

Policy brief on shot wads made of plastic

Opportunities for substituting non-degradable shot wads

Baltic Marine Environment
Protection Commission

Policy briefs



The problem

During hunting with a shotgun, there are two primary waste products: shotgun cartridge shells and shotgun wads. The shell lands near the hunter and is taken home for proper disposal, but the wad lands 20-30 meters away and is often impossible to find. This results in large amounts of plastic ending up in nature from hunting. The hunter does not intentionally discard plastic in nature, but it is an unintended consequence of using conventional shotgun cartridges (Danish Environmental Protection Agency, 2023). In the Danish government's plastic action plan from 2018, it is estimated that hunting in general in Denmark leaves up to 30 tons of plastic per year, solely from shotgun wads (The Danish Government, 2018). Furthermore, it is estimated that from hunting in Danish coastal marine and brackish water bodies alone the total annual discharge is up to 600,000 cartridges (Kanstrup and Balsby, 2018).

600,000 wads are approximately equal to 18 tons if all are left behind.

Since 2018, the game yield has decreased in Denmark, and thus the consumption of shotgun cartridges. In the 2022/23 hunting season, the estimated amount of plastic lost to the Danish environment is closer to a total of 20 tons.

It is currently not possible to give an estimate of the total loss in the HELCOM area due to lack of knowledge of hunting preferences.

The dominance of plastic shotgun wads in the market is due to plastic having several advantages over traditional felt wads. The main advantage is the flexibility of plastic wads due to the small skirt against the gunpowder charge, allowing it to form an effective gas-tight seal between the gunpowder gas and the shot, regardless of the barrel diameter. A traditional felt wad lacks that flexibility. Another significant factor is that loading shotgun cartridges with a

plastic wad is faster and therefore more profitable in the hunting situation than using a traditional felt wad.

In 2021, the market for biodegradable shotgun wads was estimated for Denmark. The market is still developing, but in 2021 three main groups of biodegradable shotgun wads were the most popular: polyvinyl alcohol (PVAL), polyhydroxyalkanoate (PHA), and paper-based wads (Danish Environmental Protection Agency, 2021).

Information has been gathered from European hunting associations in 2023 to map the supply of biodegradable shotgun wads in the EU, and the feedback indicates that there are at least 14 manufacturers of ammunition with "biodegradable" shotgun wads in EU.

The term "biodegradable" should be considered carefully as it might refer to standards for degradation under very specific conditions such as industrial facilities and not under natural environmental conditions with low temperatures, in deep or shallow marine waters etc. Examples have been seen to references to the European standard EN 13432 for industrial composting. It includes ISO 14855 as a test for biodegradation, but at temperatures at 58 °C and a pH value range of 7-9 with a demand of >90% biodegradability within 6 months, which are not ambient natural conditions in the Baltic Sea.

Another term to consider is the "home composting" which does not explicitly refer to specific standards but provides details of the technical requirements that a product must meet in order to obtain such private certification. It refers to conditions that may apply in a garden compost heap with much higher temperatures and much higher biological activities than those that can be found on a cold soil surface or in the waters of the Baltic Sea.



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Alternatives

A couple of examples of different “biodegradable” plastic types or paper/cardboard which shotgun wads can be made of and are available on the market are listed below with a short description.

Polyvinyl alcohol (PVAL)

Water-soluble shotgun wads are made of polyvinyl alcohol (PVAL), with the addition of various additives to give the material the desired strength and color. PVAL is known from products such as dishwasher tablets, where the thin film coating is made of PVAL and can dissolve with the detergent. PVAL dissolves quickly and is biodegradable under the right conditions, but not necessarily completely in a cold environment like around the Baltic Sea, as it takes considerably longer for the degradation in cold temperatures. There is only a small risk of toxic by-products during the degradation of PVAL, and PVAL is not classified as toxic. In degradation tests, PVAL shows approximately the same degradation rate as ordinary cellulose and paper when it is shredded into small particles less than a couple of mm in size. Tests have thus not been undertaken for the whole shot wad as such, but only for shredded material (Danish Environmental Protection Agency, 2021).

Polyhydroxyalkanoate (PHA)

Wads made of plastic that degrades upon contact with soil are made of polyhydroxyalkanoates (PHAs). In 2021, four PHA wads were examined. The results indicated that wads made of PHA would degrade slowly under Danish conditions: temperature fluctuations are estimated to reduce the degradation rate by 3-5 times. In practice, a product that degrades just within the allowed limit of 2 years for “Biodegradable Soil” (certified test method for soil biodegradability) can take up to 10 years to break down in the soil in the Danish environment. In situations where PHA wads end up in an environment with few or no soil bacteria, degradation will be minimal, such as during hunting on the coast or at sea (Danish Environmental Protection Agency, 2021).

Paper or Cardboard

These wads have been successfully used for many years. Paper-based wads can be surface-treated with a plastic-based material to repel moisture and ensure stability, which naturally affects the degradation time. Depending on the type of plastic, it can take a long time for the

plastics to breakdown. It should be underlined, that the amount of plastic contained in these shot wads is much lower than in those made entirely of plastic. In their current form, paper-based wads are more cumbersome to handle in the loading process, as they often consist of multiple components, making the loading process slower.

Availability of wads made of “biodegradable” alternatives (including alternative plastics)

It is in many cases not possible to identify the actual material that is claimed as being biodegradable. Some have a reference to the EN standard EN 13432 or ISO standard ISO 14855, that is not relevant for natural conditions, where the shot wads are left behind.

