



FUNCTIONS OF THE ENZYMES ON FLOUR QUALITY

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Introduction

1. Factors Effects on Flour Quality
2. Intended Use of Flour Additives
3. Stabilization And Improving The Quality Of Flour With Enzymes
4. Enzymes Versus Flour Rheology
5. Various Bread Trials With The Selected Enzymes
6. Test Baking With Mirpain Enzyme Blends
7. Enzymatic Flat Bread Solutions
8. Using Enzymes in Pasta Production



1. Factors Effects on Flour Quality



Wheat flour quality



Individual genetic disposition of wheat cultivar
Agricultural practices
Environmental effects

+ Additives




Standardize the flour in terms
of gluten strength, color and
fermentability...



**IMPROVED
OVERALL BAKING
QUALITY**



2. Intended Use of Flour Additives

- 
- Ensuring Standardization
 - Improving flour quality
 - Enhance consumer acceptance
 - Restore the deficiency
 - Reducing cost

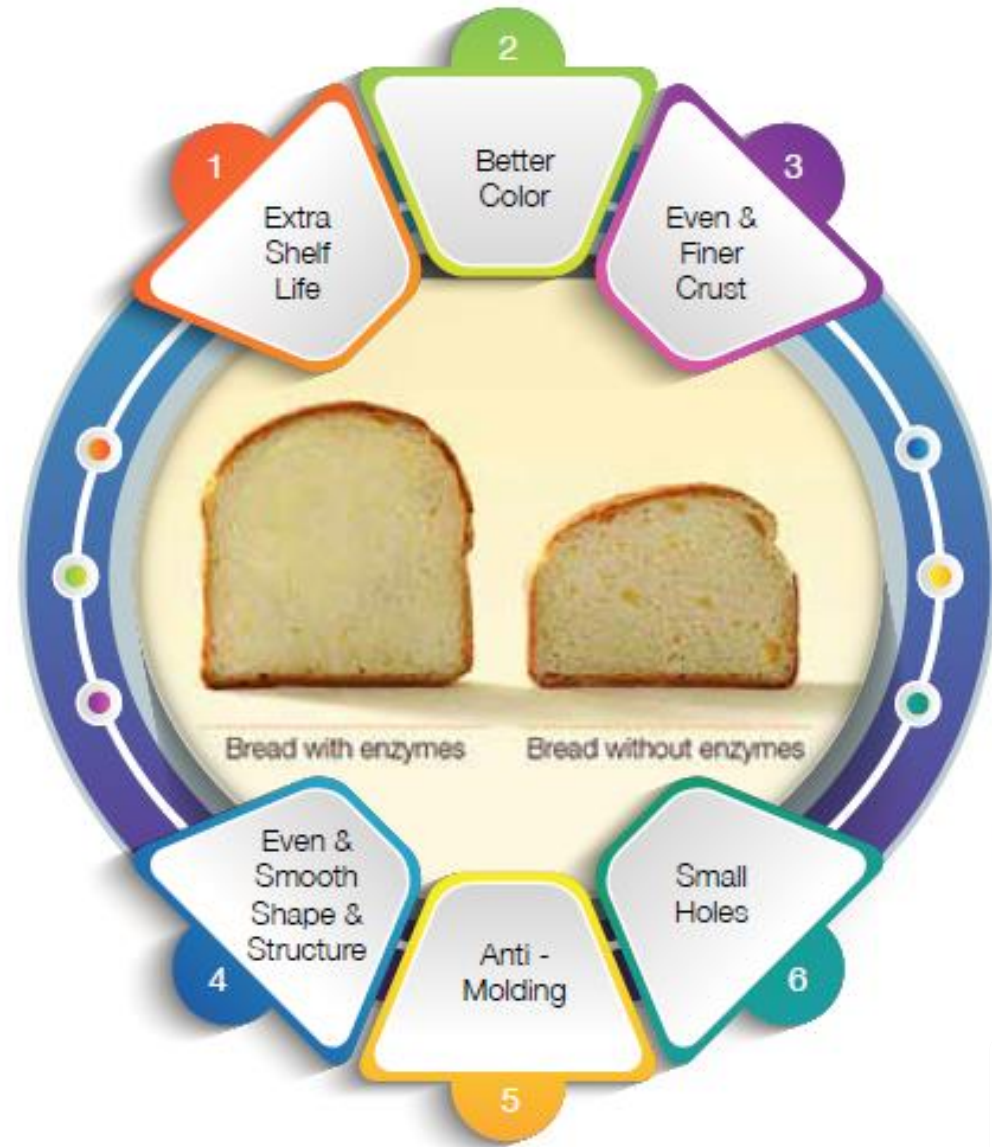


Production consistency
for mill

For correct use of additives



The main components of flour and bread additives are enzymes.



3. Stabilization And Improving The Quality Of Flour With Enzymes

The ingredients for flour improving are especially ultra concentrated enzymes catalyze chemical reactions in the case of flour/dough.

