

NOVAtest[®] *eco*

**Biodegradable
Cassette**

Product Brochure

Oct. 2022

Design Background

The original commonly used cassette of *in vitro* diagnostic reagents are made of plastic. Plastic, offers enormous flexibility in colour, strength, shape, weight, and durability. However, plastic pollution is one of the gravest threats facing the world.

The severe situation by 2050 on current trends of using plastic:

12,000 Megatonnes

Projected amount of plastic waste in landfills and the natural environment

6.5 GtCO₂e

Growth in plastic will result in substantial increases in global greenhouse gas emissions

More than **85%**

Proportion of plastic in marine pollution

Over **700** species

Wildlife threatened directly by plastic pollution by ingestion

As a responsible company with a high sense of environmental protection, we take actions, following UN Environment programme, to turn off the tap on plastic pollution at the source.

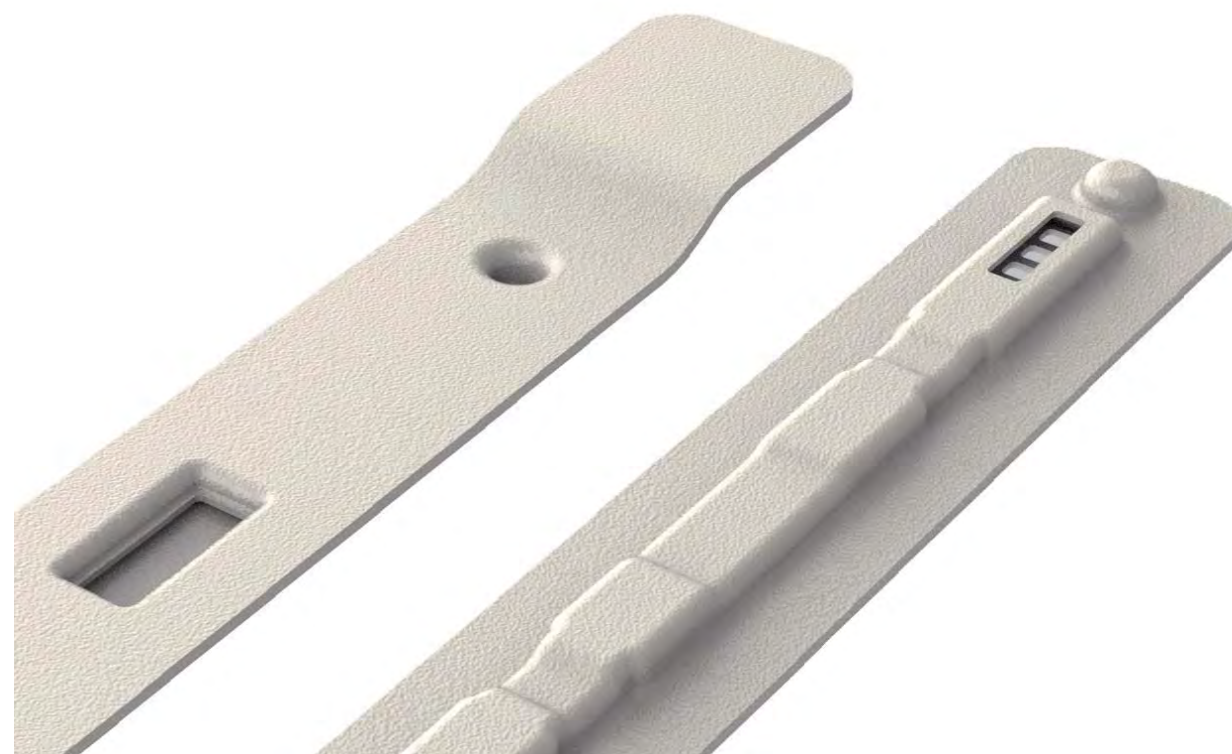
Through continued research, development, and field trials, we start to use biodegradable materials, instead of regular plastics, as the cassettes of our *in vitro* diagnostic reagents.

Why we choose Biodegradable Materials?

