

Grégoire ● Michaud

# Artisan 麵包教室 Bread



萬里機構 飲食天地出版社出版

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## Artisan Bread

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## 麵包教室

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Greg,

*It is a real pleasure for me to preface your work.* So much more than a book, you are placing an important stone in the edifice of our profession. You are leaving your mark, a trail that others can follow. In writing this book, you are continuing the noble tradition of our forefathers by transmitting their precious savoir-faire.

For you as for me, in France, Switzerland or whatever the country, night time is reserved for us bakers. Our families and friends are sleeping, and discretely, our work begins. Our master-bakers guide us, the kneading machines are running, the ovens are warming, the leavens fill the kitchen with their particular aroma and our commitment to this art starts to rise.

This commitment today becomes part of you, and if you find that as a result of this book, you inspire other bakers, even just through one recipe, by giving them a hint or a simple idea, you have achieved your goal.

I am often in the habit of presenting our profession as the coordination of the hand and the head.

Nothing worth doing comes without intense reflection.

The first few pages of the book discuss the theoretic approach of our profession. This is very important. Baking is evolving, and even if it is not necessary to look for a rational explanation for everything, if that aspect of magic subsists, we must do our best to understand, anticipate and plan ahead. Our mistakes must bring us enlightenment and the technology of baking is there to help us.

The values of bread are universal. You continue to show from your home in Hong Kong, that your commitment is intact. The trip you have embarked upon allows you to share you passion with others; it is now up to you readers to discover it.

My compliments to the baker-writer-traveller that you are.

*Xavier Honorin*

Champion du Monde de Boulangerie  
Bakery World Champion



*Although the idea has crossed my mind more than once;* far from me is the idea of advocating the unique supremacy of wood oven and stone milled organic flour in all continental style bakeries. Indeed, I believe that quality bread is very relative to personal perception. However, with this book, I am honored to participate in, what I hope would be a global effort to bring back the art and the science of producing the crusty and flavorful loaves that we once knew.

Thanks to my father Bernard, I had the chance during my childhood to participate in the baking of old fashioned rye bread in wood fire oven, just like they did centuries ago when Artisans were the main producers of goods; before the industrial revolution. This experience might have sparked the passion I have today for great bread.

The physicist and gastronome Nicholas Kurti stated: *'It is a sad reflection on our civilization that while we can and do measure the temperature in the atmosphere of the planet Venus, we do not know what goes on in our soufflés'.*

