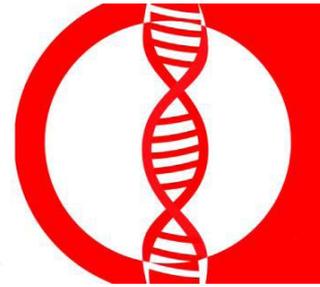


Research Group for Biological Arms Control



Background information for the 2012 BWC-MSP Side Event

Technology, Trade and Transparency – Lessons from Other Treaty Regimes

The use of trade data for enhancing transparency is a rather new concept for the BWC regime. This paper covers some basic information on this issue, but does not integrate the contributions of further panelists, nor does it necessarily reflect the positions of other organisers. We aim to provide delegations soon with an updated version that contains lessons from this side event.

Trade Data

”Cooperation and assistance, with a particular focus on strengthening cooperation and assistance under Article X” is a standing item of the current intersessional process (ISP). While there seems to be no consensus among state parties as to what degree Article X has been implemented, the analysis of trade data might contribute to an empirical baseline for the on-going debate. Article X relevant information can be manifold. Exchange of technology can be understood as the transfer of knowledge to foreign places: either within people’s heads or in the form of tangible equipment. Here the concept of using information on the global trade of biotechnological goods as a source for transparency in the BWC regime is introduced.

Trade data provides information about the trans-border shipment of traded items. Biotechnology has developed into a highly globalised business in the sense that biotechnology companies are active in more and more countries, and that a growing number of countries are entering the age of biotechnology. Reports from consultancy firms usually provide general facts on the development of biotechnology business on the basis of stock exchange quotations and business reports of the main market players. However, there is no good information on the situation in states where biotechnology branches are in early phases of development. Trade data, however, has the potential to display more detailed information on *what items are traded, in between which countries, in which volumes, and how this changes over time.*

Use of Trade Data in Other Treaty Regimes

The analysis of trade data is a valuable tool, as long as trade in the relevant items is not or not completely prohibited. It's especially useful when trade in the relevant items is encouraged by treaty requirements. Unlike export control systems, trade monitoring is not a restrictive licensing mechanism, but the ex-post evaluation of trade flows in the search for certain patterns that can indicate good or bad implementation of treaty obligations. In most cases, though, trade data is not a sufficient stand-alone tool. Hence, the aim of trade monitoring is rather to provide an empirical basis for further inquiry and discussion.

There is a precedent for the use of trade data to track treaty compliance in many varied policy fields. Monitoring mechanisms or independent monitoring actors often employ this data for their purposes: Trade in chemical substances is tracked by the Organization for the Prohibition of Chemical Weapons (OPCW) for the CWC (scheduled substances and precursors), by the International Narcotics Control Board (INCB) for the international drug control treaties (precursors), and by the UNEP Ozone Secretariat for the Montreal Protocol on Substances that Deplete the Ozone Layer (ODS). The EU Joint Research Centre is developing an approach to track nuclear equipment, UNSCOM/UNMOVIC used the analysis of trade data within its inspection regime in Iraq, and the London based NGO Environmental Investigation Agency (EIA) uses trade data for ODS tracking as well as for detecting trade in protected lumbers.

Sources of Trade Data

The starting point in the compilation of trade data is the declaration form for import or export that a company fills out when goods are shipped. The traded good has to be, amongst other things, identified with its commodity code. While the last digits of this code may vary from country to country, the first six digits are worldwide compatible, and identify a specific good or group of goods. These six-digit codes are multilaterally agreed upon in the Harmonized System (HS), a standardized system of names and numbers for classifying traded products, developed and maintained by the World Customs Organization (WCO). While not all WCO members are contracting parties to the HS, all states make use of the nomenclature. 98% of the merchandise in international trade is classified in terms of the HS. The commodity codes are read out by customs services, and via national authorities the information is transferred to databases like UN COMTRADE. Together with the codes, information on the value and volume of shipments is also transferred. The UN COMTRADE database is publicly accessible (however, for the download of large amounts of data users have to subscribe to the premium access service).

Trade Monitoring in the BWC – A Case for Article X

Generally speaking, trade in biotechnological equipment and agents is perfectly legal. The BWC does not regard biotechnology as a weapon. Much to the contrary, it encourages the spread of biotechnology. However, just as in other arms control treaties, regulations against proliferation (Article III BWC), and those that promote the exchange of technology (Article X BWC) are, to a certain degree, contradictory. Since both articles are related to trade issues, trade data could provide information helpful in understanding the extent of their implementation. However, there are good reasons to begin with a focus on Article X, and postpone applying the concept to the monitoring of Article III. First, at the moment only trade in one of the items that is considered relevant for BW programs by UNSCOM/UNMOVIC can be tracked with the available data (biological growth media). Even if this changes in the future (see below), no good criteria are available to assess compliance with the non-proliferation requirement, because discussing implementation of Article III is still a discussion about intentions. Similarly for Article X, there are few measures or indicators available to gauge the extent of its successful implementation. But, even without having specified what dimensions of trade indicate successful implementation of Article X, it is possible to determine whether a country would participate in the market at all, if this participation is developing, who its trade partners are, and to compare it with countries in similar situations.

