

Shooting with lead on gelatine and soap

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How are metal fragments from hunting rifles distributed in game meat? To find out, researchers at the German Federal Institute for Risk Assessment (BfR) are using a method that is unusual for food research. At the Ulm proof house with the participation of the German Research and Testing Institute for Hunting and Sports Weapons (DEVA), gelatine blocks of different sizes were shot with hunting rifle bullets. The procedure comes from ballistics and criminalistics. Here one takes gelatine and (ballistic) soap in different block sizes as simulants for tissue. With these experiments, the BfR first wants to investigate which block size is suitable to establish representative studies on hunting-related metal content in game meat. On the other hand, the aim is to standardize test procedure regarding the effectiveness of hunting projectiles (energy output per centimetre penetration depth) in order to be able to compare results nationally and internationally. The first videos of these tests (high-speed recordings) BfR has now on the homepage (<https://www.bfr.bund.de/de/mediathek.html>). The German Federal Institute for Risk Assessment will continue the tests with gelatine and extend them to ballistic soap. This will use hunting rifle projectiles, which are among the bullets frequently used in hunting.

The research team of the department 'Safety in the Food Chain' at the BfR determined in what size, in what quantity and what distribution metal particles from hunting rifle bullets shot in game meat. With the shoots of simulants, the standard of a process in which metal splinters are extracted from the blocks to determine their size and quantity realistically.

The bullet tested is one of those used by hunters rather rarely used and belongs to the very high-energy hunting rifle bullets. Nevertheless, this should also be tested for its effectiveness in simulants (here gelatine 20%). The tests are mainly concerned with the form in which the commonly used gelatine block sizes meet the requirements as test medium used in the bombardment process. For this reason, three of each size were usually tested in gelatine blocks with the Dimensions: 35 x 15 x 15 cm (length x height x width) and 40 x 25 x 25 cm bombarded to clarify whether there is a difference in the gelatine block sizes with regard to the energy release profiles to be determined in the simulant and with regard to the reproducibility of the results. The two videos show that the small block size is not suitable to withstand the very high-energy output of the bullet to the required extent. The blocks show strong expansions from which the energy of the projectile could escape through cracks in the surfaces of the blocks. The larger block size withstands the shown bombardment, as the energy of the projectile leads to cracks inside the gelatine block, but these do not extend to the outside. This allows an energy output profile to be determined by measurement of the cracks that have developed can be derived. Under these circumstances, it would probably require a lot of shootings to obtain representative results. The BfR will continue the tests on gelatine and extend them to ballistic soap. Hunting rifle bullets will be used, which belong to the bullets frequently used in hunting.

Technical data for the shots:

1. Video: Gelatine-klein_Ulm_Schuss2_Block_2_793,63m-s.mp4

Bullet designation: RWS .338 Lapua Magnum SPEED TIP

Bullet mass: 16.2 g

Target speed: $V_z = 793.63$ m/s

Block size of the gelatine: 35 x 15 x 15 cm (LxWxH)

Production of the gelatine according to recipe TG "9 mm x 19 cartridge, reduced harmful substances", version: September 2009

Date and location of recording: 12/12/2019, Beschussamt Ulm

2. Video: Gelatine-groß_Ulm_797,28m-s.mp4

Bullet designation: RWS .338 Lapua Magnum SPEED TIP

Bullet mass: 16.2 g

Target speed: $V_z = 797.28$ m/s

Blocksize of gelatine: 40 x 25 x 25 cm (LxWxH)

Production of gelatine according to recipe TG "9 mm x 19 cartridge, reduced harmful substances", version: September 2009

Date and location of recording: 12/12/2019, Ulm proof house

3. Film: High-speed camera: Photron Fastcam SA5, 15,000 frames per second

Further information on the BfR website on the topic ...

Lead load from game meat

<https://www.bfr.bund.de/cm/343/bleibelastung-von-wildbret-durch-verwendung-von-bleimunition-bei-der-jagd.pdf> (in German)

Research project "Food Safety of Game Obtained through Hunting"

https://www.bfr.bund.de/de/forschungsprojekt_lebensmittelsicherheit_von_jagdlich_gewonnenem_wildbret-129597.html (in German)



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About the BfR

The German Federal Institute for Risk Assessment (BfR) is a scientifically independent institution within the portfolio of the Federal Ministry of Food and Agriculture (BMEL) in Germany.

It advises the German federal government and German federal states ("Laender") on questions of food, chemical and product safety. The BfR conducts its own research on topics that are closely linked to its assessment tasks.

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