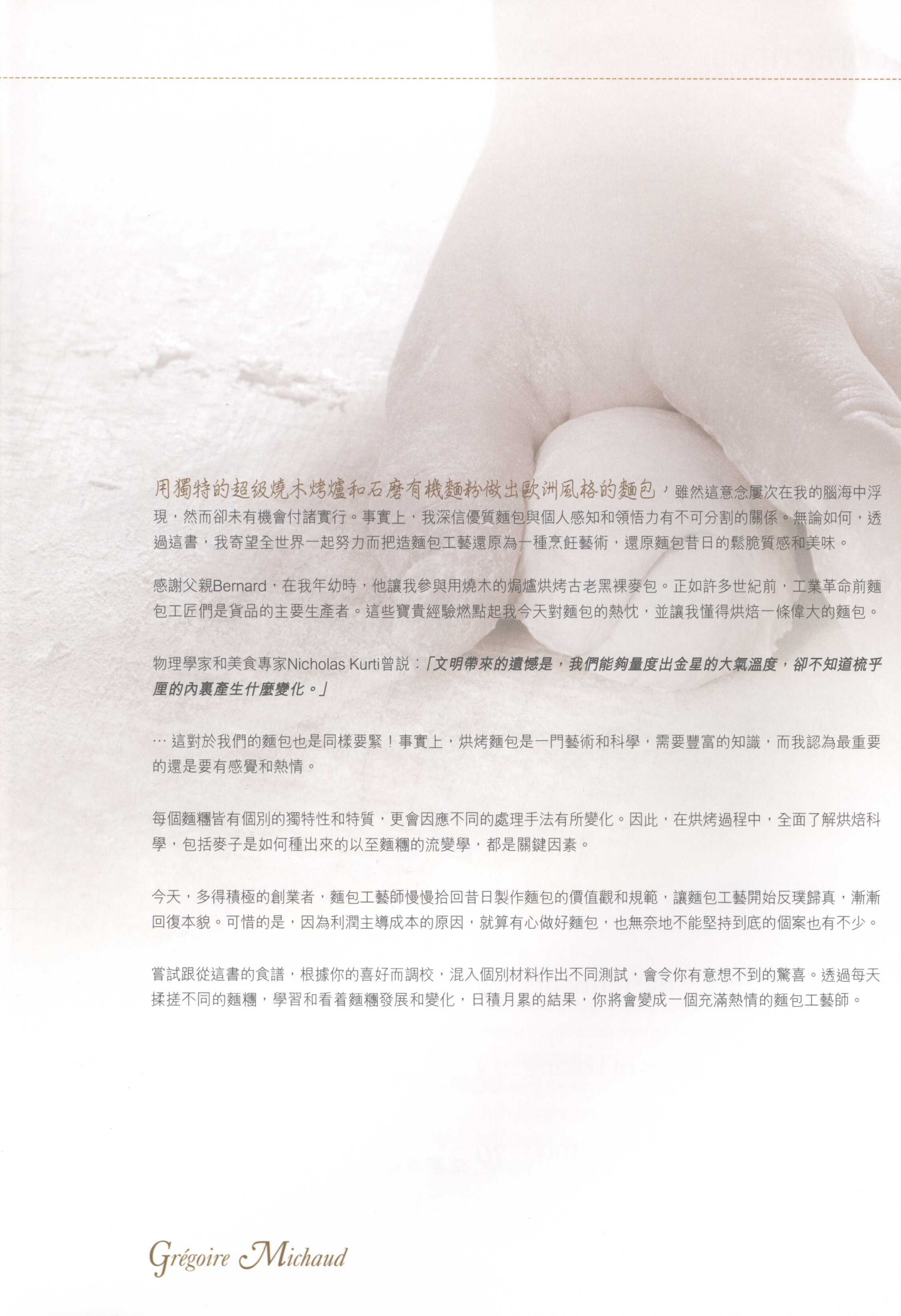
... And for that matter in our breads! Indeed, baking bread is an art and a science that requires great knowledge, but above all and from my point of view, it requires feeling and passion.

A dough has its own individual identity and its own character. Thus, it will react in a different manner every day and to understand the baking process, it is key to comprehend the science of baking from the work of the farmer to the influence of rheology in dough.

Today, thanks to motivated entrepreneurs, Artisan bakers are slowly coming back with the values and the discipline that makes bread what it should be. Unfortunately, still in many cases, the profit has taken over the reason and with it the crusty and flavorful loaves.

Try the recipes of this book, adjust it to your liking, make different tests, and add an ingredient that will surprise your guest, learn and evolve along the everyday kneading of the dough for you also, to become a passionate Artisan baker.





用獨特的超級燒木烤爐和石磨有機麵粉做出歐洲風格的麵包，雖然這意念屢次在我的腦海中浮現，然而卻未有機會付諸實行。事實上，我深信優質麵包與個人感知和領悟力有不可分割的關係。無論如何，透過這書，我寄望全世界一起努力而把造麵包工藝還原為一種烹飪藝術，還原麵包昔日的鬆脆質感和美味。

感謝父親Bernard，在我年幼時，他讓我參與用燒木的焗爐烘烤古老黑裸麥包。正如許多世紀前，工業革命前麵包工匠們是貨品的主要生產者。這些寶貴經驗燃點起我今天對麵包的熱忱，並讓我懂得烘焙一條偉大的麵包。

物理學家和美食專家Nicholas Kurti曾說：「文明帶來的遺憾是，我們能夠量度出金星的大氣溫度，卻不知道梳乎厘的內裏產生什麼變化。」

…這對於我們的麵包也是同樣要緊！事實上，烘烤麵包是一門藝術和科學，需要豐富的知識，而我認為最重要的還是要有感覺和熱情。

每個麵糰皆有個別的獨特性和特質，更會因應不同的處理手法有所變化。因此，在烘烤過程中，全面了解烘焙科學，包括麥子是如何種出來的以至麵糰的流變學，都是關鍵因素。

今天，多得積極的創業者，麵包工藝師慢慢拾回昔日製作麵包的價值觀和規範，讓麵包工藝開始反璞歸真，漸漸回復本貌。可惜的是，因為利潤主導成本的原因，就算有心做好麵包，也無奈地不能堅持到底的個案也有不少。

