

& freeze-dried ham also does

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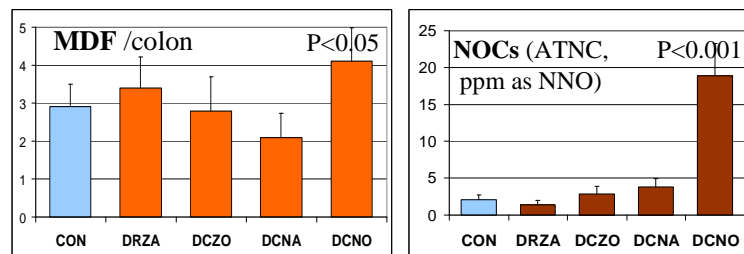


Study #2 - Effect of Model Processed Meat on MDF Promotion

Promoting effect of 4 models of cured meat, selected from study #1, was looked for in a 100-day study. Moist cured meats were included (47% dry matter) into low-calcium AIN76-based diets and were compared to a control diet (15% of lipids). Carcinogenesis endpoints were mucin depleted foci (MDF) and aberrant crypt foci (ACF) in the colon of dimethylhydrazine initiated F344 rats. In addition to biochemical endpoints of study #1, N-nitrosated compounds (NOC) were measured in feces of rats by Pollock (Broadlab Ltd, UK).

Study #2 Results

The DCNO diet containing oxidized cooked nitrated high-heme meat significantly increased the number of MDF per colon compared with control diet (4.1 and 2.9 MDF/colon respectively, $p=0.04$). MDF were more abundant in those rats than in rats fed with similar non-nitrated meat or with similar non-oxidized meat (DCZO and DCNA, both $p<0.05$). The 4 meat-products increased ACF formation in rats (23 to 31% increase compared with controls, all $p<0.05$). Last, fecal NOCs were much higher in DCNO-fed rats than in other groups ($p<0.001$)



Only oxidized* cooked nitrated high-heme meat promoted MDF in DMH-initiated rats and induced high NOC level in rats feces**

CON, No-meat control (balanced for all cured-meat nutrients)

DCNO, Dark meat, Cooked, Nitrated, Oxidized

DCNA, Dark meat, Cooked, Nitrated, **Anaerobic** packaging

DCZO, Dark meat, Cooked, **Zero-nitrite**, Oxidized

DRZA, Dark meat, Raw, Zero-nitrite, Anaerobic packaging

* Oxidation = five days unpacked in a dark fridge

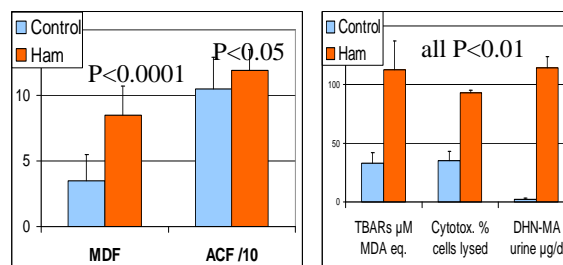
** NOCs = N-nitrosated Compounds, were assessed as apparent total N-nitroso compounds (ATNC) by Pollock (Broadlab Ltd, UK)

Study #3 - MDF Promotion by Freeze-Dried Ham

Promoting effect of a 55% freeze-dried ham diet was looked for in a 100-day rat study. It was a cooked cured ham obtained from a local supermarket that became rancid after freeze-drying. Carcinogenesis endpoints were MDF and ACF.

Study #3 Results

Freeze-drying strongly induced fat peroxidation in ham. Ham-fed rats and controls had 8.5 and 3.5 MDF/colon respectively ($p<0.0001$). Ham diet also increased ACF formation (+13%, $p<0.05$). Ham-induced promotion correlated with the above cited fecal and urinary biomarkers.



Freeze-dried oxidized cooked ham promoted MDF & ACF in initiated rats and increased fecal & urinary markers of lipoperoxidation & cytotoxicity

CONCLUSIONS

- ♦ Freeze-dried cooked ham promoted colon carcinogenesis.
- ♦ Model cured meat (similar to badly packaged cooked ham) also promoted colon carcinogenesis in rats.
- ♦ Nitrite and oxidation played a part in this promotion.
- ♦ Results thus point to packaging and processing modifications toward healthier cured meat.

More Conclusions

- ♦ Promotion was associated with fecal water cytotoxicity and lipid peroxidation (TBARs in fecal water and DHN-MA in urine)
- ♦ MDF promotion was seen only in rats with high fecal NOCs (no NOC assay done in study #3)
- ♦ **Mechanisms** are not yet unveiled: nitrosyl heme or other N-nitrosated compounds might be responsible for carcinogenesis promotion in rats fed oxidized cured-meat.

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