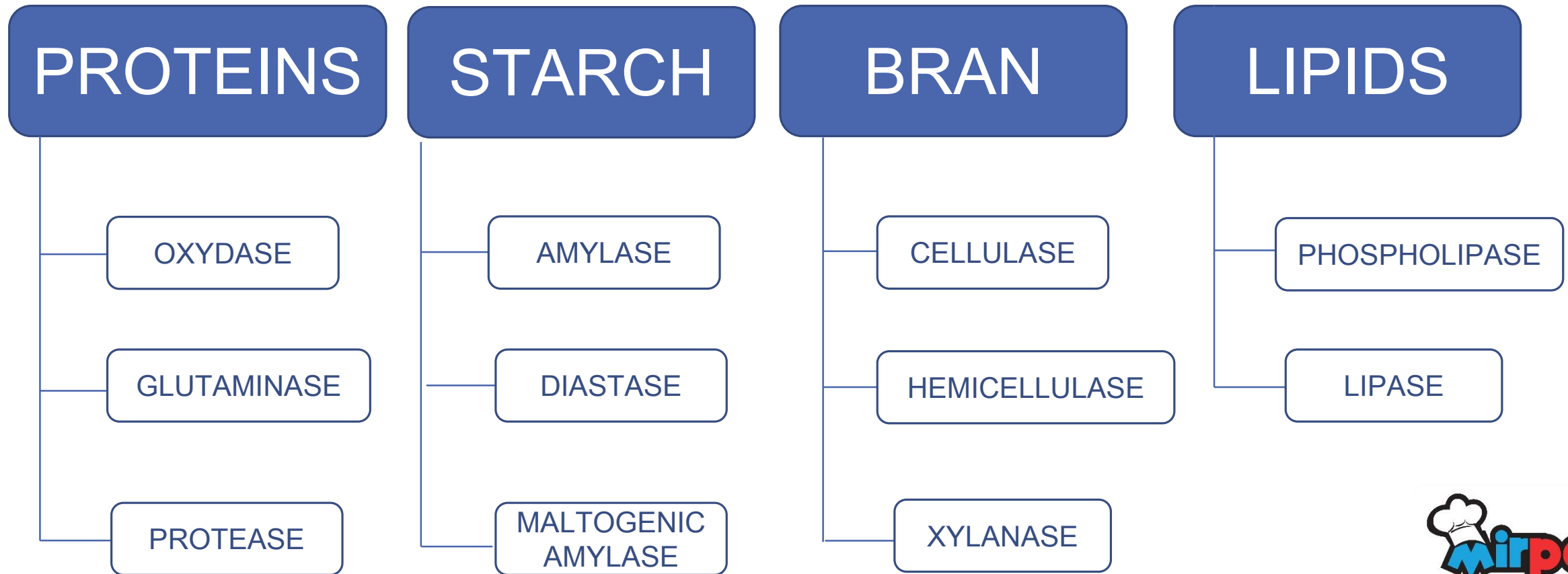


Ultra concentrated enzymes

- Low dosages(ppm)
- Yield big desired effects



Each enzyme is specific for a certain substrate.



4. Enzymes Versus Flour Rheology

One quick and economical way to determine the effects of enzymes is using flour rheology test equipments which are

- Farinograph
- Alveograph
- Mixolab
- Falling Number



AMYLASE

Amylase have measurable effects on the Rheofermentometer with improved gas production and dough height.
Amylase has an effect on Falling Number
Increases L value on alveograph

XYLANASE

Xylanases might have positive effects on Alveograph P/L ratio increasing L.

LIPASE PHOSPHOLIPASE

Lipase and phospholipase, normally would not have measurable rheological effects.

OXIDASE

Glucose Oxidase improves the Farinograph stability and reduces the Farinograph degree of softening.

PROTEASE

Proteases have a strong, measurable effect on the Alveograph; the addition of a protease strongly reduces W values leaving P/L ratio almost unchanged

If you desire the most accurate result on effects of the enzymes; **BAKING TESTS** will tell you the **TRUTH.**



ALPHAMILL PF
ALPHA
AMYLASE

- Gas production,
- improves volume, crust colour,
- retards staling

HEMIMILL
SPRING
XYLANASE

- Improves dough machinability,
- increases volume and oven spring

LIPOMILL(S)
LIPASE

- Improves volume and dough strength
- Preserves freshness

OXIMILL QP
GLUCOSE
OXIDASE

- Strengthen flour,
- improves flour stability and dough machinability
- provides better knife opening

MIRPAIN XL
MALTOGENIC
AMYLASE

- Improves bread freshness
- reduces staling

PROMILL
PROTEASE

- reduces flour strength
- destroys gluten



5. Various Bread Trials With The Selected Enzymes



w/o ALPHAMILL PF

with 8 ppm ALPHAMILL PF



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5. Various Bread Trials With The Selected Enzymes



5. Various Bread Trials With The Selected Enzymes



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5. Various Bread Trials With The Selected Enzymes



5. Various Bread Trials With The Selected Enzymes



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5. Various Bread Trials With The Selected Enzymes



6. Test Baking With Mirpain Enzyme Blends





w/o

Hemimill SPRING

3 ppm

Hemimill SPRING

5 ppm

Hemimill SPRING





7. MIRPAIN'S TAILOR MADE ENZYMATIC FLAT BREAD SOLUTIONS

Most common problems of flat bread:

- Springing back or shrinkage of the dough
- Falling off the wall of the oven during baking
- Drying too quickly, not enough browning
- Poor dough stability
- Poor sheeting quality
- Breaking of the loaves during shelf-life



Criteria evaluated in sensory analysis of Flat Bread

Layers Separation

Foldability

Chewiness



Homogeneity of Color

Biting Quality

Freshness

Shape



8. When are enzymes used in pasta production?

Nowadays pasta is made from unconventional commodities in many countries of the World due to the high price of durum wheat.

Sufficient processing and balanced formulations are required to eliminate unconventional commodities poor technological properties.

- Economically speaking, the use of soft wheat flour for pasta production could be advantageous; however, the poor sensory attributes and cooking quality of such products have dictated that durum semolina be used.
- Attempts to overcome the poor quality of non-conventional pasta have primarily relied on the use of additives.
- It has been reported that firmness, color intensity and cooking quality have been improved with the appropriate drying program and additives.



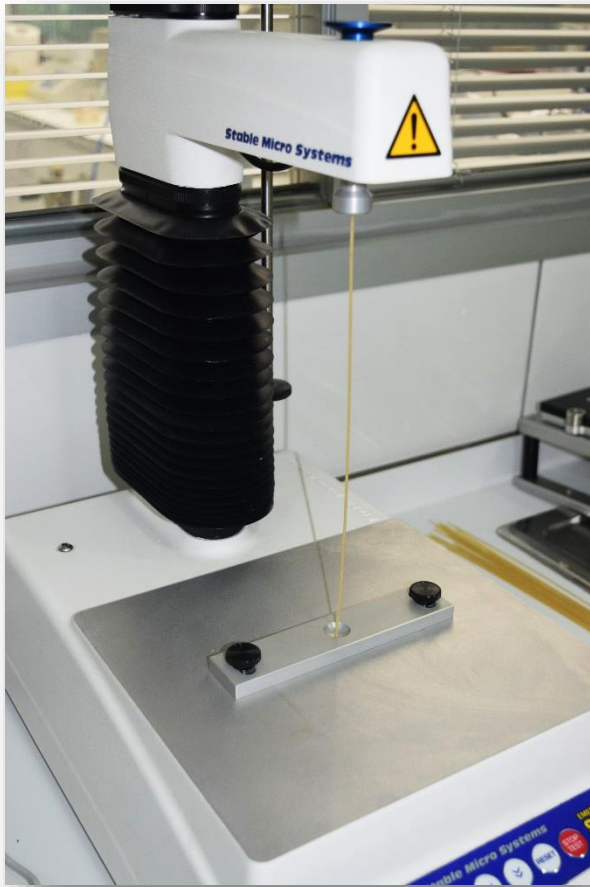
Pasta Quality Parameters

- Stickiness
- Firmness
- Elasticity
- Brightness
- Cooking tolerance
- Biting quality
- Color



