

Title:

**EFFECT OF SOY ON WATER MOBILITY OF MICROWAVABLE
FROZEN DOUGHS**

Authors & affiliations:

Luca Serventi and Yael Vodovotz
The Ohio State University, Department of Food Science and Technology, Columbus, OH

Microwavable frozen baked goods are used frequently by the food industry to enrobe meat, vegetable and sweet items for convenient meal delivery. These microwaved frozen doughs suffer from poor texture upon microwave heating. Ice crystal formation during freezing has been shown to be a major cause of quality loss, since the migration of water during frozen storage may cause irreversible changes to the structure of the gluten matrix. Our preliminary studies on soy bread doughs showed that their “unfreezable” water content was significantly higher compared with wheat controls. We, therefore, hypothesized that microwaving soy containing frozen doughs will result in a texturally improved baked product.

Four dough formulation were developed with 0, 20, 40 and 55% soy addition. Fresh samples were analyzed, stored in freezer (-18°C) for 2 weeks, thawed and analyzed both before and after microwaving (60 sec at high power). Nuclear Magnetic Resonance (T1 and T2 tests, Bruker NMR DX 300 MHz) were performed. Additionally, moisture content, “Freezable” and “unfreezable” water were determined by DSC and TGA as well as various textural parameters were obtained using an Instron.

T1 test of fresh dough samples showed a reduction in water mobility proportional to the addition of soy. T2 test on the same samples showed a similar value for all soy containing doughs which was lower than the control (0 soy addition). These data resulted correlated to thermal and textural measurements depicting less water mobility in all soy doughs. Results on frozen storage before and after microwaving will be discussed.