嘗試跟從這書的食譜，根據你的喜好而調校，混入個別材料作出不同測試，會令你有意想不到的驚喜。透過每天揉搓不同的麵糰，學習和看着麵糰發展和變化，日積月累的結果，你將會變成一個充滿熱情的麵包工藝師。



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# bread evolution 麵包的演變

*Bread as we know it today dates from over 5000 years ago when water and crushed cereals mixture was left near a heat source and rose naturally.* A few centuries ago, this was still the case where leavened bread was produced; following a long and natural leavening method. In 1680, natural yeast was already being studied. Dry yeast was created with the advancement of technology during the Second World War period and from that point on, faster production methods were available.

A major development affecting what bread would become today occurred in 1961 with the development of today's most used bread production method in modern industrial bakeries: The Chorleywood Bread Process (CBP). This method used an intense kneading of the dough with strong mechanical processes. The result of this practice reduced considerably the time taken to produce any baked goods.



The industrial evolution of the end of the 20th century brought its lot of faster methods, more productive machinery, enhanced improvers, all of this to achieve better margins and greater productivity; quality started to suffer.

From mixers to oven, all the equipment became more efficient and helped the baker to make his daily tasks less physical, making this craft more attractive.

On the other hand, the creation of workers union influenced the time people would spend at work and thus flexibility of staff became an issue.



Flour processing plants became modernized and consequently the baker could better understand bread process thanks to different analysis from the miller.

Recently, we also saw that domestic bread maker machines were becoming popular in households. This topic requires further investigation but can certainly be linked to the lack of freshly baked quality bread available on the market or to the general level of convenience that the consumer has reached.

For generations, the ethics of eating bread was that white bread was considered the preferred bread of the upper class while the poor ate dark bread. However, in the late 20th century, dark bread became the favorite with its superior nutritional values while white bread became linked with a category of consumer ignoring its poor nutritional values.

Since the new millennium, technology, bio-engineering and to great extent marketing have influenced the way people taste food and see food. Quality of bread has therefore lost its single definition to people's own perception of quality.

據知，麵包已有五千年的歷史。當初磨碎的穀物混合了水，置放在熱源附近，混合物自然膨脹起來，人就知道做麵包的原理。幾世紀前，透過長時間和天然發酵的方法，生產出已有酵的麵包。到了1680年，天然酵母已研究成功。直至第二次世界大戰期間，隨著科技進步，製造出乾酵母，從此麵包可在較短時間內做出來。

1961年開始，應用了“佐利活式麵包製作程序”(CBP)來生產麵包，令麵包製作得以大躍進發展。這種方法利用強力的機械以密集式搓揉麵糰的方法製造麵包，在烘焙不同製品時能有效地減省時間。

二十世紀末的產業革命，引發出許多快捷方法、生產機械、多種改良劑，所有一切的目的是達到最佳的生產邊際成本、最大的產出，不過卻對品質帶來破壞。

由攪拌器到焗爐，所有器具演變成高效率工具，以協助烘焙師應付大量日常工作，減少勞動，讓工藝更具吸引力。另一方面，工會的創立影響人們投放在工作的時數，從而影響員工的靈活性。

麵粉加工廠趨於現代化，使烘焙師能較明瞭麵包製作過程，這有賴於磨坊主人提供不同的分析。

近年，我們看到許多家庭採用本土麵包製造機器來做麵包。這個課題留待日後探索；不過，自做麵包普及化讓人聯想起市場上缺乏優質麵包，或是消費者只能買到一般水準的麵包。

一般而言，上流社會才能享用白麵包而草根才會吃用黑麵包。可是，踏入二十世紀，與白麵包的營養價值比較，黑麵包倒成為超級營養價值之選。

自從千禧年後，技術、生物工程和市場發展迅速影響到人們品嚐和欣賞食物的態度。就人們對質素的感觀而言，優質麵包已經沒有單一定義了。



# the farmer's work 農夫的工作

*The grower of wheat has the responsibility of a few factors that will affect the end product in bread making.* The first important step is the selection of the type of cereal that he will grow in order to produce an excellent grade of flour. To do so, he will select the purest mix of seeds, avoiding too many other seeds mixed together that would result in a decreased quality of flour.

