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## Dry aging beef

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### Abstract

The effort needed to serve the perfect steak requires good cattle to create high quality fresh beef with optimum flavour and texture. Nevertheless, these properties can be enhanced by optimising a dry aging beef process beyond the traditional aging period. The results are discussed in terms of the specific parameters involved during the storage, together with the effect on the sensory properties, on taste and mouth feel, to obtain top quality meat.

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### Introduction to the culinary concept

*The time honoured way to age beef is to dry age it*

A very often mistake is using packaging for aging beef. In fact, sealing beef is indeed not aging it, but preserving it. From our point of view, there is no discernible improvement in flavour of this beef. As a matter of fact the opposite occurs and the quality is diminished. The beef will always have a drying texture on the palate, a sort of liverish cardboard flavour.

*So what makes dry aging so good and what happens to the meat over time?*

It is well known there are two main factors which affect meat throughout time, flavour and texture. The first factor is reasonably well documented in Harold McGee's (2004) book 'Food & Cooking' (2004). In this book, he states that the action of enzymes on the protein changes characteristics, flavour and texture. Once the animal is slaughtered

and the control systems in its cells stop functioning, the enzymes begin attacking other cell molecules indiscriminately, turning large flavourless molecules into smaller, flavourful fragments. They break proteins into savoury amino acids and fats and fat like membrane molecules into aromatic fatty acids. All of these breakdown products contribute to the intensely meaty, nutty flavour of aged meat. During cooking, the same products also react with each other to form new molecules that enrich the aroma further.

The second factor affecting meat over time is that the muscle enzymes also diminish toughness. The major candidate to explain tenderisation post-rigour is the enzyme called calpain (Hopkins and Thompson, 2002). This enzyme mainly weakens the supporting proteins that hold the contracting filaments in place. Equally it appears that other enzymes have a role in tenderisation.

In conclusion, it is well known that enzyme activity in meat goes on for about 14 or so days. However, what is happening after that? That is the peculiarity and where does the improvement in flavour come from? This is a little less impressively documented. Traditionally, dry aging would take place for about 28–35 days. At this point the view is that the meat has reached its potential, the balance

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between tenderness, taste and juiciness is at an optimum. However, there is no information about the quality of the meat after this traditional period of aging time. It is at this point that we did indeed start our beef ageing programme at Rockpool Bar & Grill Melbourne some 6 years ago.

The aim of this work therefore was to follow the quality of aged meat far beyond the traditional time to see the evolution in sensory properties such as flavour and texture.

### Culinary concept: Definition

Flavour and texture of dry age beef can be intensely enhanced by increasing aging time and optimising storage beyond the traditional aging period to obtain top quality meat.

### Description of the culinary process

Tasting beef with longer ages on it was definitely an improvement in flavour and texture. Ribs of beef were firstly stored for 45 and 50 days and monitored to follow any change in the beef. What we found was that, to our taste, there was a deeper and more complex flavour, especially in our 36-month-old Black Angus grass fed beef

and full blood Wagyu. Although we noticed a slight decrease in juiciness, it certainly was worth the trade-off.

At that stage, beef ribs were stored to age from 80 days to 120 days. What we found was that a 120 days dry aging process, to our taste, had not increased the flavour of beef at the same levels we had observed between 35 and 80 days; on the other hand, juiciness had diminished to a point where it affected the eating quality of the steak. For all these reasons, we decided that in order to manage our stock and to get the maximum out of our beef, the aging process needed to be established between 50 and 80 days. This is the point to which we produce our beef ribs in all our Rockpool Bar & Grills today.

What happens and why does the beef taste more complex? It clearly seems that the beef is dehydrating slowly and that is concentrating the flavour within the cells. This is where the trade-off of flavour and juiciness is decided. We believe that between 50 and 80 days, the more dense meat due to dehydration actually created an interesting and quite delicious mouth feel that adds to the allure of the concentration of flavour (Fig. 1). So in effect the



Fig. 1. Beef at one week aged and beef at 60 days.



Fig. 2. UV lighting.



Fig. 3. Fans driving air around the room.



Fig. 4. Ribs of Cape Grim 36 months grass fed beef.

lack of juiciness or the diminished juiciness of dried versus fresh steaks at that point is as important to the overall taste perception of the dry aged steak as in the concentration of flavour.

This is through trial and error where we have ended up with our beef programme which clearly seems the optimum way of ribs production that allows to create one of the great steaks of the world.

However, it is also important to note that beef aging can only happen in very controlled circumstances.

Firstly, temperature control is critical to slow and almost stop the rotting process. Beef is received right after

slaughter and it must be held at a core temperature of around zero degrees (this is done by our cool room running between  $-0.5$  and  $1$  °C). Secondly, airflow is critical. Increasing the airflow around the aging room is needed to make sure that the fresh beef dries as quickly as possible on the surface to stop bacteria and potential mould growth. To achieve this, we have a number of ceiling mounted fans to push air in different directions around the room (Fig. 2). Thirdly, the use of UV lights is crucial to kill any air borne bacteria (Fig. 3). Lastly, the humidity is important and it must be between 80% and 85%. At high levels of humidity mould growth is an issue. If the humidity is too low the beef will dry out too quickly and therefore cause the steak to have less juiciness than is needed (Fig. 4).

In conclusion, this culinary process shows a thoroughly sensory study on taste and mouth feel to really optimise dry aging beef process beyond the traditional aging period. We feel confident that for us, all of this work produces an excellent quality steak.

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