1. Reduction of the Amount of Waste Produced: biodegradable plastic breaks down only in a period of **a few months**, while, 9% of traditional plastic can be recycled;
2. Easy to Recycle: biodegradable materials can not only take less time to decompose when discarded but can also be **easily recycled** through an organic process. They are also **non-toxic** since they have no chemicals or toxins.
3. Consume Less Energy During Manufacture: the manufacture of corn-based polymer

requires **65% less** energy compared to a similar polymer made from petroleum, this means fewer fuel fossils will be in use; hence, reduction of environmental

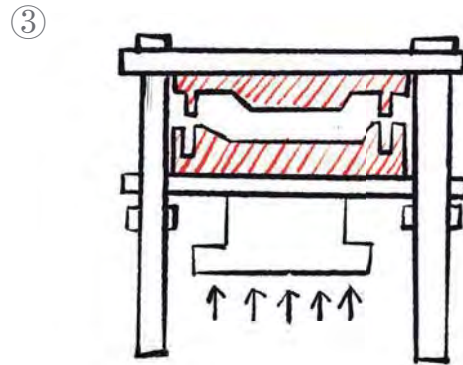
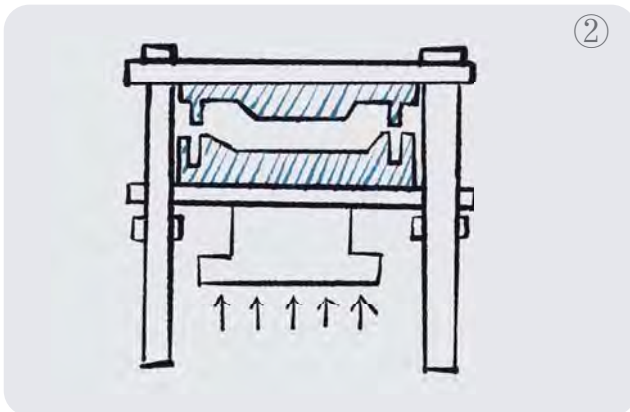
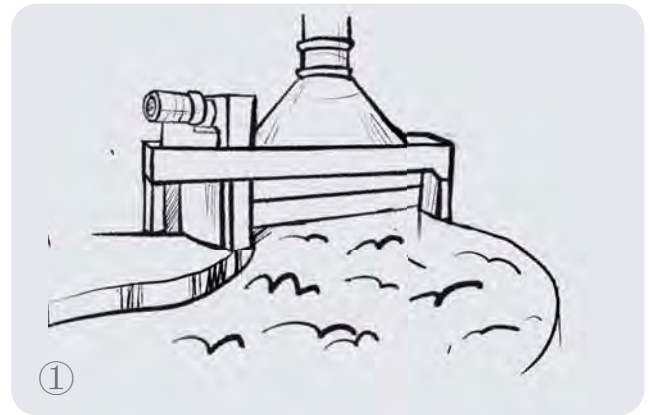
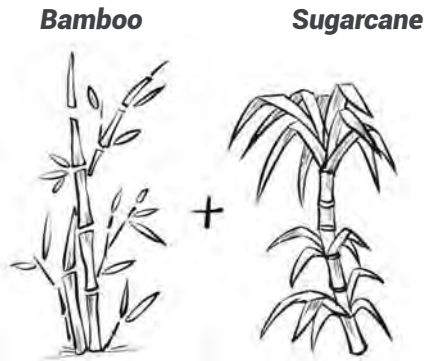
pollution. Also, it produces **68% fewer** greenhouse gases during its manufacture, posing a significant environmental benefit.



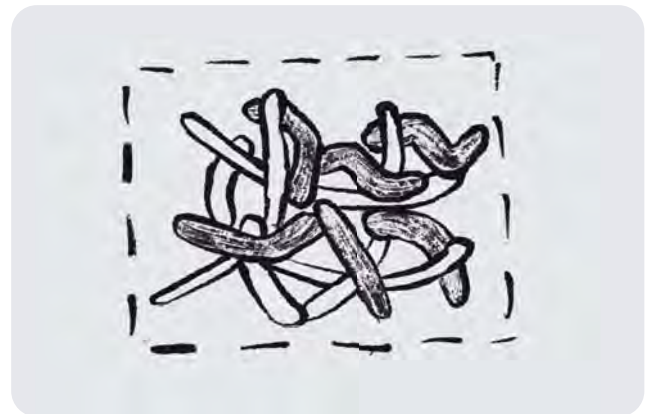
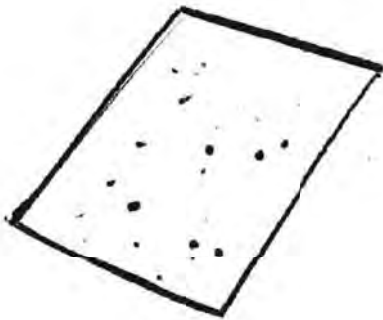
Process Design

How our Biodegradable Cassettes are created?