There are many factors affecting the growth of wheat cereal starting with the soil where the seeds are being planted. It must be ensured not to be soiled with high level of pesticides and other contaminants. The soil nutrition depends on the location of the field and on its natural characteristics in which the grower has little influence over the facts. In more controllable matters, the farmer can influence the development of the grain by using different fertilizers such as nitrogen at planting or flowering period to increase the protein content to a level above 11%. With a low level of protein, the grain wouldn't be suitable for bread flour making.

The planting period is calculated according to the maturity time of the selected kind of wheat; following the weather forecast statistics. For quality bread flour for example, Hard Red Spring wheat is planted



during the fall to be harvested during the spring – the cold temperatures are having a positive influence on the development of the crops. During the growth, too much water will decrease the grain yield, but increase the protein content. There are also diseases that can affect the size of the kernels. Excessive frost can as well have negative effects on the growth of wheat, especially just after the flowering period.

As a general rule, the humidity level of the harvested wheat must be between 12% and 14.5%. A grain that is too wet might be subject to deterioration by mould and insects or even severe mycotoxins. The grower will choose a date of harvesting that was forecasted at sowing to harvest its wheat with an optimal humidity condition. To control the quality, using special equipment, the farmer will check the yield of grain, counting how many grains are in one kilogram for example.

## CEREALS SUITABLE FOR BREAD MAKING

Wheat, Rye, Barley, Oat, Millet, Corn and Rice are the most suitable cereals to make bread flour, however, from a bread-making point of view, wheat and rye are the only cereals that have a composition suitable to make bread flour used on their own in today's industry. The other cereals can't be used alone in a dough

and need to be mixed with either rye or wheat. At growing, rye is less demanding than the wheat. Rye is cultivated as a main cereal where the climate is extreme and the quality of the soil is not good enough for the wheat.

Often forgotten in bread making, the above mentioned other kind of cereals are often used in this book since they bring special aromas and feature to bread that are very attractive for the Artisan.

小麥的種植者對影響麵包製品的因素負有責任。首要的步驟便是挑選穀類的種類，然後才能產出優質麵粉。接着，選出最純正的雜類種籽，避免太多其他種籽混合在一起，結果會弄到麵粉品質下降。

有許多因素會影響到小麥穀粒種植。先從播種到土壤說起，不要揀選含有毒素或已受感染的土壤種植小麥。土壤營養依賴本土農田的自然特質，種植者的影響有限。有許多可受控制的事項，農夫採用不同的肥料以影響穀粒生長。例如小麥在綠葉植物時會用氮肥；到了花期時需要增加蛋白質成份達到11%。如果蛋白質水平過低，那些穀粒磨成的麵粉卻不適合做麵包。



按照挑選出的小麥種類而計算出成熟期所需時間，接着便配合天氣統計數字預算生長期。以硬紅春麥為例，從種植至收成期，全程都在春季，所以寒冷的溫度是直接影響到穀物的成長。當小麥處於生長期，太多水份會減低收穫，但是它卻增加了蛋白質的含量。倘若這裏的土壤已受到感染會影響到穀粒的大小。過濃的霧同樣地對小麥生長帶來負面影響，特別是在小麥才完成花期。

一般而言，小麥處於收成期時，濕度必須達到12%至14.5%。穀物太濕會因發霉和昆蟲或是黴菌毒素等令到它們變壞。種植者會選對收成的日子，預計從播種至小麥收成的濕度情況，並用上特別工具作品質控制。農夫們會以每千克小麥含有多少穀粒作計算，然後估量穀物的收成。

### 適合製造麵包的穀類

小麥、黑裸麥、大麥、燕麥、黍、粟米和米等是最適合做麵粉的穀類，不過，從製造麵包角度而言，小麥和黑裸麥的組合成份才是適合研磨成麵粉的穀類，亦是現今工業的基本麵粉。其他穀類不能單獨用於麵糰，需要配合黑裸麥或小麥的麵粉使用。兩種穀物的成長，小麥的需求量相對地大於黑裸麥。培植黑裸麥與小麥的天氣條件趨兩極化，加上生長黑裸麥的土壤品質絕對不適合小麥生長。