Texture Analysis for Pasta

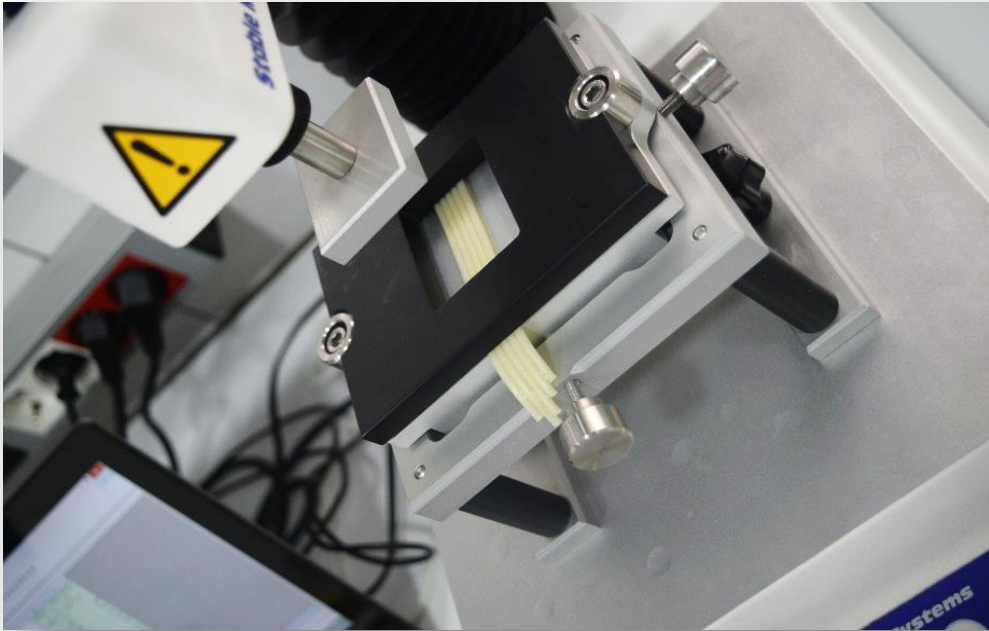
1. Flexibility



Probe: Spaghetti Flexure Rig

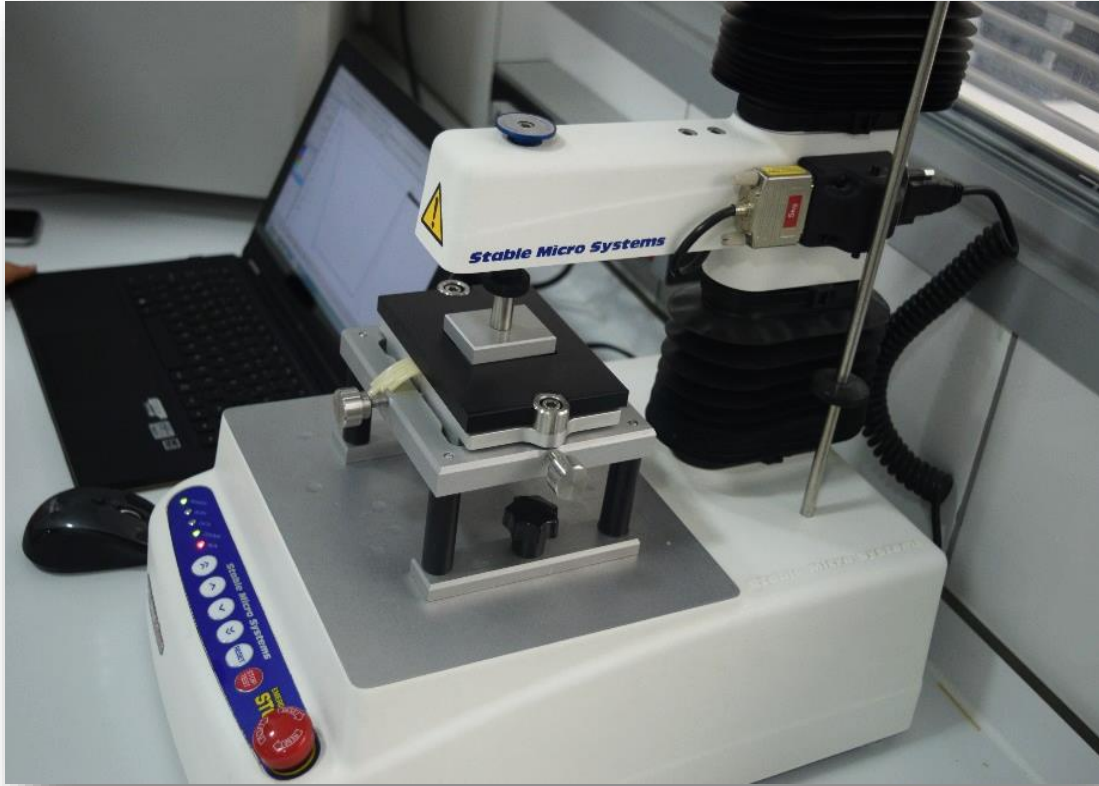
Spaghetti flexure rig determines the elasticity of the spaghetti by measuring the breaking distance of the samples.