A.



B.

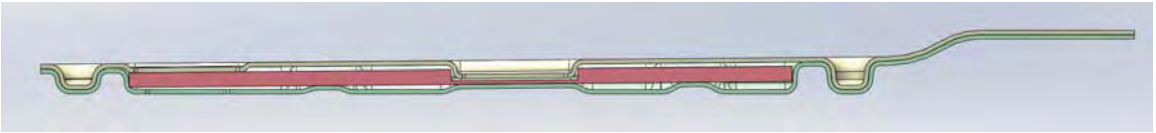
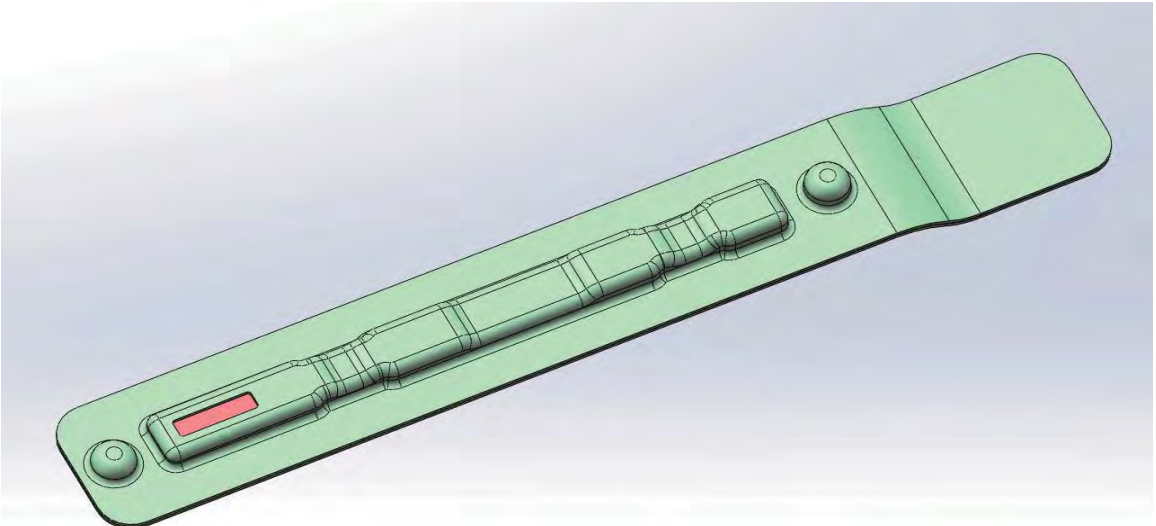
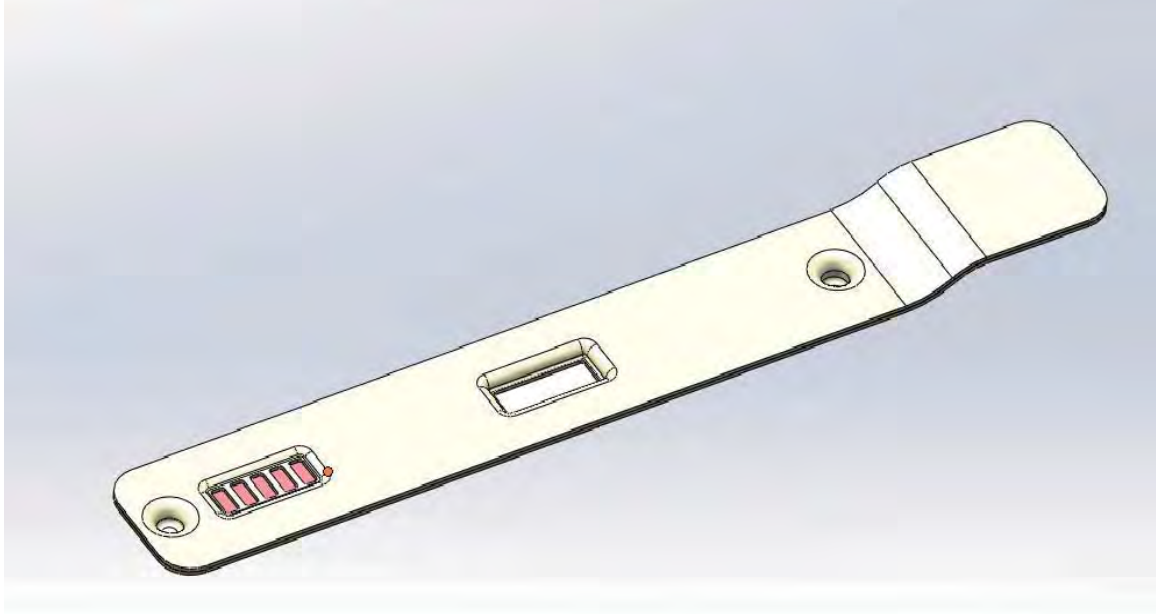


