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GM and varietal registration in Brazil, and the effect of gene editing technology on regulations

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Until the mid-1990s, the share of national breeding companies in the soybean and maize seed markets was over 70% and 30%, respectively, in Brazil. As a result of several acquisitions of national companies, the issuance of the Patent Law and the Plant Variety Protection Law, commercial varieties were introduced by the large multinationals companies, considerably reducing national participation in the market. Multinationals operate R & D strategies that use, in addition to conventional breeding, advanced biotechnology tools such as genomic wide selection and genetic engineering. With these strategies is possible to develop varieties that incorporate characteristics such as herbicide and pest resistance, tolerance to different stresses, and improvement of yield and nutritional value. Globally, this strategy has been successful in the development and commercialization of varieties combining diverse biotechnological tools. Genetically engineered transgenes were able to improve agronomic characteristics leading directly or indirectly to increased grain yield in various commodities in many situations. More recently, a new revolution in the development of genetic variability has arisen. Plants that had their genome edited by precision genetic engineering techniques like CRISPRs, ZFN, and TALEs began to be offered to the market. Hybrids of maize with modified composition of starch, more suited to the industrial process, or mushrooms and apples whose genome has been edited for inactivation of oxidases that cause the post-harvest darkening of the vegetal tissue, generating products with longer shelf life, are examples. Because they do not carry transgenes, these products are not considered GMOs in important countries like the USA, Canada and Argentina. It would be strategic for Brazil to follow the main scientific course, since this will allow national public and private companies to reinforce their presence in the market and the process of developing varieties with high technological value based on precision genomics.