C&A – Q&A

What is a Lactone?

Why are Lactones important in the Flavors & Fragrance industry?

Lactones are used extensively in the flavor & fragrance industry. We sell many types of lactones and we are often asked what a lactone is? To fully explain lactones requires a lesson in chemistry but we will try to keep this explanation simple

First let's looks at some definitions that you might see or find when searching for info on lactones:

Lactone is an organic compound containing an ester group –OCO-as part of a ring

Lactones are cyclic carboxylic esters

Lactones are cyclic esters formed from hydroxyl acids

Understanding the chemistry of lactones can be complicated but let's try to look at a small amount of lactone chemistry and why lactones are so important to the flavor and fragrance industry

Lactones are a class of organic compounds formed from hydroxyl acids & containing the group – (CO) OC- where carbon atoms are part of a ring. Lactones are known with rings of all sizes from small to large from single rings to multiple rings. The term lactone has its origin in a compound known as a lactide, which is formed after lactic acid is dehydrated. They are named by adding a Greek letter as a prefix and the word lactone as the suffix. The prefix suggests the number of rings a particular lactone has. Gamma lactones are 5-member lactone rings and Delta lactones are 6 member. Gamma and decalactones generally have a sweat, creamy, fruity aromas and are very important to the flavor and fragrance industry

These cyclic compounds are found in many natural products and contribute significantly to the flavor of these products. From simple to complex many simple examples of lactones occur in essential oils but their levels are typically low because the molecules are heavy and do not pass to the oil as part of steam distillation. Lactones are also found in fruit and in unfermented and fermented dairy products. Lactones are therefore very useful in many flavors and fragrances. Lactones are used to flavor foods and add fragrance to them. Here are some examples of lactones flavor profiles:

Gamma decalactone, which has a coconut-peach like odor; in dilution peach taste

Delta decalactone, which has a creamy coconut/peach flavor

Gamma dodecalactone, which has a characteristic fatty, fruity, peach odor, milky-peach taste

Gamma octalactone, which has a sweet-coumarinic, coconut-like odor and taste

Gamma nonalactone, which has strong, fatty, coconut odor and taste

Gamma valerolactone, which has a sweet hay-like, coumarinic odor and coconut taste

Gamma hexalactone, which has a coumarin-like, sweet odor and taste; creamy note

Gamma heptalactone, which has a coconut, hay-like, coumarinic odor

Gamma undecalactone, which has a strong fatty, Peach-Apricot odor; Peach taste in dilution