A.

1. Sugarcane fibers and long bamboo fibers are hybridized into a kind of new highly interwound fibers under a special process in the mixing machine.
2. Hybrid fibers are processed under cold-press formation.
3. Hybrid fibers are processed under hot-press drying and printed for the further step.

B.

The hybrid material has a high dense structure. Meanwhile, the hydrogen bonds rearrange under the cold and hot pressure of lignin, resulting in the features of biodegradable, high strength and waterproof properties.



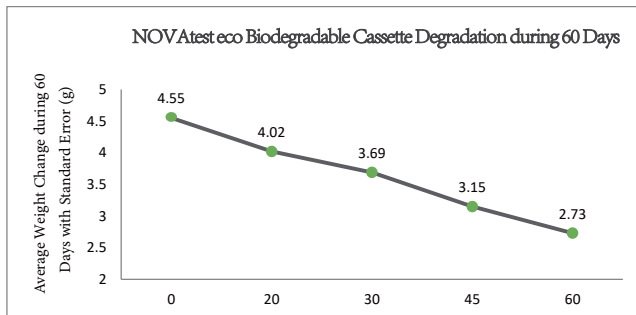
Colloidal gold immunochromatography requires a rigorous working environment, especially in consideration of the hydrodynamics of the entire system, therefore, it is vital to design an internal structure that meets the requirements of the good working environment.

The above structure is extremely complex. We use a fully digital design to perfectly integrate the internal working units and the cassette, with a tolerance less than $0.1 \mu\text{m}$. The innovative usage of 3D printing technology is a guarantee to create prototypes to conduct various trials. After thousands of trials, we decided the optimized shape and size.

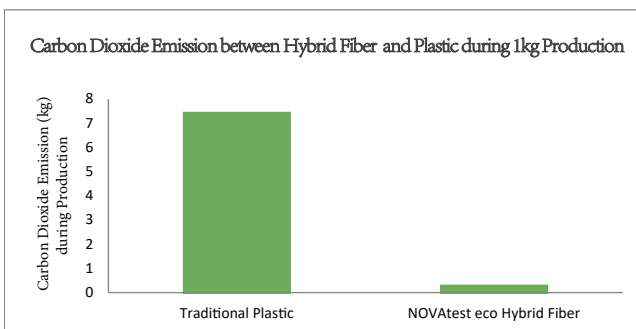
Unique Superiority

What are the reasons you decide to use NOVAtest eco Biodegradable Cassette?

