MyTaq™ HS DNA Polymerase | Plant DNA Amplification

Plant material contains an abundance of potent PCR inhibitors such as polyphenols, tannins and complex polysaccharides. This makes amplification of plant-derived DNA a challenging task.

MyTaq™ HS is a new generation of very high performance PCR products developed by Meridian, designed to deliver outstanding results on all templates, including the complex genomic DNA templates found in plants. MyTaq is based on the latest technology in PCR enzyme preparation, engineered to increase affinity for DNA, resulting in significant improvements to yield, sensitivity and speed. The enzyme is supplied with a novel industry-leading buffer system, specifically formulated and validated for the unique properties of MyTaq. In order to show the suitability of MyTaq HS for PCR of plant DNA, the MyTaq HS and ISOLATE II Plant DNA Kit were used with a number of different plant types.

The leaves from plants such as *Arabidopsis thaliana*, corn and tomato are used for agricultural research and are a ready source of DNA without causing too much damage to the main plant. The use of ISOLATE II and MyTaq means that high quality DNA can be extracted from many leaves and then used in PCR (Fig. 1).

Rice is a staple food for over half of the world's population, as it is the only crop that can be grown continuously without the need for rotation and can produce up to three harvests a year. However nutrients are lost during milling and polishing. Research is therefore being carried out to improve the nutritional properties of this important crop. PCR from DNA isolated from milled rice samples has been difficult to perform firstly because of small amount of DNA left in milled rice (normally found in the bran layer and embryo alone), secondly because of the presence of higher levels of polysaccharides (>90% starch) and thirdly because of DNA shearing and/or degradation that may have occurred during the processes of desiccation, storage and milling of mature rice grains. Here we used a combination of Meridian's ISOLATE II Plant DNA Kit and MyTaq HS Red Mix to show how easy it can be to perform PCR (Fig. 2) and that it is also possible to multiplex from such materials (Fig. 3).

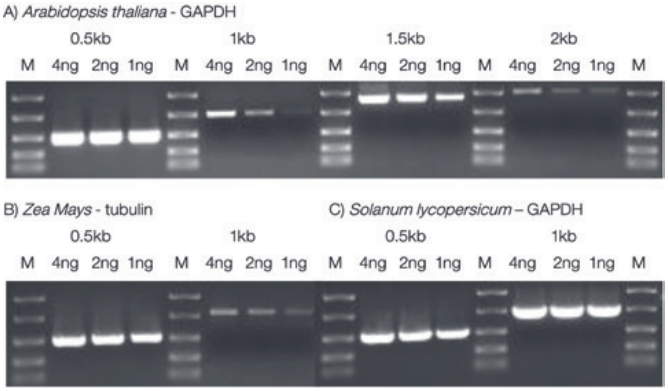

Fig 1. PCR of Genomic DNA extracted from plant leaves.
Genomic DNA was extracted from A) *Arabidopsis thaliana*, B) *Zea mays* (corn) and C) *Solanum lycopersicum* (tomato) leaves using an ISOLATE II Plant DNA Kit (BIO-52070).Decreasing amounts of DNA were amplified using MyTaq HS (BIO-25048). The GAPDH gene was amplified in *Arabidopsis thaliana* (0.5 kb, 1 kb, 1.5 kb, and 2 kb) and *Solanum lycopersicum*, two fragments (0.5 kb, 1 kb). Two fragments (0.5 kb, 1 kb) of the tubulin gene were amplified in *Zea mays*. M EasyLadder I (BIO-33046).

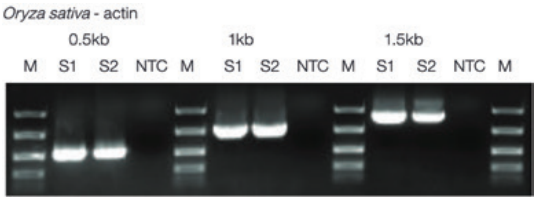

Fig 2. PCR of Genomic DNA extracted from one grain of rice.
Genomic DNA was extracted from *Oryza sativa* (rice) using an ISOLATE II Plant DNA Kit. Two extractions (S1 and S2) were performed and amplified 4 ng DNA with 0.5 kb, 1 kb, and 1.5 kb fragments of the *Oryza sativa* actin gene using MyTaq HS. M EasyLadder I.

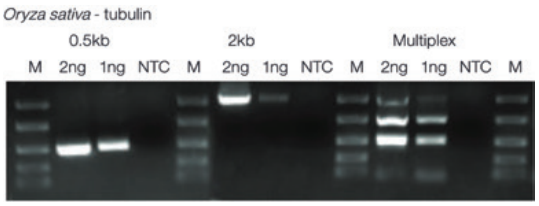

Fig 3. PCR of Genomic DNA extracted from one grain of rice.
Genomic DNA was extracted from *Oryza sativa* (rice) using an ISOLATE II Plant DNA Kit. Decreasing amounts of DNA were amplified using MyTaq HS. Two fragments of the tubulin gene of *Oryza sativa* were amplified in singleplex (0.5 kb and 2 kb fragments) and as a multiplex (0.5 kb, 1 kb, 2 kb fragments) using MyTaq HS. M EasyLadder I.

SUMMARY

MyTaq HS is evidently a highly robust and versatile polymerase and together with a novel buffer, delivers high performance in chemically complex reaction conditions. The result is superior tolerance to a wide range of common PCR inhibitors, which results in unsurpassed performance in PCR of DNA from plant materials.

REFERENCE: Murray, S.A., *et al.* Appl. Envir. Microbiol. **77**, 7050-7057(2011)