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Phenotyping of internal structure of seeds of legume crops by imaging and chemometrics

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► To cite this version:

Benoit B. Jaillais, Dominique Bertrand, Jean-Bernard Magnin Robert, Gérard Duc. Phenotyping of internal structure of seeds of legume crops by imaging and chemometrics. 6. International Food Legumes Research Conference (IFLRC VI), Jul 2014, Saskatoon, Canada. , 225 p., 2014. hal-02743186

HAL Id: hal-02743186

<https://hal.inrae.fr/hal-02743186>

Submitted on 3 Jun 2020

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IFLRC VI & ICLGG VII

6th International Food
Legume Research
Conference

7th International
Conference on Legume
Genetics and Genomics

PROGRAM & ABSTRACT BOOK



TCU Place
Saskatoon, Saskatchewan, Canada
July 7-11, 2014



formation of SMC in seeds of common bean.

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Phenotyping of internal structure of seeds of legume crops by imaging and chemometrics

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Improvement of phenotyping in legume breeding is a major challenge to increase yield or to imagine novel food uses. The analysis of large genetic resources collections requires for developing fast, cheap and reliable screening tools and related data processing.

Artificial vision with several lighting of different wavelengths seems to be a good alternative to characterize seeds of genetic resources collections. This technique consists in the acquisition of a set of spectral images on a unique sample. The aim of this work is to develop a new methodology of seeds phenotyping, which can be applied to different legume species.

To achieve this goal, we have used multispectral imaging and chemometrics for evaluating the phenotypic variability of the internal structure of faba bean and lupin seeds. For each cultivar, 10 seeds were cross-sectioned at half-length and a multispectral image (spatial size of 10 mm * 9 mm) of this section was acquired. The images gave many relevant pieces of information about the variability of some criteria related to internal texture, shape parameters and color. Some spectral signatures were assigned to tissues and exploited to label histological areas in seeds. PCA analysis of these images highlighted that some cultivars a low intra-genotype variability, and that the inter-genotypic variability was higher than intra genotype for shape of seeds.

110	Seeds and Nutrition	Kang, B.K.	The Effect of sprouting temperatures on Growth characteristics, Protein content and Antioxidant activity of Pea(<i>Pisum sativum</i> L.) sprouts
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The Effect of sprouting temperatures on Growth characteristics, Protein content and Antioxidant activity of Pea (*Pisum sativum* L.) sprouts

Kang, B.K.^{1*}, Kim, H.Y.¹, Choi, M.S.¹, Koo, S.C.¹, Lee, Y.H.¹, Kim, H.T.¹, Yun, H.T.¹, and Baek, I.Y.¹. ¹Department of Functional Crop, NICS, RDA, 20, Jeompiljaero, Miryang, 627-803, Korea. *(hellobk01@hotmail.com)

Pea, *Pisum sativum* L, is an important legume crop grown throughout the world. Here we show characteristics of pea sprouts and optimum germplasms for a sprout material. Peas were germinated at 20°C, 23°C and 25°C during 7 days. We investigated characteristics of Pea sprouts and analyzed protein, antioxidant compounds and activities.

It was a 5 day that Hypocotyl length was adequate to use as a food because the average length was close to 8cm that is known as the most preferable length of soybean sprouts. The range of whole length, hypocotyl length, thickness and yield rate of sprouts germinated at 20°C, 23°C and 25°C on 5day was 10.4~20.8cm, 4.4~12.1cm, 1.22~1.53mm, 329~677%, respectively. PI269803 and PI343300 had high yield rate at 23°C on 5day.

The range of protein at 20°C, 23°C and 25°C on 5 day was 22.8~36.2%. PI269803 had the highest protein content among 5 germplasms. Protein contents are not significantly different among three temperatures except PI343283 and PI343307.

Total polyphenol content(mg GA eq/g), DPPH and ABTS radical scavenging activity(mg Trolox eq/100g sample) of