2. Stickiness



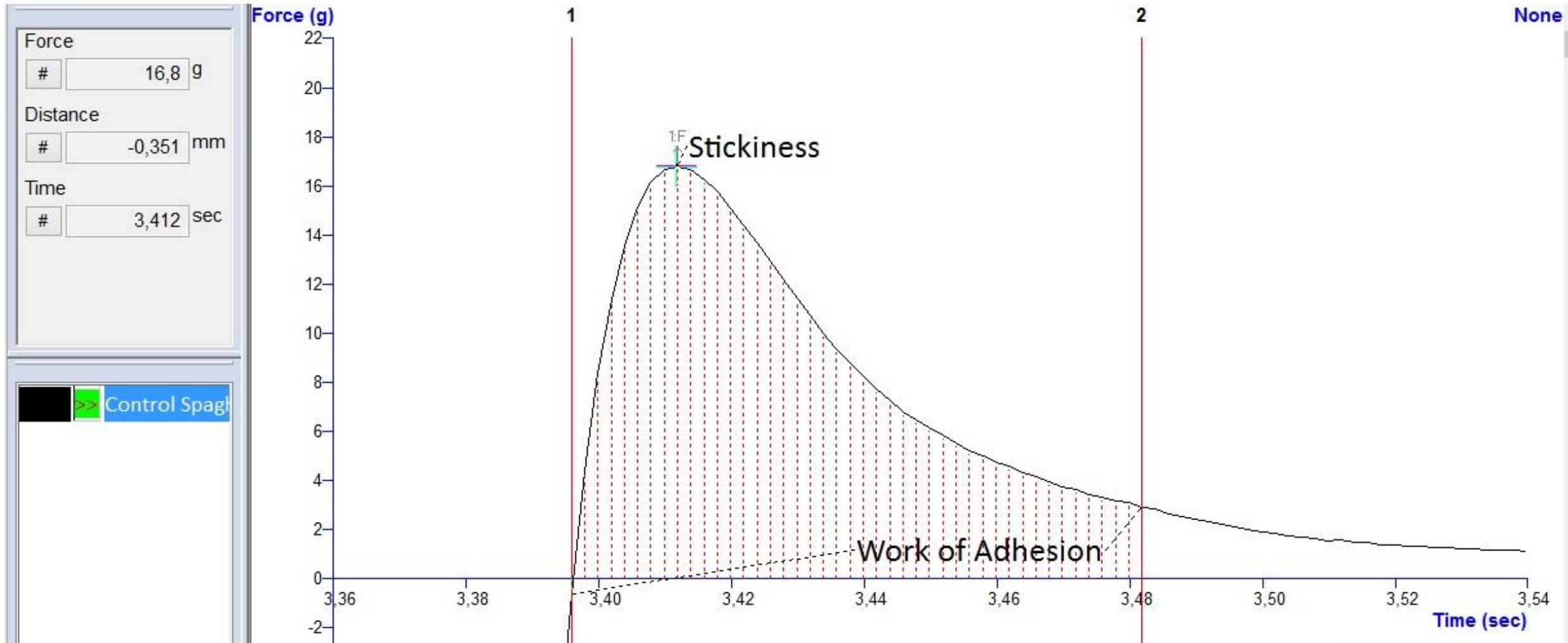
Probe: Spaghetti Stickiness Rig

This equipment measures the durability and stickiness of the cooked pasta. The pasta cooked under the same conditions according to the method is kept in the texture analyzer using a support block.



- The pressure plate attached to the load cell immobilizes the pasta.
- The probe applies an appropriate compression force to the sample.
- It contacts the sample for a certain period of time, and as the force required to remove the probe from the surface of the sample increases, the pasta is more sticky.

