June 16, 2014

Biotechnology Regulatory Services
U.S. Department of Agriculture
4700 River Road, Unit 147
Riverdale, MD 20737–1236

SUBJECT: DOCKET ID APHIS-2012-0067 Public comment

I am writing to comment on APHIS’ assessment of the Petition for Determination of Non-regulated Status by J.R. Simplot Co. for a Potato Genetically Engineered for Low Acrylamide Potential and Reduced Black Spot Bruise. I am a Distinguished Professor of Plant Sciences and Director of the Seed Biotechnology Center at the University of California, Davis. I am knowledgeable about crop genetics and biotechnology and particularly seed and reproductive biology. I served as the Chair of the Department of Vegetable Crops at UC Davis and have served as the UC liaison with the California Potato Research Advisory Board for the past 20 years, so I am familiar with issues in the potato industry. I was also a member for 32 years of the Board of Directors of the California Crop Improvement Association, the seed certifying agency in California, which conducts a program specifically in the inspection and certification of seed potato crops.

The information presented in the petition and in APHIS’ Plant Pest Risk Assessment on the biology of the potato, its reproduction and the methods of commercial replication and planting is all correct to the best of my knowledge. Potatoes are propagated almost exclusively by clonal means through the use of seed tubers or tuber pieces. These are grown under certification programs to maintain varietal purity and to meet phytosanitary regulations, and seed tuber production is a distinct and highly controlled operation compared to commercial potato production. Outcrossing is rare or nonexistent, and in any case, would not be relevant to this clonal propagation system. Similarly, any pollen flow from these varieties to commercial potatoes would be without consequence, as it would not affect the tubers produced on such plants. Potatoes are not weedy, and the modifications made in the varieties described in the petition would have no effect on weediness at any rate, as APHIS properly concluded from the evidence. Thus, there is no reason to expect that these varieties will become plant pests. As I noted in earlier comments to APHIS on the original petition, from a reproductive biology (i.e., outcrossing, seed production, etc.) and ecological perspective, there is no reason to believe that these varieties would be pests or result in adverse environmental consequences.

The genetic modifications to the potatoes in the petition result in lower levels of reducing sugars (variably among events) and asparagine, which will reduce the incidence of black spot bruise during storage and the formation of acrylamide during cooking. Both of these traits would address important issues for potato producers and consumers. Reductions in potato quality due to bruising cause financial losses to growers and put additional pressure on land and resources to compensate via higher yields for these post-harvest losses. The presence of acrylamide in fried potato products is well documented, and the proposed modifications offer a simple method to reduce the levels of this toxic chemical in our food. The modifications reduce the level of acrylamide below the threshold for Proposition 65 in California, enabling the industry to provide safer food for consumers and avoid labeling.

While recombinant DNA (rDNA) methods were utilized in creating these potato varieties, numerous and repeated studies have concluded that genetic modifications via recombinant DNA methods result in no greater risks than
those resulting from other genetic modification approaches, including wide crosses, mutation, hybridization, polyploidy and others that are completely unregulated, and which have resulted in only two documented cases of any safety consequences in the entire history of plant breeding, both of which involved intentional breeding for increased insect resistance and known endogenous toxins (in potato and celery). This record of safety is despite the tens of thousands of crop varieties that have been produced using a wide array of genetic modification methods in crop plants for over 100+ years. Thus, genetic modification by non-transgenic means has an almost perfect record of safety, rDNA methods pose no greater risks than those methods, the composition of the products are as expected from the modifications made, and other compounds in the potatoes are within normal ranges, so there is little reason to conclude that there is any inherent safety issue with these varieties. In contrast, the reduced potential for acrylamide production during cooking actually lowers the potential risk and increases the safety of these products for the consumer.

The genetic changes utilized to develop these potatoes are based on the insertion of DNA sequences that produce RNA molecules that block the expression of target proteins (enzymes). This RNA interference or RNAi method does not result in the possibility of production of novel proteins in the plants. Thus, any presumed issues with allergenicity are unfounded. RNAi approaches target and silence specific genes, and data presented supported that this was the case in these potatoes. Other cases where RNAi-related methods have been used, as in virus-resistant papayas, have demonstrated the efficacy of the method and its long-term stability with no associated problems. Silencing one specific PPO gene (among several in the potato genome) in the present case prevented discoloration due to bruising without impacting other possible roles of PPO in insect or disease resistance. Silencing genes associated with asparagine production had the expected effect of lowering asparagine levels with minimal effects on other metabolites, and effects detected (i.e., increased glutamine) were as predicted.

The developer (Simplot) has committed to an Excellence Through Stewardship program to assure orderly marketing of these potato varieties in countries where they are approved. Growers are enthusiastic about the opportunity to bring the advantages embodied by these varieties to the public and are working with food companies to assure identity preservation through the marketing chain. Growers who wish to produce non-GM potatoes and obtain their seed potatoes from certified sources will have no issues associated with out crossing or pollen flow, as can occur in seed and fruit crops. There are no inherent barriers to coexistence of GM and non-GM potatoes in production or in the marketplace with reasonable care during handling.

I fully agree with the conclusions of the APHIS Biotechnology Regulatory Service following its thorough review of the data that these potato varieties should be granted non-regulated status. The changes incorporated in these varieties will have benefits for both producers and consumers, there is virtually no chance of gene flow via pollen to other crops or wild relatives, there would be no ecological or economic consequence even if such transfer were to take place, and it is very difficult to achieve similar genetic changes by conventional breeding approaches due to the genetic polyploidy and heterozygous nature of the potato plant. I therefore strongly support the petition for non-regulated status for these varieties and urge APHIS to allow the commercialization of these varieties and enable their advantages to be realized for growers and consumers.

Sincerely,

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