Expandable Data Situation

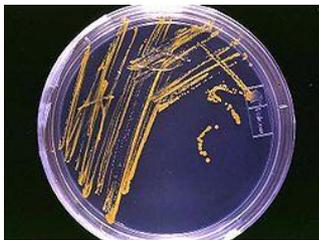
Actually “prepared culture media for the development or maintenance of micro-organisms (including viruses and the like), or of plant, human, or animal cells” is virtually the only biotechnological item individually identified with an HS code. Most other equipment is identified in “basket numbers,” together with other items. Consequently, trade flow of bio equipment cannot be identified against this background of “white noise”. The analysis of trade flow in growth media might, however, provide valuable information on the biotechnological development level of a country. To put it simply, importers of growth media obviously have something to grow. Hence, the development level of national biotechnology branches can be assessed through careful consideration of the available data. However, in order to draw a more precise picture, it would be extremely helpful if more biotechnological equipment would be identified in the HS. A basic selection of relevant items could be taken from the UNSCOM/UNMOVIC items list. Though this list was developed to identify BW programs, the primary aim of trade monitoring is to check compliance with Article X. The list is nevertheless of

help, because in the bio area we have the paradoxical situation that the list of the most BW relevant items is, in large part, the same as the list of the most commercially important items.

A better identification of biotechnology items in the HS might be possible. The WCO sees the HS as a “multipurpose instrument”. Beside its original function of aiding customs and tax authorities, the WCO has amended the HS in the past on the request of multilateral regimes by allocating individual codes for items relevant in the regimes. The Research Group for Biological Arms Control proposes that actors in the BWC consider establishing contact with the WCO in order to initiate an amendment process.

Trade in Culture Media

The HS code 382100 is defined as “Prepared culture media for the development or maintenance of micro-organisms (including viruses and the like), or of plant, human, or animal cells.” There are no further subdivisions (10-digit level) in any of the big supplier states’ national nomenclatures (this has been checked for the US, the EU, China, and India). The definition excludes items like pure agar and yeasts (e.g. for beer brewing), but includes a broad variety of culture media. Culture media are liquid, dehydrated, or gelatinous and come in countless different varieties.



Culture media on streak plate



Dehydrated media



Liquid bulk media

Sorts and areas of application of culture media

Culture media for microorganisms are used for either production or for research/diagnostic purposes.

- Culture media can be undefined or defined. In the latter all the chemical ingredients are known, and no yeast, animal, or plant tissue is present.
- Some culture media used for the growing of somatic cells and tissues,
- Others for the growing of certain micro-organisms (“selective/differential culture media” when only one type of bacteria shall be grown).

- Unspecific media is used for bulk production (e.g. for bacterial vaccines).
- Viruses need living cells. Culture media can be needed if tissue or cell cultures are applied, however, often embryonated eggs are used for the growing of viruses.

Different from culture media for the growth of microorganisms are culture media for the in vitro cultivation of plants. To grow plants that are not contaminated with pathogens, it is common practice to grow them in vitro on sterile culture media. These plants can then be grown vegetatively. Vegetables, such as tomatoes, are increasingly grown on soilless media in indoor cultures. It is not yet clear whether these nutrient media are also traded under HS 382100.

Trade data comes with information on volume and value. Single deals cannot be identified, but it can be estimated whether mainly cost intensive specialised media (relatively high value and low volume), or low priced bulk media (relatively low cost and high volume) were traded. Consequently, the actual data could contribute to an assessment of the implementation of Article X by providing answers to the following questions:

- Does a biotechnology industry exist and/or is it developing,
- Is the focus of biotechnology application on work in hospitals and research laboratories, or are there major production capacities,
- Who are the trade partners (countries), and how do trade relations develop over time?

It has to be stressed that trade monitoring is not the only instrument, but just one of many needed contributions to attain full transparency.

First results

The Research Group has just started analysing global trade in growth media, making use of UN COMTRADE's publicly accessible database. As mentioned above, this database is open to everybody interested in global trade flows or certain kinds of specific trade data. Our first step was to manually download the detached datasets for each country via the interface provided at www.comtrade.un.org. For our (so far) limited purposes we decided to download datasets in the familiar .csv format, visualising them with Origin Labs *Origin Pro 8.5* – notwithstanding the extraordinary personnel expenditure.

