LSD Purity: Cleanliness Is Next To Godliness

by Bruce Eisner

Originally published in *High Times* January 1977

In the late 1940s, psychologists began experimenting with LSD as a "psychotomimetic" drug - one that causes the taker temporarily to mime the condition of psychosis. Some experimental subjects, however, and eventually some modern mystics like Aldous Huxley, Allen Ginsberg, and Alan Watts discovered in LSD a shortcut to the ecstasy and egolessness of nirvana. LSD was recognized as the switch that turned on the clear light of the void.

Today's acid trip, however, is far more likely to resemble a live TV broadcast in runny color from the from seat of a roller coaster or a scene from *The Exorcist*. The decline in psychedelic quality over the years, which resembles the degeneration of Christianity and Russian Communism, has been a consequence of greed and opportunism on the part of manufactures and distributors. They offer to substitute immediate sensory gratifications for the original spiritual ideals. But the history of underground chemistry is also one of ingenuity and courage though influenced by haste and amateurishness. Its is the story of how LSD-25, the most powerful and spiritual molecule known to humanity became a "street drug."

Originally all LSD was made by Sandoz Pharmaceutical company, which had developed the chemical and hoped to market it commercially. It came in glass ampules filled with blue liquid, or small tablets in bottles with pharmaceutical labels specifying strength.

With underground LSD use came underground manufacture. The first recorded underground laboratory was set up by Bernard Roseman in 1962. Roseman, who now lives in seclusion in Oregon, was later arrested for allegedly attempting to smuggle 62,000 doses of LSD. In his *LSD and the Age of the Mind*, he has this account of the first manufacture of LSD of less than pharmaceutical quality:

> "I have already invested a year - on and off - and all the money I could save on this project, and I was at the point of admitting defeat. At this time, I was naturally reading everything I could lay my hands upon about ergot alkaloids. I stumbled upon a few articles that at first seemed quite unrelated to LSD, but they were logical and worth a try; because by comparison the process was exceedingly simple, compared to Hofmann's monumental preparation.
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> I obtained new starting material and worked it up to the point I was sure was correct, where I had *d*-lysergic acid monohydrate, quite useless by itself but the prerequisite for making LSD-25 by any system. The rest of my ordered materials arrived and I was ready to proceed. After so many repeated failures, I couldn't accept the possibility that this few-day procedure would work.
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> I went ahead nevertheless, though pessimistically, so that my seemingly apparent failure would not bother me too much. I worked with extreme care, protecting anything from heat and light. At the last step, when I was recrystallizing the few grams I had obtained, I was filtering the crystals off by vacuum and using ether. When all the ether evaporated , the substance started to absorb moisture from the atmosphere and was turning black before my eyes. All my work was gone: I stood there shocked unable to move for a moment. My hands instinctively grabbed an alcohol bottle and I pored it over the black decomposed material hoping to salvage something. I separated it with water and disheartedly took the black mess home. All night I tossed and turned and dreamt horrible, unrelated dreams.

> At the first crack of dawn, I jumped out of bed, grabbed the flask from the refrigerator, poured a teaspoonful and drank it down. I went back to bed and turned on Wagner's *Parsifal*. Minutes passed by and nothing seemed to happen. I had psychologically prepared myself for failure, so I just closed my eyes and lay back an listened to the wonderful sounds of Wagner. In my concentration, I failed to notice that the music was getting slowly louder and instead of just my ears hearing, all my senses seemed to encompass the sound., and instead of hearing the music - I was the music!
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> Beautiful, soft colors emerged and exploded as climates of tone were achieved. An immediate understanding of the composer's intentions was revealed to me; I was being taken on a heavenly excursion into the world of pure sound and emotion. All at once, I sprang up with joy. I was in the state of LSD - my own LSD which I had made. I was deliriously happy and proud of my success."

LSD is a translucent crystal; this was a black mess. Thus, the first underground LSD was also the first impure batch, and its distribution may, somewhere, have incurred the first unfavorable consumer reaction.

