



BIOSCIENCE AT A CROSSROADS: THE FOOD AND BEVERAGE INDUSTRY AND THE NAGOYA PROTOCOL*

The global food and beverage industry relies on biological resources more than any other sector, typically in the form of raw materials from plants and animals, rather than genetic resources. However, scientific, technological and market changes are shifting the way in which this sector uses biological resources, with increasing use of genetic resources in interesting and innovative ways. Sub-sectors focused on novel foods, nutrigenomics, biotechnology, nanotechnology, bioactive ingredients, processing techniques and flavours, for example, are increasingly using microorganisms in bio-processing – to create new flavours, colours or synthetic forms; investigating novel ingredients and traditional foods for interesting bioactive compounds; adding new nutritive ingredients to functional foods; or developing highly specialised medical and personalised foods based on genetic resources. Traditional knowledge is also being used to indicate safety and efficacy. The growing interest in biodiversity as a source of new ingredients, the increasing integration of food with other sectors, such as pharmaceuticals, agriculture, biotechnology and botanicals, and a heightened consumer interest in natural products suggests an upward trend on the use of genetic resources by a small, specialised component of this sector, and therefore a greater relevance of the Nagoya Protocol on Access and Benefit Sharing and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA).

INDUSTRY OVERVIEW AND MARKET TRENDS

- ▶ Retail sales of food and beverages worldwide reached \$11.6 trillion in 2009 and are predicted to top US\$15 trillion in 2014. In 2011, natural and organic foods were estimated to be worth about \$53 billion. The Fairtrade certified market was valued at under \$5 billion in 2009, accounting for less than 2% of the overall food and beverage retail market.

- ▶ The estimated value of the functional food market in 2010 was \$63 billion, expected to reach \$90.5 billion by 2013. The United States is the largest market for functional foods, followed by Japan and Europe, which combined, attract 90% of total sales.
- ▶ Nanotechnology – the science of dealing with matter at an atomic and molecular scale - is growing in the food industry, with a global market of \$5.6 billion in 2012, an increase of \$5.46 billion since 2006.
- ▶ The sector has progressively become intertwined with other sectors such as pharmaceuticals, agriculture, biotechnology and botanicals.
- ▶ Scientific, technological and market trends are leading to greater consolidation and integration within the sector.
- ▶ Customers are becoming more aware of the environmental and social footprint of the products they consume.

RESEARCH, DEVELOPMENT AND TECHNOLOGICAL CHANGE

Research and development (R&D) represents a small proportion of industry investment, with innovation often “invisible” in the final product. Innovation primarily comes from know-how and on-going process improvements to existing ingredients with no known side effects, rather than R&D using new ingredients. Some subsectors are, however, transforming to a medium-high technology industry with greater reliance on innovation and research. Key trends include the following:

- ▶ Increased health and wellness are a major focus of the R&D activities in this sector.
- ▶ There is an increasing intersection of new molecular approaches and food innovation. For example, it has been made possible, through new technology, to identify and screen molecules arising from natural compounds in order to find those that can enhance tastes in products.
- ▶ New uses for nanotechnology are being developed, such as

* This factsheet has been prepared by Rachel Wynberg. For more details, see the policy brief on the food and beverage sector at <https://www.cbd.int/abs/policy-brief/default.shtml/>



the intersection of nanotechnology and biology to create biological systems, and the use of microorganisms to synthesise nanoparticles.

- ▶ The emerging field of nutrigenomics is providing tailored nutritional advice and customised food products for particular individuals or populations.
- ▶ Medical foods are incorporating genetic resources to manage diseases.
- ▶ Microbial organisms are becoming increasingly important, where through biotechnology they are used to produce active compounds in much higher yields.
- ▶ Biosynthetic versions of high-value natural commodities are being developed through partnerships between producers of food ingredients, flavours and fragrances and synthetic biology companies.

RELEVANCE OF THE NAGOYA PROTOCOL: RESPONDING TO SCIENTIFIC, TECHNOLOGICAL, POLICY AND MARKET CHANGE

ABS is very new to the food and beverage sector and the fact that the biological resources are mostly used as raw materials and commodities also means that ABS issues may not be relevant to many users and providers operating in this sector. Some larger companies are embedding ABS in their policies and procedures, but for most companies awareness remains extremely low. Although R&D on genetic resources in this sector is likely to continue to represent a small proportion of its overall portfolio and profits, the upward trend of using genetic resources is likely to increase the relevance of ABS for the sector. Implementation of the Nagoya Protocol can support this process in the following ways:

Providing legal certainty, clear and workable regulations and effective and streamlined measures – The Nagoya Protocol seeks to create an environment of legal certainty and mutual trust by requiring Parties to designate a national ABS focal point to make information available on procedures for obtaining prior informed consent (PIC) and reaching mutually agreed terms (MAT) and one or more competent national authorities to grant access (Article 13). Establishment of an ABS Clearing-House (Article 14) for sharing information will help to ensure transparency and enhance legal certainty.

Supporting the sharing of benefits from the use of traditional knowledge – Through Parties' implementation of Articles 7 and 12, the Nagoya Protocol can help Parties, companies and indigenous and local communities to ensure that traditional knowledge associated with genetic resources is accessed and used with PIC and that MAT are established. The establishment of mechanisms pursuant to Article 12 to inform potential users of traditional knowledge associated with genetic resources about their obligations can assist companies to understand the requirements for obtaining PIC and for the establishment of MAT.

Providing clarity on scope – Most food and beverage products are



based on commodity trade in large volumes, as well as multiple ingredients, many of which are known ingredients with established supply chains that involve little R&D. The Nagoya Protocol, however, focuses on the utilization of genetic resources as defined by Article 2 (c) of the Protocol, and does not include commodities in its scope, or ingredients that are used as raw material. Implementation of the Protocol can help to provide guidance about which resources and activities fall within its scope, thus providing certainty and clarity about ABS implications and requirements. The Protocol also helps to provide clarity about its relationship with the ITPGRFA.

Building the capacity of governments, researchers and companies to engage with ABS and changing scientific and technological developments – The Nagoya Protocol promotes awareness-raising and capacity development for its effective implementation (Article 21 and 22). The importance of building the capacity of country governments to implement ABS measures is recognised, including for the development, implementation and enforcement of domestic legislation, negotiation of MAT, and development of research capabilities to add value to their own genetic resources. The use of codes of conduct, guidelines and best practices and/or standards (Article 20) can help to enhance capacity and compliance with ABS requirements.

Improving monitoring of the use of genetic resources – The monitoring of ingredients incorporated into food and beverage products presents significant challenges due to the multiple ingredients and product lines that are involved across several sectors. Through the checkpoints described in article 17, the internationally recognized certificate of compliance, and the ABS Clearing-House, the Nagoya Protocol can help to monitor the use of genetic resources throughout supply chains and provide evidence that PIC has been obtained, MAT have been established, and that benefits are equitably shared.

Developing regional ABS approaches – Many species and traditional knowledge associated with genetic resources used in the food and beverage sector are widely distributed across political boundaries. Implementation of Article 11 on transboundary cooperation provides important opportunities to investigate common regional or sub-regional approaches for such resources and knowledge. Consideration of the need for and modalities of a global multilateral benefit-sharing mechanism, as stipulated by Article 10 of the Protocol, may also be important in this context.



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