

Annex 3 to the GDCh/SEC Open Letter of June 16th 2020 to the European Commission

Regarding the current discussion of more advanced nonselective herbicide technologies in Europe

Main innovation efforts during the past few years of the Specialty Chemical Industry in general and Surfactant Manufacturers in particular have mostly targeted towards

- a) biodegradability and syntheses via biochemical processes and
- b) multifunctionality of adjuvants to add more capabilities to formulations.

There are products already approved and available now and others in active development with performance properties, chemists had not been able to even dream of when their imagination was still limited to categories of Glyphosate and POEA. Innovation has made and is continuing to make fascinating progress on the rather new conceptual basis that active ingredients, each one with its specific chemistry require adjuvants equally with specific, tailormade chemistry in order to create true synergistic units. Thus, it is easier to meet the more and more demanding property profiles of modern pesticide formulations.

There is no lack of new and more advanced products but rather hesitation and even refusal on the part of authorities in charge of approving such new products and product systems. Industry which almost exclusively drives this innovation process regrets that the roadblocks are political in nature and have still a lot to do with the controversies about the IARC-Monograph 112 conclusions. There is still mistrust left toward all kinds of innovation generated by chemical industry. We are convinced that the EU Commission could be helpful to pave the way towards advanced non-selective Herbicide Technologies in Europe.

1. Active ingredients, alternatives to glyphosate

Environmental Associations and Institutions push for pelargonic (CAS 112-05-0) and acetic acid to replace glyphosate as biochemical alternatives (GLOBAL2000.at/glyphosate-alternatives-landwirtschaft); products are approved and commercially available in Austria; “costly to buy but producible by the user” is claimed by GLOBAL2000. Pelargonic acid is also emphasized by (www.ulmer.de pflanzenbauwissenschaften: “Gegen Unkräuter, Moose und Algen”); Supplier in Austria is e.g. W.Neudorff GmbH KG; For facts about pelargonic acid see: www.Pelargonic Acid-EPA;

Nowadays there are already true biological alternatives to classical chemical crop protection products existing e.g. active ingredients based on living microbial biopesticides e.g. fungal spores and many others; these are mostly used as fungicides at present but herbicidal applications are in focus of product development as well. Sufficient viability of tank-mix systems with such living organisms strongly depend on available multifunctional special adjuvants (see below).

University of Tübingen has recently discovered strong herbicidal efficacy of 7-Desoxysedoheptulose (7dSh). This natural sugar derivate may have the potential

to replace glyphosate in future. R&D on this alternative candidate is in full swing; the problem of too fast biodegradation of 7dSh at present should be overcome in not overly distant future.

2. Advanced new adjuvants including alternatives to POEA

In this area agrochemical development has achieved enormous progress. Since several years already various alkylpolyglycosides (CAS 68515-73-1), amines, coco, alkyl, ethoxylated (CAS 61791-14-8), polyglycerol esters of fatty acids (CAS 79665-93-3) and triethyleneglycol-monobutylether (CAS 143-22-6) are on the market and are being used instead of POEA in commercial glyphosate-formulations and other crop protection products. Special new polyglycerol esters of natural fatty acids with hydrophilic or hydrophobic characteristics have been developed recently to provide most favourable performance combinations for adhesion, retention and drift control (*Product Class Representatives Registered in Germany: 8399-00; 00A137-00; OMRI and FiBL-listed*).

Adjuvants of completely new molecular design based on Trisiloxane technology have been synthesized during the past few years. They are capable to combine several desirable features more of a spray than it had been possible with POEA and the other "classical" adjuvants mentioned above. Good spreading or super spreading, rapid uptake and penetration through the cuticula are beneficial features which operate directly on the leaf surface. Even more important requirements on today's sprays are improved retention and minimized wash-off to prevent soil contamination. This goes along with improved rainfastness, reduction of driftable particles and minimized overall spray drift. Another positive side effect of all these new adjuvants is the reduction of active ingredient use-rates.

Biodegradable and water soluble liquid but even solid Trisiloxane compounds on solid carriers - molecules you had not been able to think about only few years ago - have been developed recently and are already on the market (*Product Class Representatives Registered in the UK: 0465, in Germany: 86676-00*). They are suitable for all kinds of pesticides in-can and as tank-mix additives but even for solid pesticide formulations which are becoming more important now. Trisiloxan-type adjuvants are the key to extended viability of spray systems with living organisms.

Another group of revolutionary new, completely natural based chemical adjuvants are surfactants based on so called sophorolipids. They are synthesized by fermentation of vegetable feedstock (sugar, natural fatty acids) using natural yeast strains. (*Product Class Representatives Registered in Germany: 8856-00*). Solid actives can be very homogeneously dispersed in low foaming formulations with outstanding adhesion and retention on difficult to wet leaves.

Another biochemical approach: „Adjuvant A-178® an alternative to POEA in Glyphosate-formulations“ is coming from Shanghai Key Laboratory of Chemical Biology, School of Pharmacy, East China University of Science and Technology. This surfactant “is based on coconut shell extracts.”

Very obviously the highly complex chemistry and biochemistry of the various new actives and adjuvants require deep and special understanding and know how. Market

analyses tell us that Europe seems to have still the leading position in this area. This strength should not be sacrificed by ideological or political hostilities.