By 1965, use had increased sharply. Most acid at this time came in sugar cubes dropped with liquid Sandoz or some type of underground LSD. What percentage of the material was Sandoz is left to future determination. Augustus Stanley Owsley III, unable to obtain any pharmaceutical LSD, began to manufacture his own - first in Los Angeles in '65, then in nearby Point Richmond in '66.

Owsley's fellow alchemist, Tim Scully, admitted to me that the 1965 batch was impure, but claims that Owsley and he perfected a purification process in 1966. Many who used both Sandoz and Owsley - the latter came in tablets of purple (Purple Haze) and white (White Lightning) of 270 micrograms - say that Owsley acid was less mystical and had more stimulant side reactions than the Sandoz product.

Dr. Timothy Leary, who realized that impurities were a threat to the spreading psychedelic revolution, uttered prophetic words of warning at a Senate committee hearing in 1966, in exchange with Teddy Kennedy:

> Senator Kennedy of Massachusetts: "What is it in the quality that you are frightened about?"
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> Dr. Leary: "We do not want amateur or black-market sale or distribution of LSD."
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> Senator Kennedy: "Why not?"
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> Dr. Leary: "Or the barbiturates or liquor. When you buy a bottle of liquor-"
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> Senator Kennedy: "This is not responsive. As to LSD, why do you not want it?"
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> Dr. Leary: "On possession?"
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> Senator Kennedy: "Why do you not want the indiscriminate manufacture and distribution? Is it because it is dangerous?"
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> Dr. Leary: "Because you do not know what you are getting..."

Despite Leary's warning, LSD was made illegal on October 16, 1966.

Owsley acid was the first large-scale commercialization of LSD. There were other smaller LSD laboratories before Owsley, and there were scores of laboratories that put out LSD at the same time that Owsley did. Some were making LSD of a purer form; the majority made it much worse.

After Owsley was arrested in 1967 at his tabbing facility at Orinda, California, his protege Scully set up a laboratory with Nicholas Sand, another alchemist long involved in the psychedelic scene. They manufactured a quantity of ALD-52 - a cousin to LSD, which they called Sunshine - in large crumbly orange tablets of 270 micrograms or so. [Erowid Note: Though it was claimed at the time that they were producing ALD-52, it has now been clearly confirmed that the chemists lied about producing ALD-52 as a legal maneuver and were, in fact, producing LSD. See Ask Erowid: Was Orange Sunshine actually ALD-52?.]

In the spring of 1969, Ron Stark, then a chemist with a European LSD factory and now a fugitive, allegedly began supplying underground acid to the Brotherhood of Eternal Love. Since the Brotherhood was also, by this time, distributing ALD-52, and since both drugs were tabbed into identical pills (except for a few early blue tablets of ALD-52), many people didn't realize that there was more than one kind of Sunshine. Many counterfeit versions soon appeared on the market, most of which were impure, according to Scully.

Sand and Scully ceased manufacturing, but Stark went on to produce over 10 kilograms (over 35 million doses in crystal form) of what became the famous Orange Sunshine - the last of which actually appeared in large red and green tablets called "Christmas Acid."

With the Sunshine boom came increased reports of side effects. In addition to stimulant reactions and symptoms akin to those of strychnine poisoning being reported, there seemed to be something missing in the spiritual dimensions of this new underground acid. Michael Hollinshead, who gave Leary his first taste of acid in 1960, later wrote in *The Man Who Turned on the World*:

There was now (1968) little good acid around, and what there was - the so-called "street acid" - came mainly from California. There was something wrong with the synthesis; it was not pure. And you were never sure what it was exactly that you were taking, so I only dropped it on those rare occasions when someone gave me "Sandoz" or "crystal" acid...

My evaluation had nothing to do with the notion that a wholly synthetic drug produced a wholly synthetic experience - the intellectual response - but was based on direct, first-hand experience (about 30 trips with street acid in all). And in each session I felt that there was something it lacked - it was too "electric," too "speedy" and too "mind-shattering." The earlier clarity of "insight" which I had obtained via the Sandoz acid was replaced by confusion, brokenness, words and worlds thrown into absolute dismemberment, or even absolute chaos, though, I must add, often coupled with a feeling that I can only describe as "sublime inflation," a super abundance of emotive energy, but it could not signify more a passionate flame and less the life-giving sun.