Untreated Spaghetti Stickiness Graphs

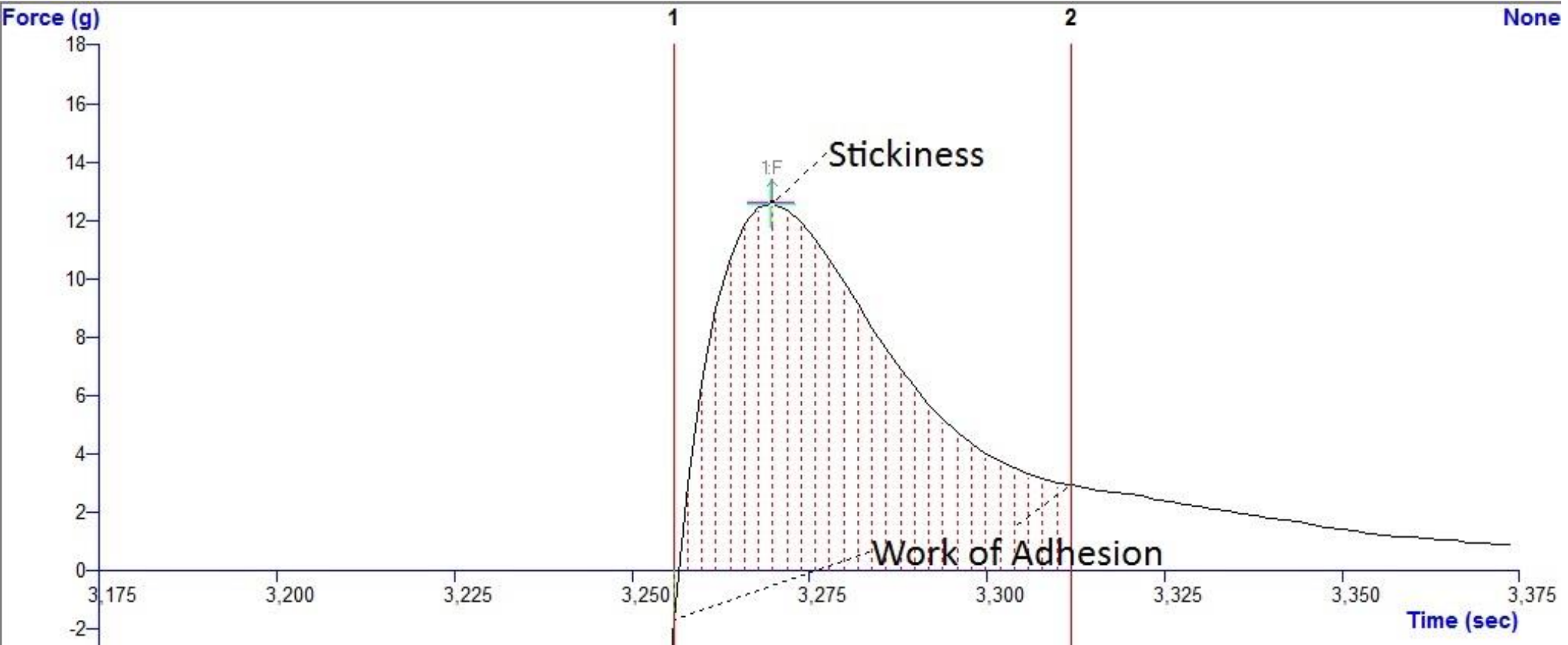


Spaghetti with Enzymes Stickiness Graphs

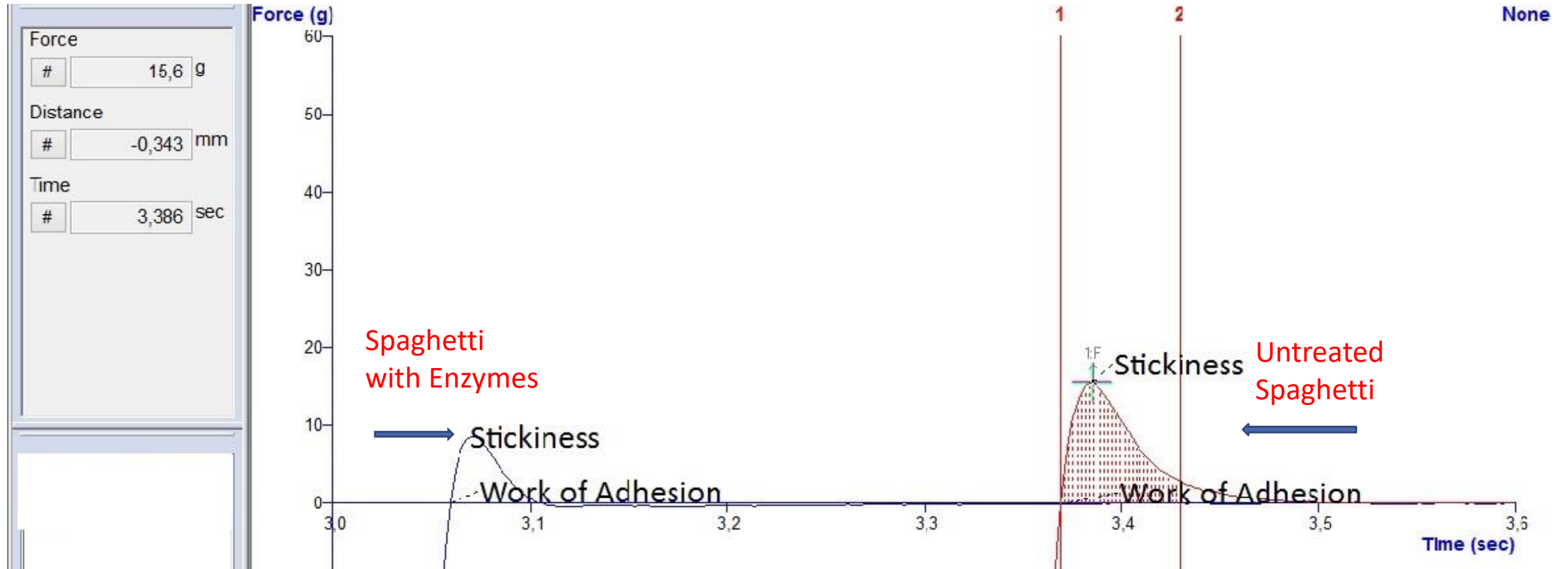
Force
12,6 g

Distance
-0,387 mm

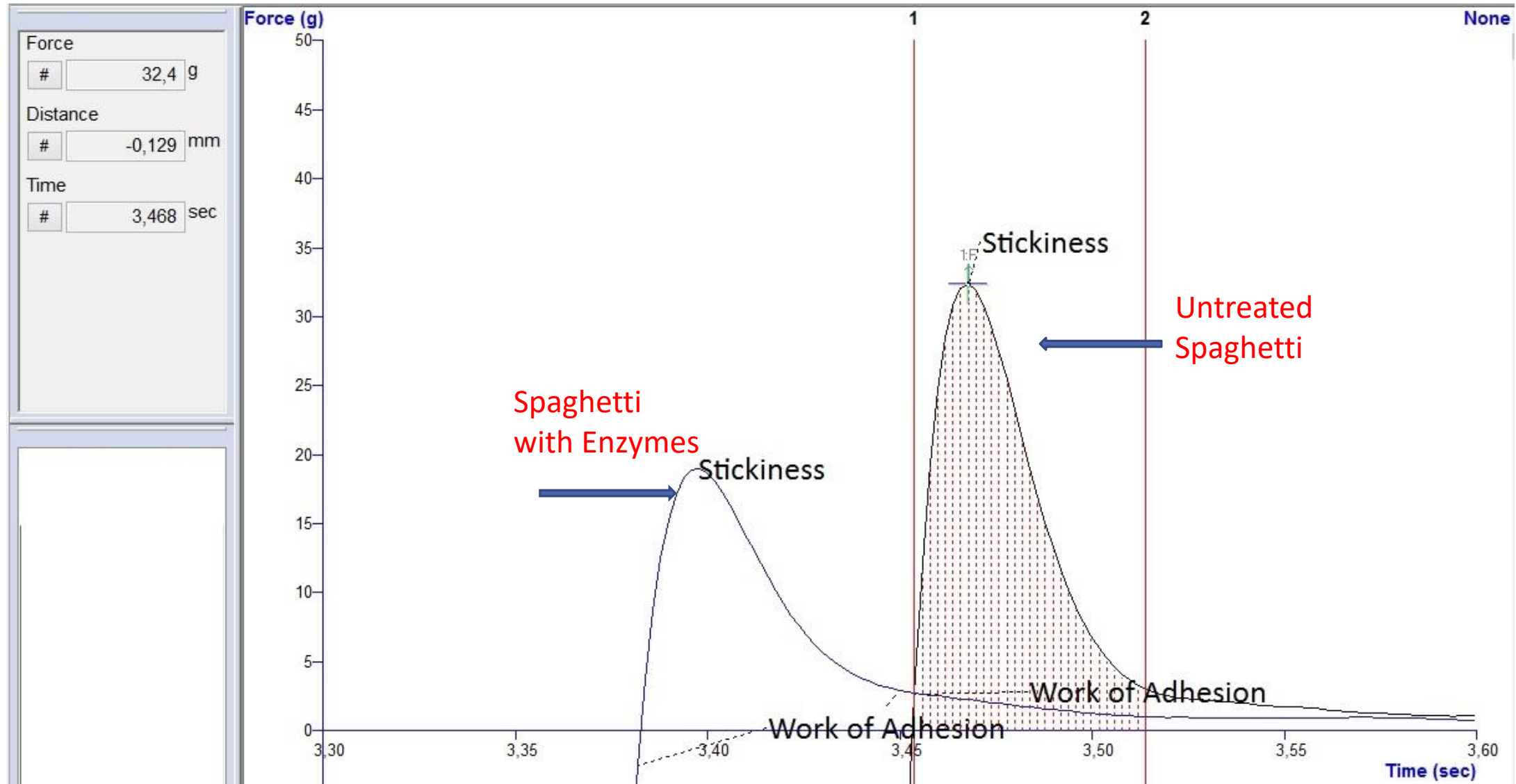
Time
3,270 sec



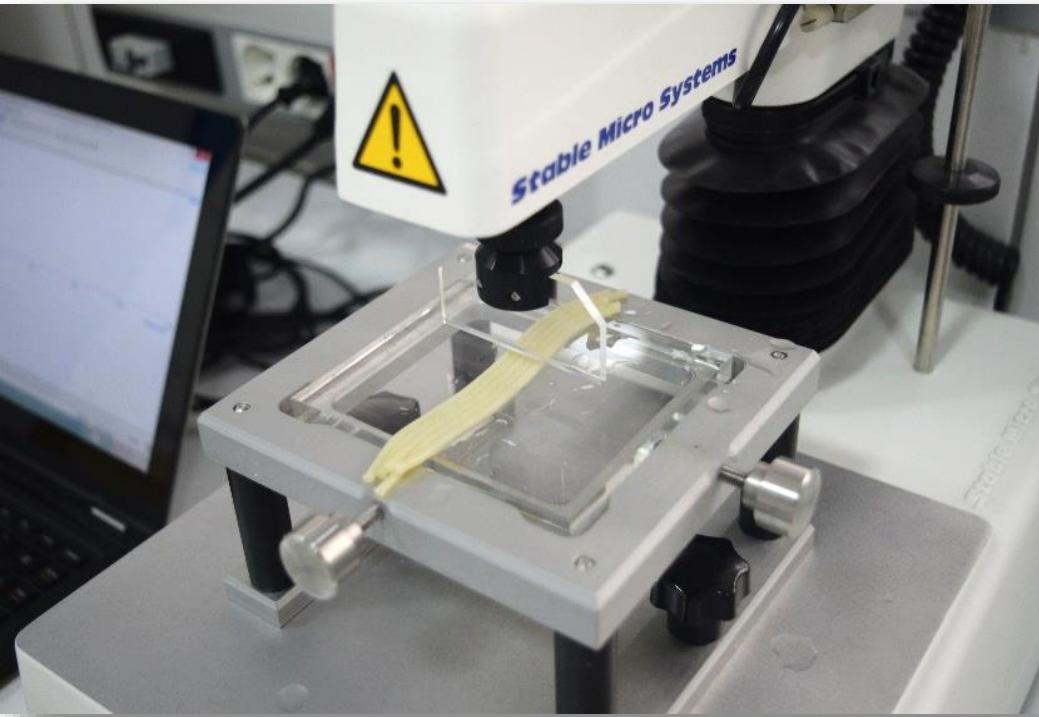
