UNDERSTANDING "SOLVENTS" IN YOUR SAMPLE

A statement from the Association of Commercial Cannabis Laboratories (ACCL), Residual Solvent Working Group

Organic solvents are commonly understood to be poisonous, flammable, and toxic to humans and the environment. While this is often true in large doses, not all solvents are equally toxic, and many of them are even produced by natural processes.

The Food and Drug Administration (FDA) requires residual solvent testing on any food or pharmaceutical that has been exposed to solvents, and has assessed their toxicity within a United States Pharmacopeia (USP) monograph [3]. USP <467> divides solvents into Class 1, 2, and 3. Class 1 solvents are to be avoided and have very low thresholds for passing. Class 3 solvents – including acetone, ethanol, isopropanol, pentane, and heptane – are all considered to be very low risk when present at less than 5000 ppm (0.5% of the sample). Class 2 solvents have potential toxicity and have action levels that reflect this. Butane, propane, isobutane, and isopentane are not listed, and are considered by the FDA to be "Generally regarded as safe" (GRAS)[7]. On the other hand, benzene – a Class 1 solvent - should never be present at any detectable level.

Unfortunately, residual solvents regulations used by the pharmaceutical and the herbal products industries have yet to be recognized by the *Cannabis* industry. Complicating the issue further is the fact that ethanol, methanol, acetone, and isopropanol are commonly formed in nature[1,2,4,5]. Some are a product of terpene degradation, while others are released when a wound is created in the leaf (trimming). These compounds are formed by natural processes and should be considered endogenous to the plant material. In the same way that further processing can concentrate the cannabinoids, these solvents can also be concentrated during that processing. While this list may not be comprehensive, there is ample evidence that ethanol, acetone, isopropanol, and methanol are all known to be produced during the life cycle of plants, and can be expected to be found in both concentrates and flowers regularly. *Cannabis* testing labs nationwide have recognized this phenomenon[6], and have developed rigorous controls to preclude the possibility of in-house contamination.

Another question routinely put to laboratories regards the consistency in results between labs and even replicate testing within the same lab. Given the extreme volatility of residual solvents, variation in test results is to be expected. This volatility is recognized visually when purging an extract, but the changing concentration of solvent will continue throughout the life of a concentrate. Even within the same batch there can be expected to be some significant variability between samples. The critical thing to understand is that most of these components are rarely present at concerning levels, and nearly all will be destroyed during combustion.

This is not to say that residual solvent testing is superfluous. Use of lower-quality solvents such as white gas or "lighter-fluid" butane can contain hazardous levels of dangerous compounds such as benzene, ethylbenzene, and xylenes. Testing for these contaminants is a valid quality measure, as these compounds meet the requirements.

Until federal guidelines are created for *Cannabis* products, states and municipalities are left to develop their own regulations and limits. Many of these solvents are naturally present in foods, plants, and the environment, and should not be considered contaminants. This is understood when dealing with foods and pharmaceuticals, and *Cannabis* should be treated the same way. Treating all solvents equally through the use of blanket bans and universal failure thresholds simply doesn't make sense when comparing carcinogens to commonplace ingredients in our daily life. The ACCL urges regulators to embrace the existing standard of USP <467>, and encourages all parties to accept and realize the difference between benzene and ethanol.

REFERENCES

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