At Woodstock, Hugh Romney (a/k/a "Wavy Gravy") of the Hog Farm announced to the crowd, "There's no such thing as bad acid, just acid that's made wrong." In 1969, LSD began to appear in microdots, and in 1971, on gelatin sheets of various shapes - dubbed "windowpane." The strength of individual doses swiftly decreased, and so did the purity of the average street dose.

In a correspondence with *City* magazine in July 1975, Timothy Leary wrote: "After 1966, my lectures and writings were mainly concerned with a general theory of psychological and political relativity and made little mention of lysergic acid, which in truth, had been driven completely off the scene by Owsley speed, orange amphetamine, and the more commercially and socially acceptable cocaine-heroin trade."

In *Timothy Leary at Folsom Prison*, a filmed dialog made for television but never broadcast, he amplifies: "I don't particularly recommend you take LSD. First of all, 99 percent of what they say about it isn't true." Ken Kesey also had occasion to reflect back on the acid scene in his recent book *Garage Sale*: "I can't really recommend acid, because acid has become an almost meaningless chemical. I mean, the first acid I took was Sandoz, given me by the federal government in a series of experiments (what now, Uncle? Don't give me that anti-American drug field bullshit: you turned me on ...!) and it was beautiful.

"With perhaps the exception of Owsley's work, every bootleg batch I've tried from then on down has been interesting, enlightening, agonizing, bizarre, etc., but never anything as pure."

Many other early trippers, including Alan Harrington (author of *Psychopaths*), Dr. Stanley Krippner (former head of Brooklyn's Maimonides Hospital Dream Lab) and Adam Smith (author of *Powers of Mind* in addition to his Wall Street best sellers), have also noted the decline in psychedelic use and linked it with the purity crisis.

An LSD experience is a complex interaction of five influential factors: set, setting, guide (fellow tripper), purity, and dosage level.

Set refers to the psychological makeup of the LSD tripper, both long term (genetic inheritance and childhood conditioning) and short term (expectations about the LSD experience and how the person feels that morning).

Setting refers to the environment of the trip - indoors or outdoors, "informal suburban house," "formal hospital room," or "windy beach at sunrise."

Set, setting and guide form the fabric of the trip. But before these influences can come into play, alteration in consciousness must occur. Thus, the nature of the biochemical used, its purity and its dosage level are most central in determining the course the session will take.

In its pure form, LSD (*d*-lysergic acid diethylamide) is an odorless, colorless, and either tart-tasting (if in the tartrate form) or tasteless crystal substance. The major pharmaceutical company manufacturing pure LSD, for research purposes, is the Spofa United Pharmaceutical Works in Prague, Czechoslovakia, although it has been manufactured by many others. Besides Sandoz Pharmaceutical Company in Switzerland, there was the Eli Lilly & Company with the patent for the Garbrecht process (the most efficient process for the manufacture of LSD), and Farmitillia of Milan, Italy, which perfected the deep-vat cultivation of ergot, a mold that grows on rye, among other places, and serves as a source for lysergic acid monohydrate, the main precursor of LSD. In addition, a number of U.S. pharmaceutical firms make small amount of LSD for testing purposes.

Today, underground acid comes in many forms; in tablets of varying sizes and colors, in capsules (most popular from 1966 to 1968), as gelatin windowpane (a lamentable hardship to vegetarians, who do not eat cow hooves from which the gelatin is derived), plastic film, blotter paper, liquid vials, and many other forms - just about anything on which a liquid can be dripped has been used. Since LSD is a crystal and the average dose is so small as to be just barely visible, it is usually dissolved in a solvent such as ethyl alcohol and then dropped on some medium buffered with some inert substance. Only if a buffering substance is inert will it not affect the course of action of the biochemical mind-changer.

