

PEKTOS CARROT FIBER and CITRUS FIBER in Tomato-Based Sauces

Tomato sauce/ketchup and tomato-based sauces are among many dishes' most popular and essential ingredients. Some are made without texturising ingredients, and the consistency and firmness come from the tomatoes themselves, their cell wall components being responsible for water binding and structure. Raw material in those products is double or triple concentrated tomato paste.

Non-premium and cheaper products with a lower content of tomato paste usually contain hydrocolloids such as modified starch, locust bean gum, xanthan gum, pectin etc., as texturising or binding agents.

Carrot or Citrus fiber can replace tomato paste or texturising ingredients to compensate for the sauce's lack of firmness and viscosity caused by the reduced use of tomato paste, similar to the natural consistency building with tomato paste.

PEKTOS CARROT FIBER KF 15 C and **CITRUS FIBER CF 1525 C** are fine powders easily added to a hot or cold product batch without lumping. They quickly bind a large portion of the available water and build a pasty, fibrous texture similar to tomato or apple paste. The resulting viscosity is highly stable against heating, acidity, pumping and mixing forces. Therefore, naturally occurring fluctuations in water content or firmness of the tomato paste can be easily compensated without increasing the solids content by evaporation.

Influence of tomato paste on the firmness

The firmness of tomato paste results mainly from the tomato cell wall components. Therefore, samples with varying ratios of tomato paste were prepared and evaluated.

Test Recipe (all-in process)	
Tomato Paste double concentrated (26/28% solids)	20 – 35 %
Sugar	15 %
Salt	2 %
Vinegar (25 % acetic acid)	1.2 %
Water	61.8 – 47.8 %

The results showed that the higher the tomato paste content, the firmer and more textured the products are. Penetrometers are suitable to characterise the firmness of tomato sauce by measuring the force necessary to push the stamp into the sample. The results correlated with the percentage of tomato paste used.

In our tests, using approximately 3 % tomato paste (double concentrated) increases the firmness by one penetrometer unit (1 g on ½ "stamp at 20 mm penetration depth).

Adding starches or hydrocolloids like xanthan gum, guar gum, etc., increases the tomato sauce's firmness and viscosity. Still, the typical pasty appearance of products with high tomato paste content,

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caused by the fruit fibers of the tomato paste, cannot be achieved. Instead, the products have a gummy or slimy, long texture, and the typical appearance is lost.

That is different from **CARROT FIBER KF 15 C** and **CITRUS FIBER 1525 C**, where the firmness and texture are caused by the fibers, just like tomato paste.

Compared with the above-discussed correlation between firmness and tomato paste content, we can say that adding 1 % CARROT or CITRUS Fibre increases firmness as much as 8 – 10 % tomato paste does.

Country-specific standards of identity for products can make it challenging to substitute tomato paste. In Germany, for example, the dry solids from tomatoes in ketchup must be a minimum of 74%, which makes it necessary to use 24.1 % of double concentrated tomato paste (28/30% ss).

CARROT FIBER KF 15 C versus CITRUS FIBER CF 1525 C

CARROT FIBER KF 15 C has a slightly orange tinge, a more neutral flavour profile and creates a pasty, fibrous texture, which appears to be better suited for tomato-based sauces than Citrus Fiber.

Water binding capacity

- WBC = min. 15* (1g fiber binds 15 g water) in an aqueous dispersion with little mixing.
- WBC increases strongly to WBC = 20 – 25* and higher through higher shear forces (high-speed mixer, homogeniser), creating a pasty, fibrous, apple-paste-like texture, non-flowing, with little syneresis and with a smooth mouth feel.

- The water binding capacity is comparable to the water holding capacity due to the strong affinity of the fiber to water.

Quick hydration, high Swelling Capacity

- **CARROT FIBER KF 15 C** starts hydrating immediately after contact with moisture and rapidly absorbs water without lumps.
- Expands rapidly after contact with water and occupies a large space without mechanical treatment / shearing / mixing.

Viscosity increase, texture and structure enhancement

- **CARROT FIBER KF 15 C** has a relatively low viscosity in water, which strongly increases in 2% or higher dispersions.
- Produces viscosity and body with smooth and rich texture and structure in products and stabilises the water in various food systems.

Process stability:

CARROT FIBER KF 15 C demonstrates good heat, pH, salt and shear stability in food products.

CITRUS FIBER CF 1525 C has a beige powder colour and a bland flavour profile, creating a mousse-like, non-fibrous mouth-feel and texture.

Water binding capacity

- WBC = 12 – 15* (1g fiber binds 12 – 15 g water) in an aqueous dispersion with little mixing.
- WBC increases strongly to WBC = 20 – 25* and higher through higher shear forces (high-speed mixer, homogeniser), creating a uniquely soft, non-flowing, stable mousse-

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like texture similar to a gelatinised starch slurry, without syneresis and with a smooth, non-fibrous mouth feel.

- The water binding capacity is comparable to the water holding capacity due to the strong affinity of the fiber to water.

Quick hydration

- **CITRUS FIBER CF 1525 C** starts hydrating immediately after contact with moisture and rapidly absorbs water.

Viscosity, texture, structure enhancement

- **CITRUS FIBER CF 1525 C** has a relatively low viscosity in water, which strongly increases in 3% or higher dispersions.
- Produces viscosity and body with smooth and rich texture and structure in products and stabilises the water in various food systems.

Gelation:

The pectin in **CITRUS FIBER CF 1525 C** can gel in high sugar / low pH conditions.

Process stability:

CITRUS FIBER CF 1525 C demonstrates good heat, pH, salt and shear stability in food products.

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