

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

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### **Introduction**

Biltong production uses a method of air-drying there lean beef at <math><39^{\circ}\text{C}</math>. 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  $A_w$ ), 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.



**Figure 1. Biltong Slice (Courtesy of Protea Foods, Melbourne, Australia)**

### **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), concerning 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  $A_w$  of 0.6 and pH of 5.5. Burnham *et. al.* used acid-adapted pathogens (eg. *S. aureus* and *L. monocytogenes*) 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 Biltong are vastly different and more enhanced than over cooked 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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