



Technical Paper

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BISCUITS, COOKIES AND CRACKERS

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The term biscuit has come to describe different products in different parts of the world, though commonly it refers to baked cereal-based products with a low moisture content and hard-eating texture. Biscuits have been made for hundreds of years and it is possible that the term is derived either from the Latin *bis coctus*, or the Old French “bescoit” meaning twice baked. These names make reference to the practice of first baking the biscuits in a hot oven and then transferring them to a cooler one to complete the drying out process (i.e. twice baked). The low moisture content of biscuits makes them generally free from microbiological spoilage and gives them a long shelf-life. This long shelf-life together with their high energy density, has made them popular with travellers and explorers over the years, and biscuits still form a significant proportion of emergency food supplies. The majority of biscuits are characterised by a low moisture content (commonly <5%) which delivers the characteristic long shelf-life and hard texture. Biscuit textures are modified through the addition of ingredients to create shorter or flaky (in the case of crackers) eating qualities.

The most common biscuit types are based on wheat flour and may be broadly classified according to the level of gluten formation that is achieved or is desirable, during mixing. This ranges from almost no gluten formation in the manufacture of wafer batter to the significant development in the manufacture of crackers. The formation of gluten or otherwise in biscuits doughs is the primarily the result of using lower water levels than with bread, and the choice of recipe fat and sugar levels. Both fat and sugar interfere with gluten development so that the higher levels of these ingredients in short-dough and cookie recipe limits the level of gluten formation by comparison with the semi-sweet or hard dough biscuits. While recipe fat levels may be relatively high in the case of crackers, the method of incorporating the fat between dough sheets allows significant gluten formation to occur when mixing the base dough of crackers.

As well as being characterised by the recipe and level of gluten formation in the dough, there is a close and sometimes, complex relationship between formulation and biscuit dough processing method. The evolution of modern, large-scale biscuit dough processing methods has enhanced this close relationship between the mixing equipment and biscuit types and is to some extent, used as the basis for classifying biscuit and cookie types (as discussed below).

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Short-dough Biscuits and Cookies

Such biscuits and cookies are based on recipes with relatively high levels of sugar and fat, together with low recipe water levels which give doughs with short, crumbly textures and limited gluten development.

Short-doughs may be mixed using a single-stage process, though multi-stage processes are commonly used to ensure the uniform dispersion of ingredients, to avoid the loss of gas resulting from the raising agent action and most importantly, to restrict gluten development.

The formation of individual dough pieces from the bulk dough may be achieved in a number of different ways, including:

Rotary moulding

This processing method is suitable mainly for doughs of a relatively dry, crumbly nature. It is the most popular process for manufacturing short-dough biscuits as there is no waste to recycle and because a rotary moulder occupies a comparatively small area of factory space.

The dough is pressed into moulds to form dough pieces with various surface designs. The dough coats a feed roller and is forced into the engraved moulds in the moulding roller, a knife scrapes excess dough from the backs of the moulds and the dough pieces are extracted onto a fabric band by the suction pressure of the extraction roller. Rotary moulding cannot normally be used for very soft or sticky doughs as they are difficult to extract from the moulds.



Control of dough consistency is very important in rotary moulding because dough piece weight at fixed moulder settings is dependent on dough consistency. Firmer doughs give higher piece weights because the doughs are more compressible. Doughs become softer at higher temperatures and if higher levels of recipe water or fat are used.