Environmental Responsibility

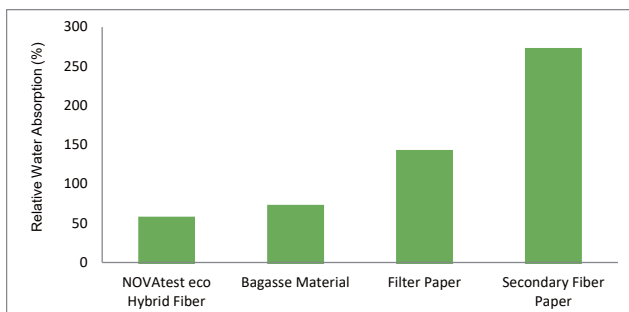


Plastic produced by fossil fuel industry is extremely difficult to naturally degrade. With this property, plastic particles remain in the food chain for long periods of time, significantly damaging the ecosystem. Microplastics have now been detected in many animals, including humans. Benefiting from the naturally derived fibers, NOVAtest eco Biodegradable Cassette is **100% natural degradation**. We buried 100 groups of Biodegradable Cassettes in soil for 60 days and tested their degradation. The experiment showed that all of the Biodegradable Cassettes degraded by almost 40-50% in the 60-day period.

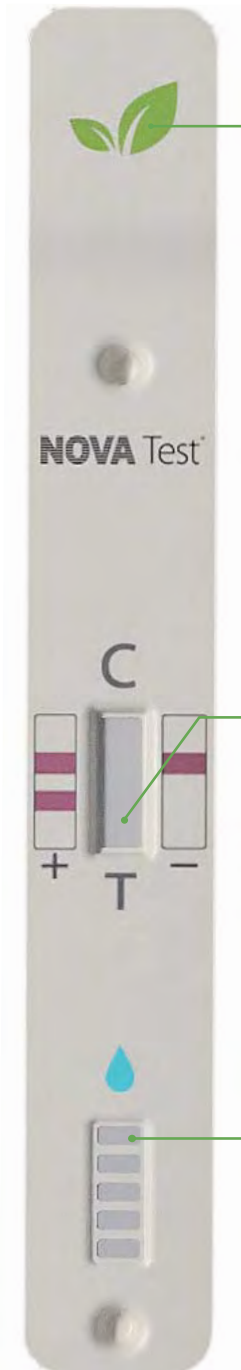


Researchers have estimated the amount of carbon dioxide emitted during the production of hybrid fibers. The CO₂ emissions from the production of 1 kg of PS plastic are reported to be 7.36 kg; according to the European Association of Carton and Carton-board manufacturers (Pro-Carton), the emissions from the production of 1 kg of moulded pulp products are 0.22 kg. The CO₂ emissions of moulded hybrid fibers are therefore **97% lower** than those of plastic.

Outstanding Water Resistance



For in vitro diagnostic reagents, the oil and water resistance of cassettes are also critical. With a contact angle of 127° to water for hybrid fibers, 0° for secondary fiber molded pulp (SFMP) and filter paper and 110° for plastics, the hybrid fibers show excellent hydrophobicity. In addition, the relative water absorption of the hybrid fibers is only 59.4%, compared to 41% for plastics, 149.2% for filter paper and 310% for SFMP, which is due to the **high hydrophobicity** and **dense structure** of the hybrid fibers.



Ergonomic Handle
Easier to take and operate

Larger Window with Interpretation Standard
Easier to accurately interpret results

King-size Sampling Area
Easier to collect samples

Products Series



NOVAtest eco Biodegradable Cassette applies to:

Product Name	REF Number	Sample Type	Specification
One Step hCG Urine Test	C1104	Urine	1 cassette/box
One Step hCG Advanced Urine Test	C1112	Urine	1 cassette/box
One Step LH Urine Test	C1107	Urine	1 cassette/box
Tuberculosis Antigen Test	C2120	Urine	1 cassette/box

Oncoming Products

NOVAtest eco Bioelectronics

NOVAtest eco Bioelectronics will bring an innovation in IVD by starting to use an electroluminescent panel to interpret results, replacing the traditional visual identification of the test line. In keeping with Atlas Link Biotech's pursuit of environmental protection, we will use the new NOVAtest eco biodegradable material as the cassette of products, and even the electroluminescent panel is made of starch-based material.

NOVAtest eco Bioelectronics will be launched in Q4, 2023. In addition, another product portfolio with calibration chips, suitable to SENSOTest instruments based on immunofluorescence and colloidal gold immunochromatography will also be marketed.

MANUFACTURER

Atlas Link Technology Co., Ltd

No.16 Xingmin Road, Gu'an South Industrial Area,
Langfang 065500, Hebei Province, CHINA

Tel: 86-10-8890 9113

Email: sales@invitro-test.com

Web: <https://www.invitro-test.com>