The rise in greenwashing of “biodegradable” products is thus a growing concern and should be a focus area to avoid misinformation to consumers. It is important to ensure that claims about the environmental benefits of products are substantiated and genuine and relates to environmentally conditions and not under conditions that are only found in situations where the wads are collected and sent to correct handling. On the

other hand use of “conventional” types of plastic that has a degradation time of several decades should be avoided.

Price

An obstruction for using alternatives can be pricing. This is something that can change overnight, but as of spring 2024 a comparison was made based on a random Danish retailer and with the prices at that specific time on the internet page, so the prices are just for comparison between the two types of ammunition.

As it can be seen there is a price difference, but it is also clear that the price in general is around 30-50 % higher. Given the low price per piece this should be acceptable for most.

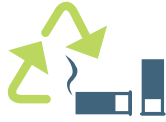
Uses

The problem arises with shot wads containing plastic being used in areas where it is impossible or too problematic to find and collect the wads after firing, which is not the case in shooting ranges where collection is easy and provided there is an obligation to clean the areas with short intervals. The collected wads made of non- biodegradable materials can be recycled which could make them a more environmentally friendly solution if there is an actual collection scheme in place.

"Biodegradable"		"Plastic"	
Type	Price pr. box (25 pcs.) / per piece in EUR	Type	Price pr. box (25 pcs.) / per piece in EUR
Size 3			
BIOAMMO BLUE HP 12/70 3/28GRAM	30.74 / 1.23	GAMEBORE JAGUAR 12/70 STR. 3/30GRAM	17.32 / 0.69
BIOAMMO LUX STEEL 12/70 3/32GRAM	22.68 / 0.9	RIO GAME BLUE STEEL 12/70 STR. 3/32GRAM	15.44 / 0.62 EUR
BIOAMMO LUX STEEL 12/70 3/34GRAM	25.37 / 1.01	GAMEBORE HYPERSTEEL 12/70 STR. 3/32GRAM	18.66 / 0.75 EUR
Size 4			
BIOAMMO LUX STEEL 12/70 4/32GRAM 25STK JAGTPATRON	22.68 / 0.9	RIO GAME BLUE STEEL 12/70 STR. 4/28GRAM	14.09 / 0.56 EUR
BIOAMMO LUX STEEL 12/70 4/34GRAM	25.37 / 1.01	GAMEBORE JAGUAR 12/70 STR. 4/30GRAM	17.32 / 0.69 EUR
Size 5			
BIOAMMO LUX STEEL 12/70 5/28GRAM	18.66 / 0.75	RIO GAME BLUE STEEL 12/70 STR. 5/28GRAM	14.09 / 0.56 EUR
BIOAMMO LUX STEEL 12/70 5/32GRAM	22.68 / 0.90	WINCHESTER STEEL STD PRES 12/70 STR. 5/28 GRAM	22.15 / 0.89 EUR
Size 6			
CLEVER MIRAGE BIO SOLUBLE T3 12/70 STR. 6/32GRAM	18.12 / 0.72	WINCHESTER STEEL STD PRES 12/70 STR. 6/28 GRAM	22.15 / 0.89 EUR

Key messages

Based on the gathered information, the following list of actions can be derived:



Increase knowledge and availability of biodegradable shot wads on the market

There is no general standard for marine biodegradation of plastics. Therefore, the overall recommendation is to avoid the use of plastics as much as possible by applying biodegradable alternatives such as paper or cardboard wads (sometimes found with a thin plastic lining). In parallel, regular updates of knowledge about development towards additional truly biodegradable materials in the (marine) environment could be conducted to ensure that recommendations align with the most environmentally responsible choices. In addition, information about the actual (chemical) composition of shot wads also considering any additives is essential.



Restrict use of non-biodegradable shot wads

If appropriate, a ban or partial ban in certain environments or certain areas may be considered. This ban could exempt shooting ranges, especially if collection is easy and provided there is an obligation to clean the areas in short intervals. Another approach could be to (temporarily) allow a thin “conventional” plastic lining due to e.g. safety issues for shot wads made of other materials. An example could be 5-10% limit of plastic in the shot wad holster.



Economic incentives

As the alternatives are still more expensive, economic incentives could be considered. That could be a tax/levy on shot wads made primarily of non-biodegradable materials while taking into consideration of the appropriateness of the use of the “biodegradable” term. If appropriate a tax/levy could be differentiated, so alternatives to shot wads completely made up of conventional plastics (not biodegradable) could have a lower tax/levy if they still need a thin lining.



Information campaigns

Information campaigns could be organized preferably together with local or national organizations such as hunter’s organizations and, if appropriate, NGOs could promote first the collection of the shot wads and if this is not feasible, the use of biodegradable shot wads. It is important that green washing is avoided.

References

Communication – EU policy framework on biobased, biodegradable and compostable plastics, 2022, https://environment.ec.europa.eu/document/download/14b709eb-178c-40ea-9787-6a40f5f25948_en?filename=COM_2022_682_1_EN_ACT_part1_v4.pdf

The Danish Hunters Association, 2023, Affaldstyper (Types of waste), <https://www.jaegerforbundet.dk/vaben/skydebaner/affaldshandtering/affaldstyper/>

TÜV Austria: <https://www.tuv-at.be/okcert/certifications/ok-compost-seedling-real/>