

ALPISTE (Canary seed) Processing Optimization and Dehulling/Milling Quality

Information regarding the impact of processing on Canary seed dehulling and milling quality is vital to food processors. Canary seed kernels have hulls that must be removed prior to milling and/or incorporation into foods, a process known as dehulling. Complete removal of the hull from the groat is often necessary for good milling, baking and sensory quality of cereal grains.

Considerations for optimization:

Tempering

Moisture adjustment prior to dehulling can positively influence the process by improving the separation of hull from the Canary seed groat. For example, in an experiment looking at four Canary seed lines, tempering Canary seed to 18% moisture gave the greatest dehulling yield using a compressed air dehuller.

Type of Dehuller

There are several methods that can be used to mechanically dehull Canary seed including compressed air, abrasion or pearling, and impact dehulling. Each method will have differing optimal conditions for separation to achieve maximum yield while maintaining intact Canary seed groats with low abrasion or breakage.

Breakage and Abrasion

Visual score systems have been developed to assess the amount of whole Canary seed remaining (Figure 1) and the amount of abrasion (Figure 2) resulting from the dehulling process.

Remaining Whole Seed

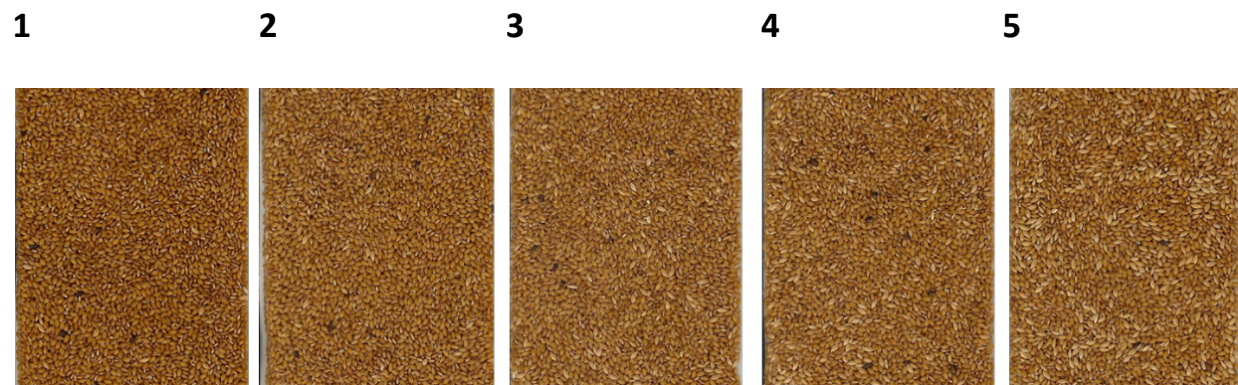


Figure 1. Visual score reference photos for assessment of the amount of whole Canary seeds remaining after dehulling.

Abrasion Visual Score

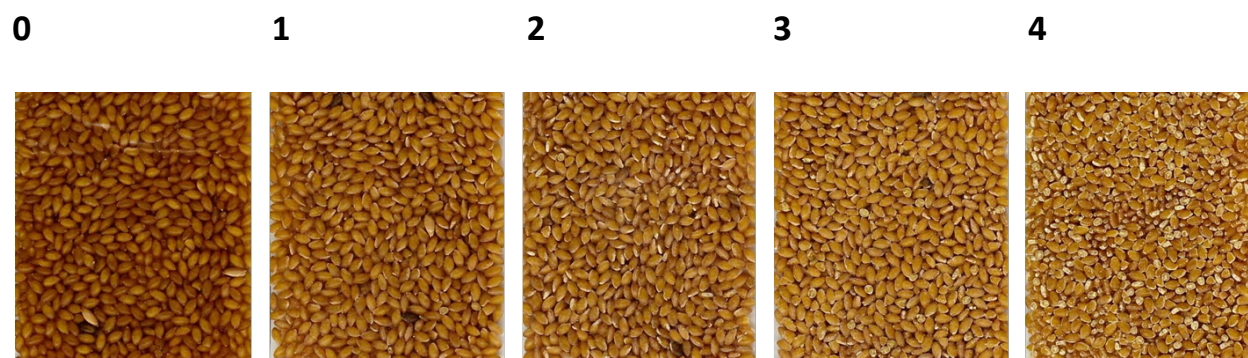


Figure 2. Visual score reference photos for assessment of the amount of seed abrasions resulting during dehulling. A score of 0 is the target while a score of 1 or 2 is still considered very good quality.

Dehulling Yield

Knowing the weight of crude Canary seed required to meet the processor's needs for a particular end product is important; this is because the inedible Canary seed hulls do not contribute to the final weight of cleaned grain, and loss due to breakage and abrasion during processing may also occur. Preliminary research has shown that when the Canary seed grain is tempered to 18% moisture and is dehulled using a combination of compressed air (Codema dehuller) and hand peeling/sorting, approximately **70-75% by weight of cleaned groats can be attained**. This includes cleaned but broken groats. Under these ideal conditions, the minimum weight of whole Canary seed needed to achieve 100 kilograms (kg) of cleaned groats would be between 133 and 143 kg whole Canary seed.

Dehulling yield (also referred to as milling yield in the case of oats) is defined as the mass of whole Canary seed (kg) required to yield 100kg of whole groats.

Optimal dehulling yield will depend on the dehuller used, other processing conditions, the particular end product (e.g. flour vs. whole intact groats), and factors such as growing year and Canary seed variety, as shown below.

Variation in Dehulling Quality due to Growing Year and Canary Seed Variety

Dehulling quality of cleaned Canary seed groats grown over two years

Year	Variety	Colour	Cleaned Groat (% of whole seed)	Remaining Whole Seed	Abrasion Visual Score
2018	C10045	Yellow	60.19	1	0
2018	C12011	Brown	58.91	1	0
2018	CDC Calvi	Brown	60.46	1	0

2018	CDC Cibo	Yellow	65.50	1	0
2019	C10045	Yellow	59.60	2	0
2019	C12011	Brown	57.64	3	0
2019	CDC Calvi	Brown	60.26	2	0
2019	CDC Cibo	Yellow	61.45	2	0

Although all four Canary seed varieties grown in two growing years had acceptable quality, significant growing year and genotype effects were seen. Interestingly, statistical analysis showed that variation in remaining whole seed was affected by growing year, while the amount of cleaned groat achieved was more strongly influenced by Canary seed variety.

These findings indicate that dehulling process conditions may need to be optimized based on Canary seed variety and/or growing year.