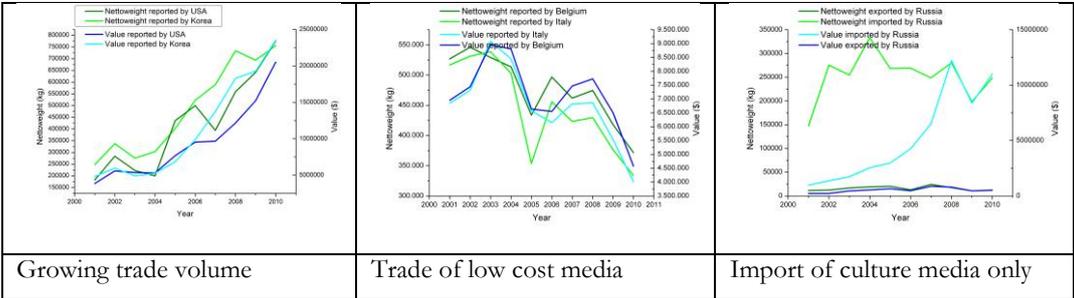
For the future, though, more powerful tools in electronic data processing are already available, allowing continuous monitoring of the trade of biological dual use goods to be a realistic task. The UN COMTRADE datasets can also be downloaded in the universal statistical data format

SDMX. By using SDMX it will be possible to access and visualise the datasets using a predominantly autonomous API (Application Programming Interface), but this requires sophisticated software. This architecture, once installed, has the potential to reduce the personnel expenditure of such a monitoring process to a quantum of what is necessary at present.

Downloads

We downloaded trade flows in HS 382100 from the 25 largest biotechnology countries into the 30 largest biotechnology countries (as in the BWPP-list) for the years 2001 to 2010, taking into account the reports of exporters and of importers. This is shown in some 1.500 data records, and visualized by some 750 graphs. The graphs can soon be found under: www.biological-arms-control.org and are on the CD distributed together with this paper. In each graph reported exports from one country to another are compared against the reciprocally reported imports (e.g. Germany’s reported exports to the US, and US imports from Germany as reported by the US). The graphs also allow the analysis of import patterns, when sorted accordingly (non-existence of a graph means that no culture media was traded between the two countries during the observation period).

Table 1: Examples for visualised trade in culture media



Data source: www.comtrade.un.org

Trade wise Observations

- Total reported exports of culture media reach USD 900 million/year.
- Trade volumes are growing in most of the examined countries (this is at least true for imports – not surprisingly, many countries have not yet developed into exporters of culture media). Hence positive development in the use of biotechnology in these States can be anticipated.
- Within the examined sample, a diverse array of countries such as India, Ireland, Korea, Switzerland and Thailand are among those that have experienced the most impressive growth.

- There are only a few main suppliers (France, Germany, UK, US) who are providing the world with the majority of its culture media. However, upcoming suppliers, such as India, may change this picture in the near future.
- We have not yet checked the volume/value ratio in detail (who supplies/consumes what kind of media?).

Data wise Observations

- There is not a single case where both data sets of reported exports and imports agree with each other; however, the differences vary enormously from case to case.
- As a general rule importers report greater volumes and values than exporters do reciprocally.
- It might be that re-exports are, in many cases, not declared as such (some states are very large market participants, both for exports and imports, although they are not known as major biotechnology players).
- Outliers (extreme values and the like) and “freak data” occur quite often. In many cases it seems quite easy to explain them with missed reporting that has been made up in the following year, but others require further investigation.
- In some cases the traded volume is not reported.

Conclusions and the Way Forward

Trade monitoring could develop into a valuable transparency instrument in the BWC regime. The Research Group for Biological Arms Control has started analysing global trade in culture media and has found that the available information could especially contribute to the debate on the implementation of Article X. Trade in culture media is one of the various indicators for the exchange of technology, and for the stage of development of biotechnology in a given country.

However, there are still some limitations of and for a wider trade monitoring. Most of the necessary enhancements can be done by non-state actors, like the Research Group, autonomously. This includes the implementation of lessons from other regimes, like those covered by this side event, the completion of data and the improvement of IT-solutions for download and processing, the application of statistical methodology, the better visualisation of the information and their combination with other open source data in a common place, and, in co-operation with other experts, the development of criteria for data interpretation.

One main challenge can, however, only be addressed by the engagement of one or more States, or a multilateral actor: Trade monitoring could produce much more detailed results, if the data basis was more abundant. For a better identification of biotechnology items in the HS, the codes have to be further differentiated. An accordant proposal at the WCO cannot be initiated by an NGO.

Sources:

www.biological-arms-control.org

www.bwpp.org

www.comtrade.un.org

www.wcoomd.org

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