

## Testing Services

### Purity Testing

- AOSA Purity & Noxious Exam
- Undesirable Grass Seeds (UGS)
- Oregon Sod Quality Exam
- Crop & Weed Exam
- ISTA Purity & OSD Exam
- Soil Exam
- Pest & Disease Exam

### Viability Testing

- AOSA & ISTA Germination
- AOSA & ISTA Tetrazolium

### Vigor Testing

- Cold Test
- Accelerated Aging
- Conductivity
- Seedling Growth Rate
- Speed of Germination

### Genetic Traits and Varietal Identification

- Ploidy by Cytometry
- Fluorescence for ryegrass and fine fescue
- Grow-outs of ryegrass and other species
- Varietal Fluorescence Level (VFL)
- Clearfield wheat bioassay
- Sodium Hydroxide for wheat
- Phenol Test

### Pathological Tests

- Endophyte
- Pest & Disease
- Orobanche
- Ergot

### Other Tests

- Seed Moisture Content
- NMR (oil and protein)
- X-ray
- Test weight (wt/bushel and seed count)
- Chemical tests to detect damage

In addition to standard testing services, we offer a wide range of customized testing and research services. Please contact us to discuss your testing and research needs.

## Our Commitment

The OSU Seed Lab is the official seed testing laboratory of the State of Oregon, a member of AOSA and ISTA, and ISTA accredited. As part of a leading university in Agricultural Science, we focus on testing services, but also have a strong capacity to contribute in research and education in our field of expertise. Our customers range from local to national and international. As a customer focused lab, operating in a world of changing needs and opportunities, we innovate constantly to provide relevant and high quality services.

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## *OSU Seed Laboratory*

# Oil, Protein and Moisture Determination in Seeds Using NMR



*Taking care of people who  
care about seeds*

## The Oregon State University Seed Laboratory proudly announces a new testing service!

We can now test seeds for oil, protein and moisture content using NMR spectrometry, a non-destructive technology.

### What is NMR is used for?

Nuclear Magnetic Resonance Spectrometry (NMR), is used for determining oil, protein and moisture content in seeds of various oil crops. The instrument is calibrated for several oil crops including soybean, camelina, canola, meadowfoam, and euphorbia, and can be calibrated for other species as needed. Tests can be performed in whole seeds or meals.

### The need for NMR

With the diversification of crops in Oregon and the search for crops to be used for biodiesel production, the need to determine the oil content of such crops has emerged. In addition, the meal in some oil seeds such as soybean is used for feed after extracting the oil and it is useful to determine the protein content in the meal as well as in the seeds. Both the USDA and Canadian Grain Commission use NMR in determining oil seed content in oil crops.

In the past, researchers have had to send their oil seeds out of the state for oil and protein analysis. The OSU Seed Laboratory's recent acquisition of a Nuclear Magnetic Resonance Spectrometer means this service is now available in-state. This provides an advantage to Northwest researchers and commercial producers both in testing turnaround and in the availability of the equipment and service for conducting customized research.



*Bruker mqz0 NMR Spectrometer*

### The principle of the test

The oil content test estimates the amount of oil that can be extracted from seeds using an industrial extraction method. Direct pressing extracts 90-92%, whereas solvent extraction remove 97-99% of oils contained in seeds.

The NMR technique measures the resonance energy absorbed by hydrogen atoms in the sample. Usually oil contents are expressed based on a specific moisture basis (e.g.,

8.5%, 10%, etc.). Using the NMR in measuring oil content is referenced by ISO 10565:1998 Oilseeds.

### Sample size and test period

Sample size is 5-10 grams for all analyses (not for each test), i.e., for oil, protein and moisture. We can calibrate the NMR for a smaller amount of seeds (i.e., 1-2 grams), if needed. It takes 24 hours to complete the test from the time of receiving the sample. The NMR is a non-destructive method, so seeds can be returned if needed. Please enclose the sample in a moisture-proof (i.e. Ziplock) bag.



*Meadowfoam (Limnanthes alba), an important oil crop in Oregon.*

### Research potential

We welcome inquiries from researchers worldwide. Please feel free to contact us to discuss your research needs.