The most common explanation regarding impurities seems to be adulteration with some other biochemical mind-changer such as speed (amphetamine) or strychnine additives. Yet, as most testing programs and drug information organizations are fond of repeating, there is rarely speed or strychnine in street acid. The most common additive is PCP (phencyclidine,

or Serylan, an animal tranquilizer that causes hallucinogenic delirium reactions), which is also present when street acid is mislabeled "mescaline" or "psilocybin." Synthetic mescaline and psilocybin (usually psilocin) disappeared from the streets a bit after pure LSD did (around 1969), and the only genuine forms of these drugs on the streets now are the organic staples of mushrooms or buttons of peyote. (Note: The acid-PCP combination is sometimes used on store-bought mushrooms, so caution is advised.)

Because of the imprecise nature of the street-drug market, a number of street drug-testing programs were established in the 1970s. These drug organizations have repeatedly labeled most street samples of underground acid as "LSD." For example, the *Straight Dope Newsletter*, a compilation of information from U. S. testing organizations, reported on a total of 209 samples turned in to the various organizations during the period from March 1973 thru July 1973, of which 183 samples were "LSD."

PharmChem of Palo Alto, California, the most noted of the various street drug testing groups, reported in 1973: "Of 405 samples said to be LSD, 91.6 percent were as alleged, 3.4 percent had no drug at all, 3 percent were actually DOM, PCP and others, and 2 percent had DOM, PCP and methamphetamine in addition to LSD."

Contrast these two reports to a survey abstracted in *LSD - A Total Study* (edited by D. V. Siva Sankar): "Marshman and Gibbons tested 519 samples of street drugs for which the vendor's claimed composition was available. Of the samples alleged to be LSD, 44 percent contained LSD with two or more contaminants or even were mixtures of intermediate chemicals resulting from the failed attempts to synthesize LSD."

There is something wrong, something impure about today's "street acid." One possible theory for the degeneration of LSD manufacture is given by Hollingshead in *The Man Who Turned on the World*:

I think the problem for the underground chemists manufacturing clandestine acid was a shortage of ergot, without which the synthesis of d-LSD-25 is impossible. Until 1965, supplies of ergot could be bought with little difficulty from three or four European chemical companies; but pressure from Washington put a stop to this, doubtlessly hopeful that this would lead to an end of clandestine LSD. In one sense, the Federal authorities were right. The underground ceased turning out d-LSD-25; instead, they discovered a wholly synthetic substance akin to *d*-LSD-25....Sure the new stuff "worked" in the sense that any new mind-altering chemical "works" to produce subjective effects within the body, but it didn't seem to produce in those who used it any particular noticeable elevation in either head or heart; at least it was - and probably is - an unpopular view amongst the "congnoscenti" who claim that some of the street acid is capable of producing positive subjective effects of a "long-lasting nature," though they readily admit a lot of the stuff sold as "pure acid" is actually methamphetamine (a potent form of amphetamine first developed by the U.S. Army) or a stripped-down ergotamine compound by modern molecular chemistry.

A more likely reason for the different effects of street acid and LSD is that by-product impurities contaminate the product at various points in manufacture. LSD can be made from lysergic acid derived from either morning-glory seeds or ergot, or from compounds made from ergot - including ergotamine tartrate, a pharmaceutical drug used in treating migraine headaches. LSD can also be synthesized totally from organic chemicals. No matter what process is used, if it is carried forth correctly, the resultant molecule is LSD.

Before LSD was made illegal, the materials for its manufacture could be purchased from a number of chemical companies in the United States and Europe. Most Owsley acid was manufactured from lysergic acid monohydrate obtained from Sandoz before lysergic acid was proscribed. But after 1966, properly prepared precursors were not easily obtainable.

The manufacturing of he necessary precursors is a long process, and a great many new occasions for impurities can arise. During the preparation of the main precursor - lysergic acid monohydrate - various ergot alkaloids and cycloalkamides of lysergic acid will contaminate the final product if not later removed by proper chromatographic procedures. Which contaminants do appear depends on whether the starting material was ergot, ergotamine tartate or morning-glory seeds. And once these proper precursors have been synthesized into LSD, various isomers and *lumi*-LSD (LSD saturated with water) may contaminate the final product if not removed by proper chromatographic procedures.

Thus, chromatography, the highly refined procedure that the organic chemist uses to isolate specific chemicals, is the key process by which impurities may or may not be removed from he eventual LSD crystal.

