June 27, 2013

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

SUBJECT: DOCKET ID APHIS-2012-0067-0001

I am writing to comment on the Petition for Determination of Nonregulated Status by J.R. Simplot Co. for a Potato Genetically Engineered for Low Acrylamide Potential and Reduced Black Spot Bruise. I am a 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 19 years, so I am familiar with issues in the potato industry. I am also a member 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.

As nonregulated status for plant varieties developed using recombinant DNA (rDNA) methods is specifically related to the potential for them to become a plant pest, I will address that issue first. The information presented in the petition 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. Thus, there is no reason to expect that these varieties will become plant pests.

Efforts have been made in the past to develop varieties that would be propagated from true (botanical) seeds, but the high level of heterozygosity common in potatoes results in high variability among the offspring produced via seed. Alternatively, reducing this variation often results in loss of vigor and yield. To ameliorate this, hybrids have been made to provide both uniformity and vigor, and while there is some limited use of these varieties, they are not utilized to any appreciable extent in the US. In addition, potato seedlings derived from seeds are weak and difficult to establish in the field, and are slow to develop compared to clonal plants from seed tubers. Thus, even when seeded varieties are used, the seedlings are often first grown in controlled conditions to produce small mini-tubers, which are then distributed as the actual field planting material. As the hybridization to produce such seeds is conducted by hand and is tightly controlled by the companies developing the hybrid variety, there is again virtually no chance that pollen from the transgenic varieties in this petition would have any impact on production of such seed. Thus from a reproductive biology and ecological perspective, there is no reason to believe that these varieties would be pests or result in adverse consequences.
The genetic modifications to the potatoes in the petition result in lower levels of reducing sugars 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 fact that these genetic changes required the use of rDNA technology is irrelevant to the safety of the products. 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 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 proposed varieties were also developed using the Innate® technology, which utilizes only DNA sequences already present in potato rather than any sequences derived from viral, microbial or other species. This further supports a determination of nonregulated status, as no components from known plant pests were used in their development.

It is hard to conceive of reasons why this petition should not be granted immediately based upon the plant pest regulatory authority of APHIS Biotechnology Regulatory Service. 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 nonregulated status for these varieties and urge APHIS to act quickly to allow the commercialization of these varieties and enable their advantages to be realized for growers and consumers.

Sincerely,

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