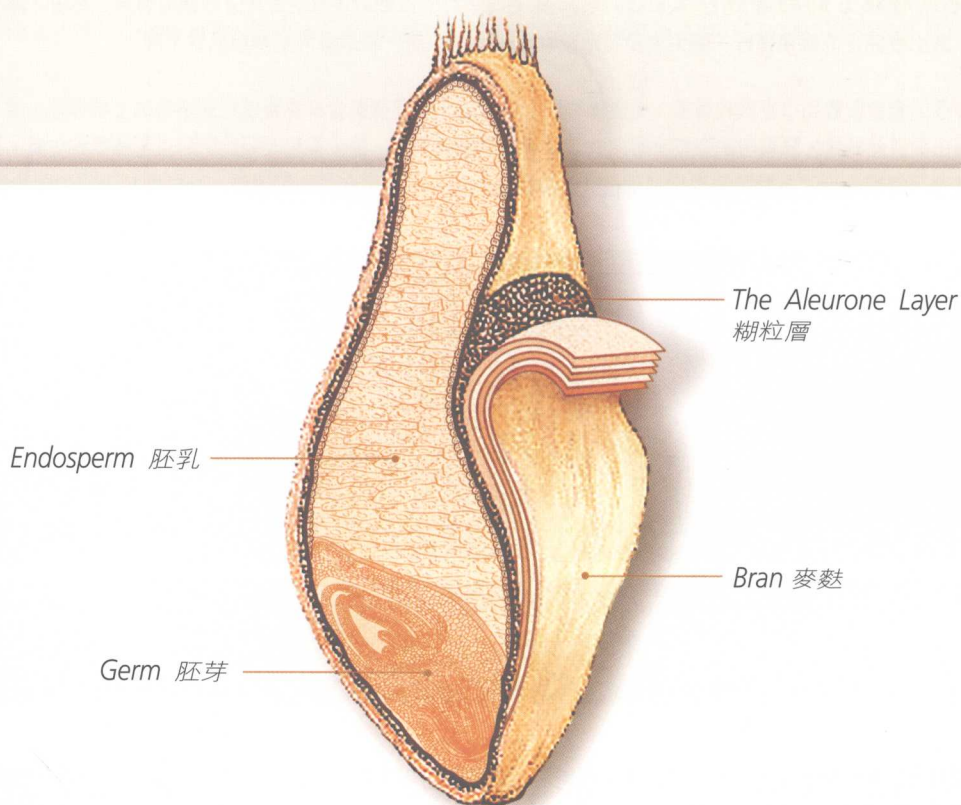
不要只從做麵包的角度出發，以上提及的其他穀類也有被應用，因為它們的獨特的香味和性質，都能吸引麵包師採用作改善麵包的氣味和質感。



# the wheat 小麥

*Botanically, there are more than 30,000 varieties of wheat.* Wheat (*Triticum*) falls into more than 20 categories; amongst others are the Spelt and the Durum that are widely known, but Common Wheat, that counts more than 200 species is the main kind of wheat used for producing bread flour. It is a grass that is cultivated in most countries around the world.

從植物學劃分，世界上有超過30,000種小麥。小麥分類可超過20大類，在眾多小麥裏，斯佩耳特小麥和硬粒小麥都是廣為人知，然而一般小麥，粗略計算也有200多種主要小麥類適合磨成麵包粉。它們如青草般廣被栽種在世界各地。



Composition of a Wheat Kernel 小麥粒結構圖



## ENDOSPERM\_ 胚乳

It represents about 83% of the kernel weight. It is the source of white flour due to the starch; there are about 20,000 particles of white flours in one grain. The endosperm contains the greatest share of the protein in the whole kernel.

胚乳佔全粒麥粒總重量的83%，亦是白麵粉的澱粉質來源。一顆麥粒包含20,000白麵粉微粒，所以胚乳佔全顆小麥最大部份蛋白質。

## BRAN\_ 麥麩

The bran is about 14.5% of the kernel weight. Bran is included in whole wheat flour and is also available separately. It is the protective layer of the kernel and the main by-product from flour milling.

麥麩佔全顆麥粒重量約14.5%，它包含了全麥粉，可獨立使用。麥麩是微粒粉層磨成粉末後的主要副產品。

## GERM\_ 胚芽

The germ is about 2.5% of the kernel weight. The germ is the embryo or sprouting section of the seed, usually separated because of the fat that limits the keeping of quality flour. Wheat germ is available separately and is included in whole wheat flour.

