill et al 2007)

13% increase in paced high intensity cycling performance

20% increase in endurance of knee extensors under continuous fatigue

*Could be the difference between winning a medal or not!*
Benefits to health

• Improvements in memory recall, language and communication in autistic spectrum disorders

• Control of secondary symptoms in diabetes

• Delayed onset and progression of Alzheimer's disease

• Anti-ageing

• Anti-oxidant
Sources

Meat sample

Freeze dried

HPLC Analysis

Quantifiable Chromatogram Output
Natural sources:

- Turkey Breast: 150 g
- Chicken Breast: 175 g
- Tuna: 248 g
- Beef: 385 g
- Lamb: 410 g
- Pork: 618 g

~800mg β-alanine
Uptake

★ Chicken Breast Extract ingestion:
  ★ increases plasma concentrations of histidine, β-alanine and 1-methyl-histidine
  ★ Improves exercise tolerance concurrent with elevations in carnosine content in skeletal muscle

(Suzuki et al., 2004, Harada et al., 2002)

★ Chicken breasts heated for 5h with 1.5vol boiling water.

★ Carnosine and anserine are heat stable therefore remaining intact post cooking
Supplemented Turkeys

Water in drinkers supplemented with β-alanine

Increases seen in histidine dipeptide content of breast muscle in stags and hens post 2 weeks supplementation.

120g turkey breast – 2 weeks supplementation

75-80g turkey breast – 9 weeks supplementation
Turkey **can** provide a viable dietary source to increase muscle carnosine concentrations to the levels beneficial to health.

*The English Institute of Sport and Korean National Sports are using turkey along side supplements as a way to improve performance!*