Stickiness Graphs of Treated and Untreated Spaghetti



Stickiness Graphs of Treated and Untreated Spaghetti

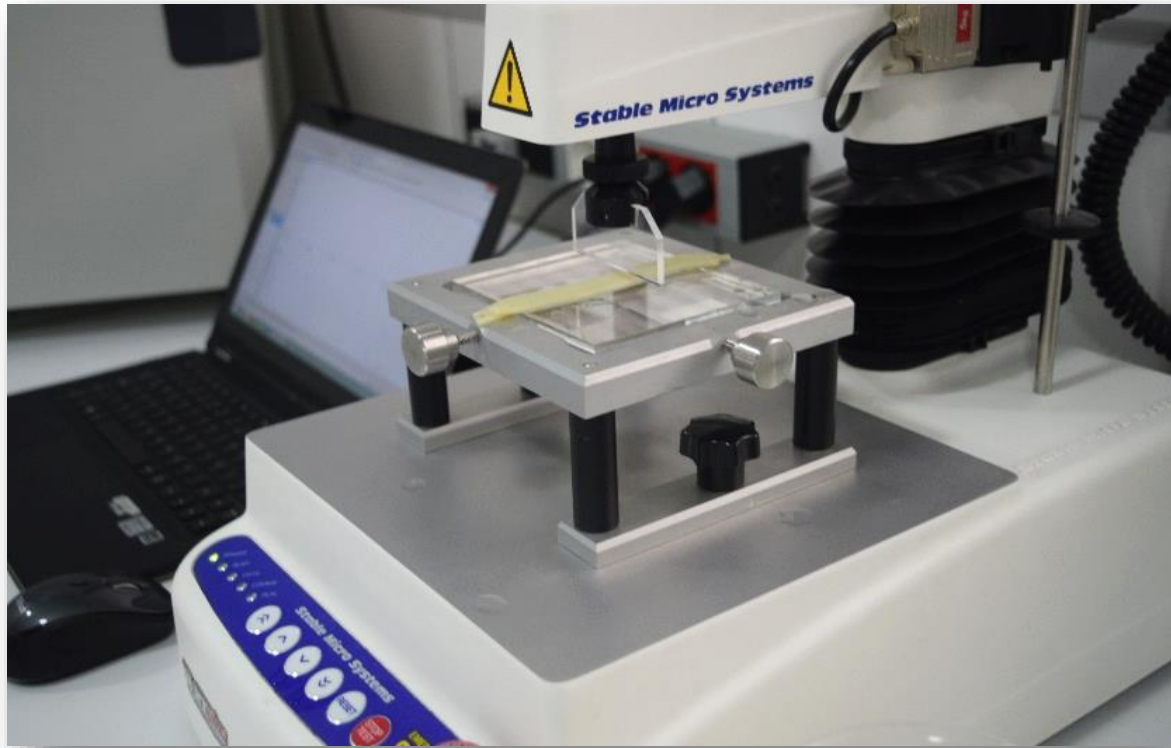


3.Firmness



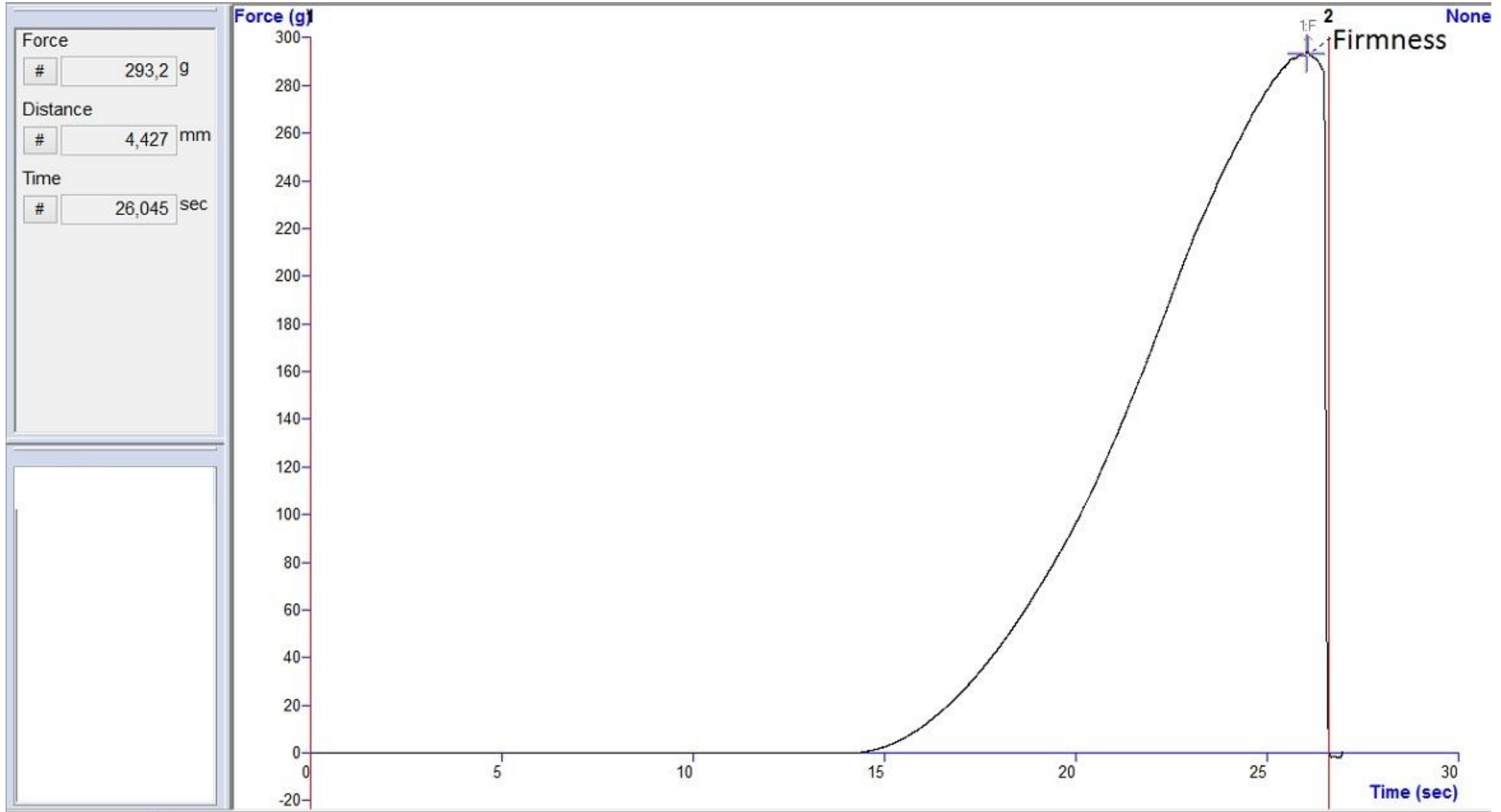
Probe: Pasta Firmness-Quality Rig / Light Knife Blade