胚芽佔全麥粒重量的2.5%，它是胚乳或嫩芽的種籽部份。由於它的脂肪會限制了貯藏期，讓麵粉品質改變，一般會被分隔。

## THE ALEURONE LAYER\_ 糊粒層

The aleurone layer is a single cell layer that surrounds the endosperm tissue of the seeds. In cereals with starchy endosperm such as wheat or rye, the aleurone layer contains about 30% of the kernel's proteins.

糊粒層是單一細胞層，圍繞胚乳種籽的軟性纖維質。在穀類含有澱粉胚子如小麥或黑裸麥，它們的糊粒層約含30%的顆粒蛋白質。

## THE PROTEINS\_ 蛋白質

There are two main groups of proteins in the wheat grain. The water soluble proteins are globulin and albumin – precious proteins in the human diet.

The other proteins are non-soluble in water and they are the glutenin and gliadin that together form the gluten. The gluten plays a key role in the making of bread dough. Gluten gives kneaded dough its elasticity, allowing leavening and contributing to form a certain texture in baked products. The elasticity of gluten is proportional to its content of glutenins.

Celiac disease is the principal disorder caused by gluten sensitivity. It is an abnormal immune reaction to digestive breakdown products of gliadin. The population suffering from such disorder is increasing and it is therefore recommended to offer gluten-free bread in an Artisan bakery.

小麥穀粒有兩組蛋白質，水溶性蛋白分有球形蛋白和清蛋白（前者的蛋白成份提供人類日常所需的營養。）

另一種蛋白屬非水溶性蛋白，從成份中的麥筋和麥膠蛋白膠結而成為網狀麵筋。這種麵筋特質在麵糰中扮演重要角色。麵筋在搓揉麵糰時產生彈性，容許發酵並給予烘焙製品組成特定質感。彈性麵筋按比例含有筋性。

麵筋排序混亂而導致乳糜瀉菌感染，這不正常免疫反應會令到麥膠蛋白未能消化而中斷。由於麵筋排序混亂增加而影響到筋性運作，麵包師會推薦沒筋性的麵包。



# different kinds of wheat 不同種類的小麥

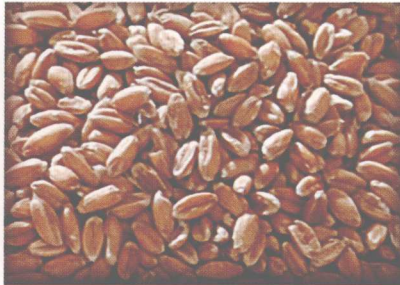
*Mainly, wheat used for bread flour originates from the USA, Canada and Australia. Other countries are also producing wheat, but in general, they also import wheat from these countries. The most popular kinds of wheat grown for the production of flour are:*

用以做麵粉的小麥，主要來自美國、加拿大和澳洲，其他國家均有出產小麥，不過主要生產國均來自前述的北美和澳洲等地。一般常用的小麥種植種類如下：



**Hard Red Winter 冬天硬紅麥**

Fairly good protein levels; good milling and baking characteristics. Used to produce leavened bread. 優質蛋白質層，適合研磨和能配合烘焙特質。一般用作生產發酵麵包。



**Hard Red Spring 春天硬紅麥**

Contains the highest percentage of protein, making it an excellent wheat for bread flour with superior milling and baking characteristics. 含有豐富蛋白質，這種極品小麥經細心研磨成麵粉，可以製造出極品麵包。



**Soft Red Winter 冬天軟紅麥**

High yielding, but moderately low in protein. Used for cake flour. 高收成，但是蛋白質含量不高，可造餅粉。



**Durum 硬粒小麥**

One of the hardest kind of wheat; mainly used to make semolina flour for pasta production. 一種很硬的小麥，主要用作製作粗麵粉以生產意大利式粉麵類製品。



**Hard White Wheat 硬白小麥**

Closely related to red wheat (except for color genes), this wheat has a milder, sweeter flavor, equal fiber and similar milling and baking properties. 與紅小麥特質差不多(除了顏色基因)，這款小麥柔軟、含甜味，纖維質平均等，研磨及烘焙特質相類似。



**Soft White Wheat 軟白小麥**

Used in the same way as Soft Red Winter (for bakery products other than bread). Low protein, but high yielding. 它的用途與冬天軟紅麥類同(除了造麵包，也適合一般烘焙製品)。蛋白質含量低，但是屬高收成的小麥。