Cannabis Potency Testing Needs to Be Done the Right Way for Consumer Protection

An increasing number of people are drawn to explore cannabis as an alternative to traditional medicines. There may be many reasons for this, including the realization that cannabis may serve as an alternative to expensive pharmaceuticals, avoiding the side effects from traditional medicines and the hope for relief from symptoms that current treatments have not realized. Many consumers experiment with cannabinoid-containing treatments not fully understanding the basis for their choice, i.e. why certain products may be better than others, or how the different cannabinoids extracted from the plant work together in your body.

We respond to cannabinoids because every cell in our body expresses proteins that bind to cannabinoids and through these interactions, tell the cells how to change their internal functions. The ability of single or combinations of cannabinoids to evoke changes in our body is correctly referred to as their potency. For example, cannabinoids that can trigger a specific biological response at low doses are considered more potent. The major unappreciated problem described in this Op-Ed is that this assumption is not necessarily true for products made with cannabis extracts that contain multiple cannabinoids.

Testing products for the percent of each cannabinoid relative to the amount of plant material tested (the current state regulated compliancy testing) indicates purity but not potency. The error in inferring product potency from chemistry alone is rampant in the industry and among consumers. The problem largely comes down to there not being enough research on how individual and combinations of cannabinoids act on human cells. Therefore, potency must be quantified using laboratory methods that rely on living cells. Animal testing and human clinical trials will be important for FDA drug approval, but these methods are too expensive and not practical at the industrial scale. Animal and human testing also are not practical to guide new product engineering or batch-to-batch consistency testing.

Nebulous vetting of product claims is a general problem in the nutraceutical/alternative medicine industries and not unique to cannabis. The amount and quality of research on cannabis and its effects on the body is likely to increase in the near future as more and more reputable labs move past the stigma associated with being a “pot testing lab” and as federal regulation of cannabis is relaxed. For the immediate future, the industry should adopt its own commercial biological testing that can demonstrate dose-dependent potency of products prior to marketing and sales.

Current state regulations and the global cannabis industry do not require proof that products actually work and have the intended effect on human biology. This does not stop marketers from suggesting numerous benefits and uses of cannabis products. The industry has become comfortable leaving product validation up to the consumer in what history will view as the largest uncontrolled, undocumented clinical trial on the planet.

The failure of the industry, states and the FDA to appreciate the need for biological potency testing has already created customer confusion, dissatisfaction and the continued marketing of products with unclear benefits. Consumers should not have to know the scientific details of cannabinoids and the endocannabinoid system to make an informed product choice. This understanding should be spelled out for consumers in lay terms through appropriate product testing and labeling.

All prescribed and over the counter treatments have to undergo testing prior to reaching the market using three validation criteria: (1) the chemical purity and abundance of active ingredient(s), (2) the activity and potency of the active ingredients for specific interactions in or

on our cells that are involved in health and disease and (3) the product's lack of serious toxic side effects. In contrast, cannabis compliancy testing requires: (1) measuring the amounts of 6 to 12 cannabinoids (and terpenes) in the product and from this, inferring biological potency and, (2) testing the product for known toxins (e.g. solvents, heavy metals, pesticides, herbicides and filth). Products as such, are considered safe for human consumption if chemicals on a list are not found in the product. What about things that could be hazardous but are not on the list? The extracts that go into products should be tested on human cells to show that they do not harbor inherent toxicity and are safe at various doses. There are many studies on cannabinoids and their effects on biology reported in the literature. Relying on these studies to support product claims without verifying the claims through biological testing assumes that what is said to be in the product is actually there. Such claims also rely on a body of research literature that was discouraged by federal regulation and therefore lacks depth and proven reproducibility.

Processors involved in extracting and developing cannabis products should know and report to consumers the relationship of their product's potency relative to defined endocannabinoid receptor activity and the mechanism of action in response to different doses. This is especially true for products containing more than one cannabinoid and terpene. As long as companies are conducting only the mandated compliancy testing, products will continue to flood the market that may have little to no real value. The argument that this will add a cost burden to processors is not supported by the fact that laboratory tests for biological potency use less than a tear drop of extract and are conducted robotically at the micro scale.

Beyond smell and taste, we understand even less about terpenes in cannabis extracts and their interactions and effects on human biology. The scientific literature used to support health benefits is scant. I have not focused in this Op-Ed on the limitations of current terpene compliancy testing, but I have little doubt that measuring amounts of terpene chemistries in a product will not be sufficient for making claims of product potency and benefits. Rather, product potency will be better determined and standardized through biological testing of terpene effects on human cells in combination with cannabinoids.

Disclosure: The author is founder and CEO of Cannametrix, LLC and has commercial interests in providing biological potency testing to the industry. An example of an industrial method currently in play has been described by CannaMetrix. LLC (http://cannametrix.org).

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