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My Experience in Coffee Quality!
A Mechanical Nose for Coffee.

Ken Calvert.
Renertech Research.

As a life long mouth breather, with a history of ear, nose and throat problems, I am no Coffee liquorer! Yes I was a Coffee Research Man, but I stuck very much to the mechanical side of processing. If you had a taste problem, tell me what it was, and I could show you how to fix it, but don't ask me to liquor your coffee.

That was until in 1997, we had a Rio problem in Papua New Guinea. Yes even I could taste the bad stuff, a kind of medicinal hospital disinfectant taste, away in the background if you took a spoon of coffee and breathed out through the nose. But the levels and statistics we discovered were really frightening. A good liquorer can detect, TCA, trichloroanisole, a byproduct of mould infection, that's what Rio is, at one part per billion! Whats a billion? A 20 tonne container of coffee for export, holds approximately 100 million beans. And if one tenth of one bean was trichloroanisole, and spread throughout the container, it was a goner! And all it fell on me! What was wrong with our processing practices that allowed this stuff to appear out of nowhere?

As I say, being of mechanical bent, and with a University background I called for help back to the old AlmaMater! Yes, it's the same as 'Cork taint' in Wine! It appears in chickens that have been reared on wood shavings that have been treated with wood preservative. A classic case was of a container of dried fruit that had sweated in the hold of a ship, and the top layer of cartons that the condensate had dripped on were contaminated. Turned out that the starch paste in the cartons had been rot proofed with a chlorinated compound. But the wonderful point was that there was an analytical procedure with a Gas Chromatograph that could detect TCA at 0.01 parts per billion. Voila! A trip down to Brisbane with some samples, a 3 day course in GC analysis, heh I was brought up in the 50s on Bucket Chemistry, and we had some answers. What's a Gas Chromatograph?

Its basically a long thin glass tube in a coil, about 50 metres long and 0.1mm internal diameter, that is coated on the inside with a sticky chemical that will absorb a range of organic compounds. The test solution is injected in the end of the coil which has a small current of pure nitrogen gas purging through it and into a Dectector that draws the graph. The coil is set inside a very sensitive oven that can slowly ramp up the temperature and as one chemical after another reached its volatile limit the original sample is divided up into a succession of smells coming out the other end, one after the other, over a period of 5-20 minutes.

The mind blowing moment however, was when John G affixed a small glass cup onto the output from the Dectector and said, "Put your nose in here!" Wow, a revelation! "Roasty peanut biscuit", Some floral scent? Another floral scent. "Geraniums, I recognise that one!" "TomCats pee Yuk! I know that one too its Geosmin!" And at 7 minutes, plus or minus 5 seconds, There it is! That's it. RIO! With my poor nose I was up with the best of them! And even better, I could add on a graph to my report that read off the concentration in fractions of a part per billion.

O.K. Getting the money for a micro laboratory and the latest model of GC to put in it, at around \$80,000 all up, took some doing. And a weeks course for a couple of our lab girls to learn how to work it meant a 10 day Gig for my University Mate from Brisbane, but the outcome was that Rose S was reporting nearly all our coffee out of one area was reading 0.55ppb Rio. That was well below the level that the smartest Liquorer in Europe could detect it, but it was a wakeup call for our industry.

I am not going to relate the rest of this story, that's commercially sensitive, but I can tell you my subsequent experience with Chromatography as an aid to assessment of coffee quality. Since then, SPME has come on the market. That's Solid Phase Micro Extraction. Using the same cup that the liquorers have sampled, A short piece of thin silica rod is put to soak for a few seconds. The original discovery was made with a bit of Fibre Optic cable. The silica rod is then inserted into the G.C. and depending on what type of coil and detector is used, it will reproduce all the important flavours/odours, spread out over several minutes for accurate cross checking. And, once again a printed graph or list of compounds with their concentrations is recorded for posterity. This is already happening in several countries, and I believe that it will become the normal requirement for every exporter to sell his coffee.

I also believe that a chromatography lab will become the norm for every training institution for coffee liquorers and quality assessment staff. The essential record of each trial is vital evidence in case of disputes and arbitration. Instead of employing three liquorers in important quality assessment, one or two, with a GC printout as confirmation, will be a better result, with a permanent record.

The top of the line models can be fitted with auto changers which can be loaded up with 20-30 samples and set running as the staff go home for the night. They return in the morning to get a complete print out of all the previous periods work!

Nor need it be expensive. Fifteen years down line from that original experience, There is now a very good market in second hand equipment. \$20,000 or less will buy a reconditioned unit out of a University, equal to what we bought as new. And, if I lived in the USofA, instead of New Zealand, I would be looking at buying unreconditioned equipment, straight from the people who used it last, for \$5,000.00., and setting it up for coffee myself. Last month, LabX.com sold an 30 year old model for \$20.00. O.K. it didn't have the attendant computer with the recording equipment, but it had all the essentials that would have teased out a SPME sample of coffee and given a bunch of trainee liquorers a mind expanding experience.

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