FUTURE FOOD

A SWISS RESEARCH INITIATIVE

Alternative grain crops : Introducing the *kabog* millet from the Philippines as a functional food ingredient

Joan Oñate Narciso, Laura Nyström

Laboratory of Food Biochemistry, ETH Zürich

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LABORATORY OF FOOD BIOCHEMISTRY

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Ancient Grains : Benefits to Society

- Improves food security
- Addresses climate change (e.g., drought)
- Promotes access to better nutrition
- Generates income opportunities
- Conserves plant genetic resources and endangered foods because

What we do not eat vanishes forever.

EAT IT TO SAVE IT !

Photo : Cebu Farmers Market

Kabog millet : Ancient grain from Visayan folklore

Photo : Cebu Farmers Market

Kabog millet : Why we should study it

For people :

- Vast, untapped potential health benefits as staple crop

For plant conservation and breeding :

- Genetic resource for improved breeding of other proso millet ecotypes

For climate change adaptation :

- Family of most drought-resilient cereals (**C4 plants**)

For the environment :

- None to little fertilizer, not susceptible to pests, diseases (organic agriculture)

Kabog millet : Nutritional content analysed

- ✓ Total Starch
- ✓ Amylose/Amylopectin Ratio
- ✓ Dietary Fibre
- ✓ Ash
- ✓ Total Protein
- ✓ Amino Acid Profile
- ✓ Phenolic Acids
- ✓ Carotenoids
- ✓ Tocopherols
- ✓ Fatty Acids
- ✓ Antioxidant activity (DPPH, ABTS, ORAC)

Kabog millet : Nutritional content reported in this presentation

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- ✓ Amylose/Amylopectin Ratio
- ✓ **Dietary Fibre**
- ✓ **Ash**
- ✓ **Total Protein**
- ✓ Amino Acid Profile
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- ✓ Tocopherols
- ✓ Fatty Acids
- ✓ **Antioxidant activity** (DPPH, ABTS, **ORAC TEAC values)**

Dietary Fibre, Ash, and Total Protein (Manuscript *under Review*)

- **Dietary Fibre (DF):** Whole grain kabog millet >>> black rice (3x higher)

  Whole grain kabog millet (14-15% DF), black rice (5% DF)

- **Ash:** Whole kabog millet >>> black rice (3x higher)

  Whole grain kabog millet (4% ash), black rice (1,6% ash)

- **Total protein:** Whole kabog millet >> white rice (2x higher)
  Whole kabog millet >> black rice (1,5x higher)

  Whole kabog millet (12% protein)
  White rice (6,4% protein)
  Black rice (8,4% protein)

Carotenoids, Phenolic Acids, TEAC (ORAC) (Manuscript *under Review*)

- **Carotenoid:**

  Whole grain kabog millet >>>>> black rice (5x higher)
  Whole grain kabog millet >>> reference miller (2,5x higher)

  Whole grain kabog millet (16-17 µg/g)
  Reference millet (7 µg/g)
  Black rice (4 µg/g)

- **Phenolic acid:**

  Whole kabog millet >> black rice (2x higher)
  Whole kabog millet >>>>> reference millet (5x higher)

  Whole grain kabog millet (1500-1600 µg/g)
  Reference millet (300 µg/g)
  Black rice (700 µg/g)

- **TEAC Values:**

  Whole kabog millet ≈ black rice
  Whole kabog millet > reference millet

  Whole kabog millet (~1400)
  Reference millet (~1200)
  Black rice (~1400 µg/g)

Conclusions

- Kabog millet has good dietary fibre, ash, and total protein content, and amount of phenolic acids and carotenoids. It is a good substitute to white rice.

- Whole kabog millet performed well in DPPH, ABTS, and ORAC antioxidant assays.

- Kabog millet can be used as functional food additives to increase the nutritional value of rice-based diets.

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