A passage from *Psychedelic Chemistry*, by Michael Valentine Smith:

There is a great deal of superstition regarding purification of psychedelics. Actually, any impurities which may be present as a result of synthetic procedures will almost certainly be without any effect on the trip.

If there are 200 micrograms of impurities present... and few compounds will produce a significant effect until a hundred to a thousand times this amount has been ingested. Even mescaline, which has a rather specific psychedelic effect, requires about a thousand times this amount.

Most of the books on the market that give details on the LSD process - for example, *Psychedelic Guide to the Preparation of the Eucharist*, by Robert Brown, *Basic Drug Manufacturing* and *The Book of Acid*, by Adam Gottlieb, as well as Michael Valentine Smith's book - fail to describe the efficient chromatographic procedures, like zone-melting chromatography, necessary for the manufacture of pure LSD. Timothy Scully told me that both he and Owsley believed the tolerable limits of impurities to be one tenth of a percentage point (requiring 99.9% purity) - far from the 50 percent figure of Michael Valentine Smith! Until careful studies are done, the true figures for tolerable impurities will remain unknown.

How do these impurities change the optimum course of action of LSD and the experience it creates? One of the theories is that, because *d*-LSD-25 is like a key (its outer electron shell has a specific shape), it fits into a number of tiny locks called "receptor sites." These are located somewhere in the brain - nobody is sure where, but one theory suggests that they might be in the brain stem. It is known, however, that these receptor sites interact only with extremely specific molecular configurations.

The various ergot compounds, cycloalkamides of LSD and *lumi*-LSD plug into the same receptor sites as LSD does. But these compounds evidently don't turn the lock in the smooth, clean manner of LSD. Many of these compounds have effects similar to symptoms of ergot poisoning - the St. Anthony's Fire of the Middle Ages. These symptoms include inflamed joints, headaches, nausea, and hot and cold flashes.

Isomers of LSD are another possible contaminant and indeed are reported present by the drug analysis groups. There are four possible isomers of LSD, but only the *d*-lysergic acid diethylamide form is active. The other rotation forms - *l*-lysergic acid diethylamide, *d* and *l iso*-lysergic acid diethylamide (contrary to recent reports!) - are inactive. they have no pharmacological role, except possibly as a catalyst for some latent effect of LSD, or to block the action of LSD at the receptor site.

If a contaminated batch of diethylamine is used in the manufacturing process, or if the chemist purposely decides to make them, LSD homologues might be present in the final crystal. Molecules similar to LSD in structure but with some addition, subtraction or rearrangement of action, homologues plug into the same keyhole that LSD does.

Some of these homologues have profound effects that vary in course of action and potency. For example, the strongest of the homologues, ALD-52, has 91 percent the potency of LSD and is said to have a slightly different effect upon the mind (there is some dispute about this).

However, as Albert Hofmann puts it in "Drugs Affecting the Central Nervous System": LSD has the highest and most specific effect and may therefore be considered as the genuine prototype of psychotomimetic compounds."

Thus, all impurities found in LSD are like imperfect keys. Such substances as ergot alkaloids, cycloalkamides and other lysergic acid derivatives, and LSD homologues and *lumi*-LSD are drugs that might open the door part way. But only pure LSD opens the doors of perception all the way.

In addition to manufactured impurities, impurities can also arise from decomposition of LSD. Dr. Albert Hofmann points out in his paper "The Chemistry of LSD": "The free base as well as the tartrate of *d*-lysergic acid diethylamide, like all lysergic acid derivatives, is very sensitive to light and oxidizing agents. All preparations must be stored carefully, protected from light and from oxygen of the air, to prevent them from being destroyed within a short time."

Even if, by some chance, an underground batch were made pure, it would turn to bunk in time, especially if put in conventional underground packaging (blotter or windowpane) that does not protect it from light or air. Pharmaceutical LSD is stored in vacuum vials in nitrogen gas. A pure, viable form of black-market LSD should find its way to the consumer in a tablet coated with pure, inert buffering material or in a vacuum vial, but this expensive packaging is certainly not reconcilable with dealing for profit.