Pasta Firmness-Quality Rig measures the firmness / hardness of the cooked pasta.

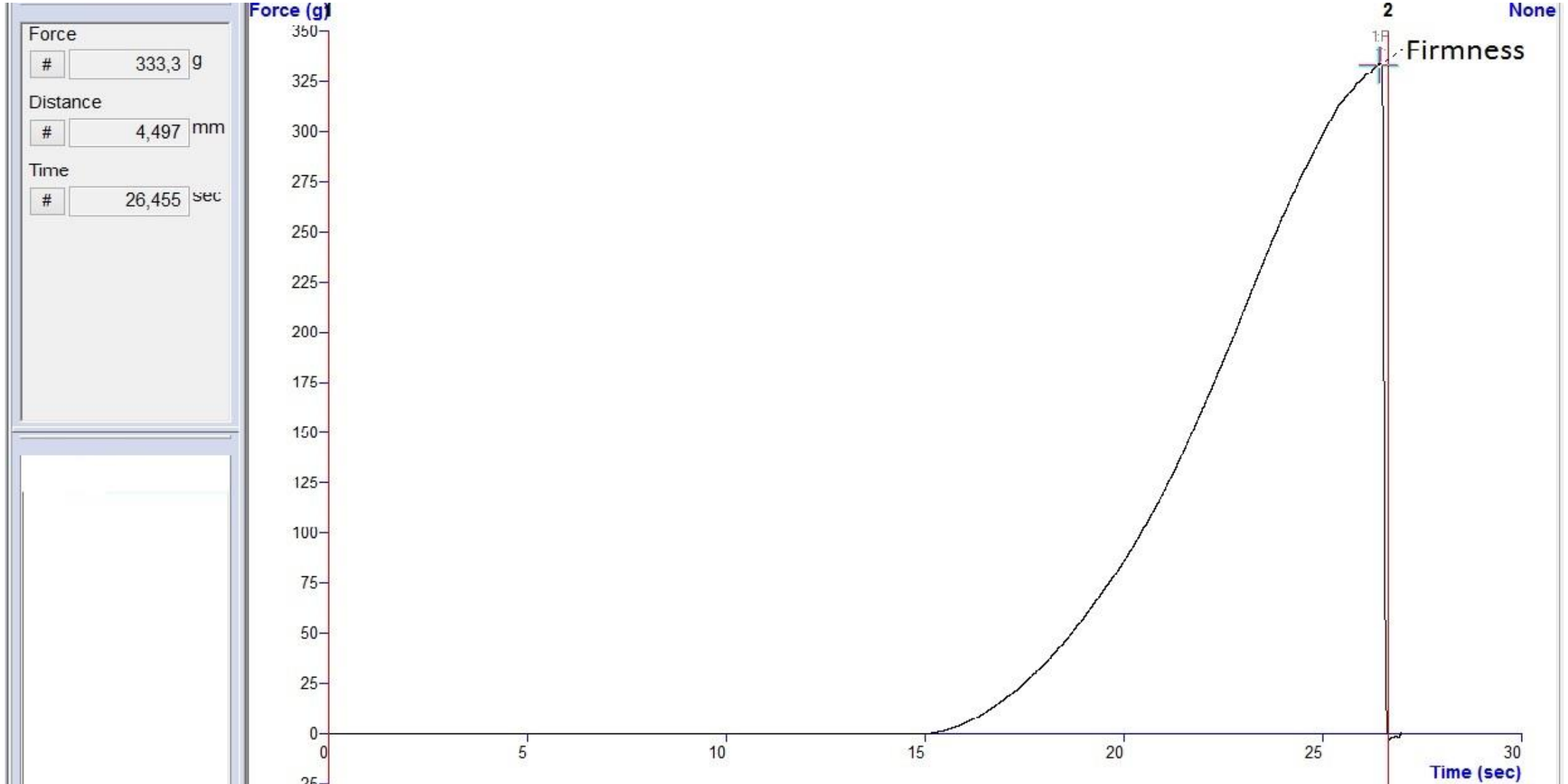


- The probe draws graphs and measures according to the force applied when cutting the cooked spaghetti on the flat platform.
- The increasing in the firmness of the pasta increases the cooking tolerance and biting quality.

