



## **Benefits of Eating Meat Products Dried at Lower Temperatures** **Food Safety and Flavour**

### **Preface**

The following report was conducted by Dr. Simon Angelo Cichello *Ph.D.*, a registered nutritionist (*R.Nutr.* - Nutrition Society of Australia). Dr. Cichello completed his Ph.D. in the field of Nutritional Biochemistry (Thesis title 'Protein and Energy Metabolism in Cachexia and Obesity') at La Trobe University. He currently is a sessional lecturer in the subject of Food and Nutritional Analysis at Victoria University, a Director of the company 'Wholesale Group International Pty Ltd', and consults to food, pharmaceutical manufacturers in Australia, China and Japan on matters of extension of food shelf-life and natural preserving systems. He also consults to clients as nutritionist and Phytotherapeutic consultant at a private medical centre in South Melbourne, Victoria.

### **Introduction**

Byron Bay Biltong, uses a commercial in confidence method of air-drying there lean beef at <39°C. Effectively, this beef has not been subjected to oven cooking, the protein has not denatured and also vitamins and other functional compounds have not degraded at this temperature. Due to the decreasing water content (denoted *A<sub>w</sub>*), the pH environment inside and on the surface of the meat decreases to and below 5.5., this makes the environment inhabitable from food pathogens such as *E. Coli O157:H7*, *Salmonella aureas* and also *Listeria monocytes* making the Biltong safe for human consumption.

### **Food Safety**

The University of Wisconsin – Madison, Center for Meat Process Validation has conducted a number of studies; (Ingham *et. al.* 2006, Burnham *et. al.* 2008). These studies concern the fermentation and drying of certain meat products. The studies conclusively proved the food safety of low temperature prepared Biltong products. In an investigation by Burnham *et. al.* 2008, they prepared Biltong at 22°C, 50% relative humidity for a period ranging from 17–26 days for biltong until the meat reached a *A<sub>w</sub>* of 0.6 and pH of 5.5. Burnham *et. al.* used acid-adapted pathogens (eg. *S. aureas* and *L. monocytes*) were used as inocula (ca. 7 log CFU /sample/pathogen). Within the biltong manufacturing process reduced pathogen levels from 7 log to 1.2, and 3.8 log CFU (*S. aureus* and *L. monocytogenes*, respectively). In the droëwors, which contains a higher fat content, there was less lethality (populations of bacteria were not reduced as significantly). This study showed that preparing Biltong at temperatures of 22°C is more than safe for human consumption.

### **Flavour**

It has been stated that air dried meats (i.e. 4°C or 22°C) as the case for Byron Bay Biltong are vastly different and more enhanced than over cook meats >80°C (Heinz & Hautzinger 2007), i.e. which may be in the case of processed beef jerky.

In a study prepared for the National Cattlemen's Beef Association's



Center for Research & Knowledge Management (Texas, U.S.A.) (Savell 2005), the research revealed the following points about air-drying meat; enhanced flavor and tenderness. The primary factors involved in developing these superior flavours and reduced microbial spoilage relied on (1) days of aging, (2) storage temperature, (3) relative humidity, and (4) air flow. Days of aging related more to the tenderness of the beef portions. Although the storage temperatures were 0 to 4°C for these particular air-dried meats, flavour has a direct relationship to the oxidation of fatty acids (fat portion of the meat) and rising temperature (Savell 2005).

Further, in a study by Bejerholm and Aaslyng (2004), they examined the effect of different pork muscle types and also cooking techniques and temperatures had on the sensory profile analysis. They found that a lower temperature of 65 °C is preferred (focus is on flavour components) versus 75 °C is overall sensory properties (taste quality) are desired.

In conclusion, Biltong which is dried at 22°C to 40 °C certainly has a lower temperature of drying and a long drying period when compared to oven dried (>80 °C) beef jerky or similar meats where the oxidation of fatty acids would be much higher and preservation of the meat's natural flavours would be lost due to heat destruction.

## **References**

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