Why is it that most of he underground LSD in the United States is made wrong? There are several other possible explanations. One chemist, for instance, told me that it was "because all the pros are out of the field." That is to say, most underground chemists, whether motivated by altruism or greed, are incompetent to manufacture pharmaceutical-grade chemicals.

Moreover, they often lack the money to buy the complicated equipment necessary to produce pharmaceutical-grade materials or to test their final product properly.

Paranoia, too, can lead to faulty manufacture. A chemist often doesn't have the time to do a full scale procedure, or will take shortcuts to limit possible exposure to bursts.

It would help if street-drug analysis groups perfected their methods of analysis. Many such groups do not have samples of the impurities that can exist in street acid, and are therefore unable to identify them.. In addition, their testing techniques are not up to the exacting task of determining the nature of their samples. Most rely on thin-layer chromatography, which can show only that LSD exists in a sample,, but not all of the other impurities lurking there.

In a private correspondence, Dr. Alexander T. Shulgin, a professor of toxicology at the University of California at Berkeley commented:

In the usual analysis of LSD (such as done at PharmChem Foundation) one chromatographs an extract of the suspected drug, observes the resulting separation under UV light, and then sprays the plate with some color-generating agent such as *para*-dimethylaminobenzaldehyde (PDAB). If there are impurities present that fluoresce (such as lysergic acid or *iso*-LSD) and that have mobility in the chromatographic separation, they will be seen. If impurities are present that have the intact indole-2-hydrogen atom, they will give blue to purple colors with PDAB.

Both tests require, of course, that there are amounts present sufficient to be seen. But if the impurity does not fluoresce (as is known to occur with *lumi-LSD* or any of the photoaddition products) or will not react with PDAB (as would be found with 2-substituted impurities such as 2-*oxo*-ergots), then they (the impurities) would remain invisible. It is completely possible that an LSD sample could be grossly contaminated with impurities and, if they did not give any response to one of these two tests, it is highly likely that their presence would never even be suspected.

Again, it would be helpful if street-drug analysis groups started looking for by-product impurities and established criteria for psychedelic chemical purity. They must stop labeling their impure samples "LSD", a habit that suggests purity and thereby creates much confusing in the public mind and among drug writers. Instead they must clearly distinguish between street acid and pure, pharmaceutical LSD. And if they cannot afford the equipment to test LSD (mass spectrometers and electron microscopes), then they should let the public know about their true capacities. For that matter, none of the commercially sold drug-testing kits is capable of determining purity.

Many early LSD users later gave up on acid and tried other methods of consciousness-expansion as available LSD became impure. They thought that LSD did not work any more, or blamed their heads, not realizing it was a change in the nature of the actual chemical. Thus, the increasing number of impurities led many people to repress the mystical experiences they had had, and retreat to a comfortable, "cool" conformity. Or they turned to Eastern gurus and Jesus movements.

I suspect that impurities give people body trips (euphoria) rather than the pure mind trips of LSD (ecstasy). People turned to other euphoria-producing drugs (pot is on of these) because street acid fell into the realm of dishonest dealing games and lost the spiritual qualities of LSD. Just the fact that LSD did not work any more led people into attempts to escape from the all-too-static reality via coke, pot, tranquilizers, alcohol and smack.

As experiences changed, the emphasis among the makers and distributors of LSD changed. In the beginning, the main motivation was spiritual - to turn people on. Much LSD was given for free, and dealing was just an amateur pastime. As LSD became another in a long list of body drugs, avarice polluted the spiritual stream.

The real responsibility for all this lies not with the underground, or even the public, victims of brainwashing with beer and TV, but with the government. Today, a small elite of government-sanctioned scientists controls LSD in the United States. Despite the good their limited research does, their exclusive and narrow-sighted use of these drugs seems sad in the face of the much greater good that psychedelics could do if more widely used. Many suggestions for more rational use include making LSD a prescription drug, creating LSD centers or making LSD a patent medicine.

The psychedelic movement, which has been in eclipse for ten years, will remain dormant until people can get LSD of known strength and purity. Until then, if you are an acidhead, chances are you've never taken LSD.