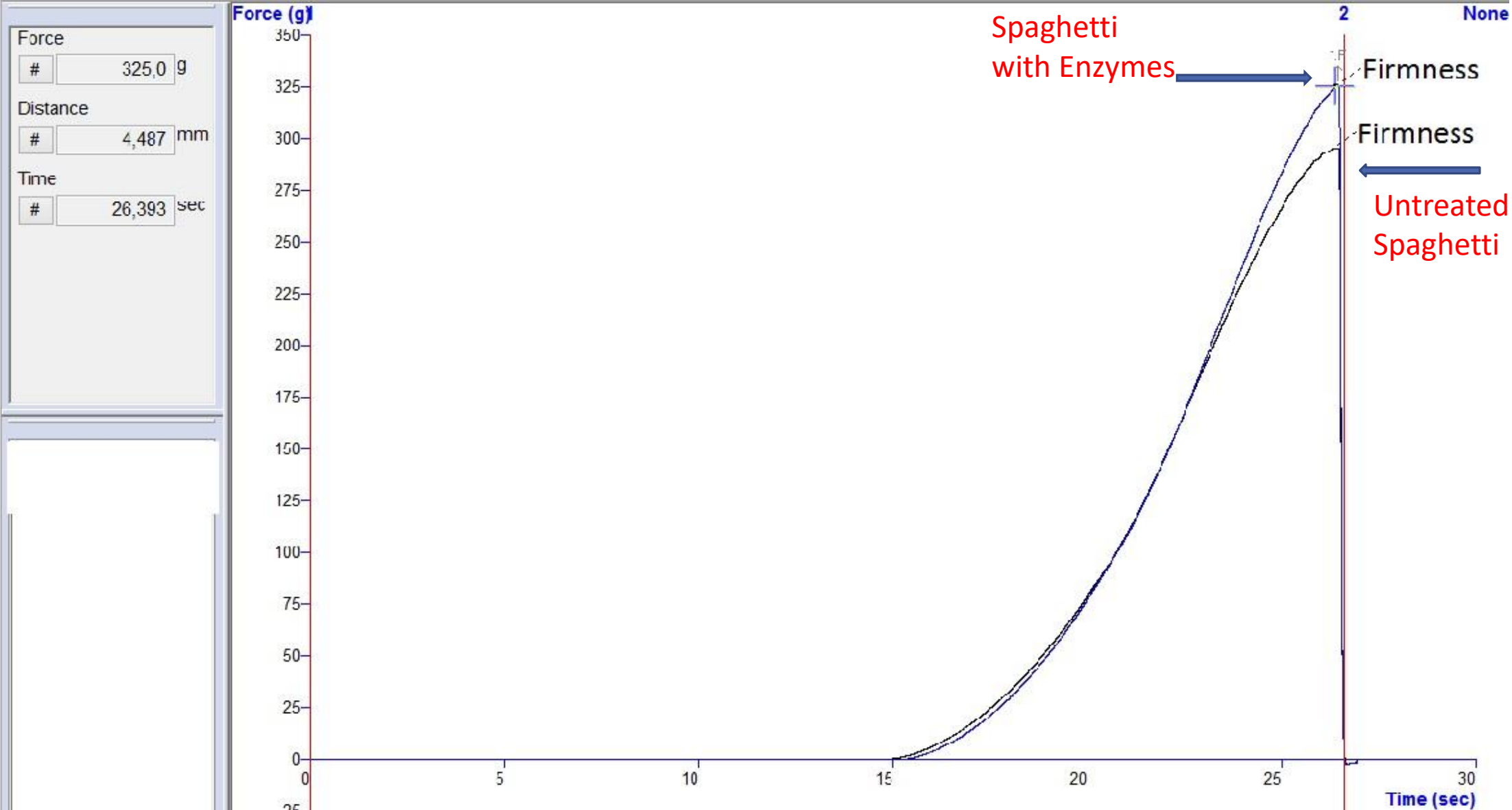
Untreated Spaghetti Firmness Graphs



Spaghetti with Enzymes Firmness Graphs



Firmness Graphs of Treated and Untreated Spaghetti



Benefits of Pasta Improvers use;

- Reduces cooking losses&stickiness
- Improves cooking tolerance
- Advances bite quality
- Improves elasticity and chew ability
- Enhances color and brightness
- Eliminates the cracking problem
- Increases surface firmness





Untreated

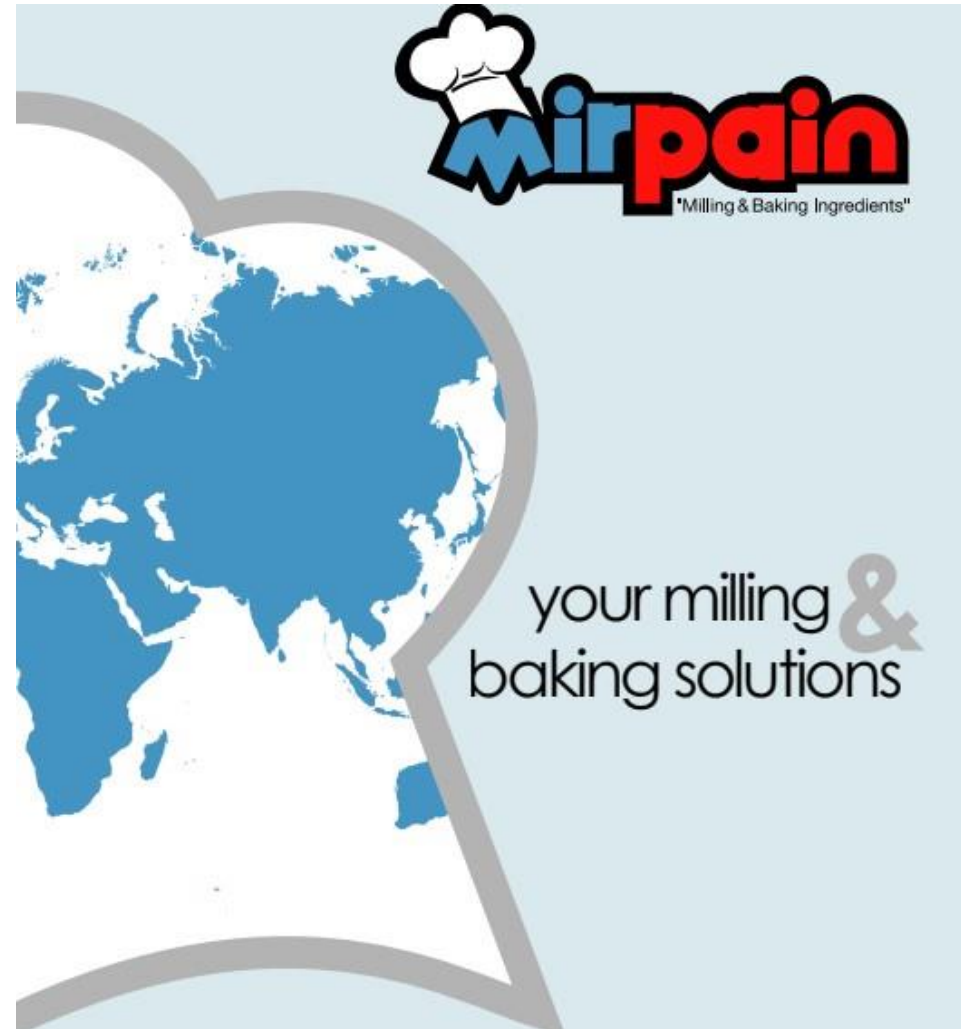
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THANK YOU FOR LISTENING !