

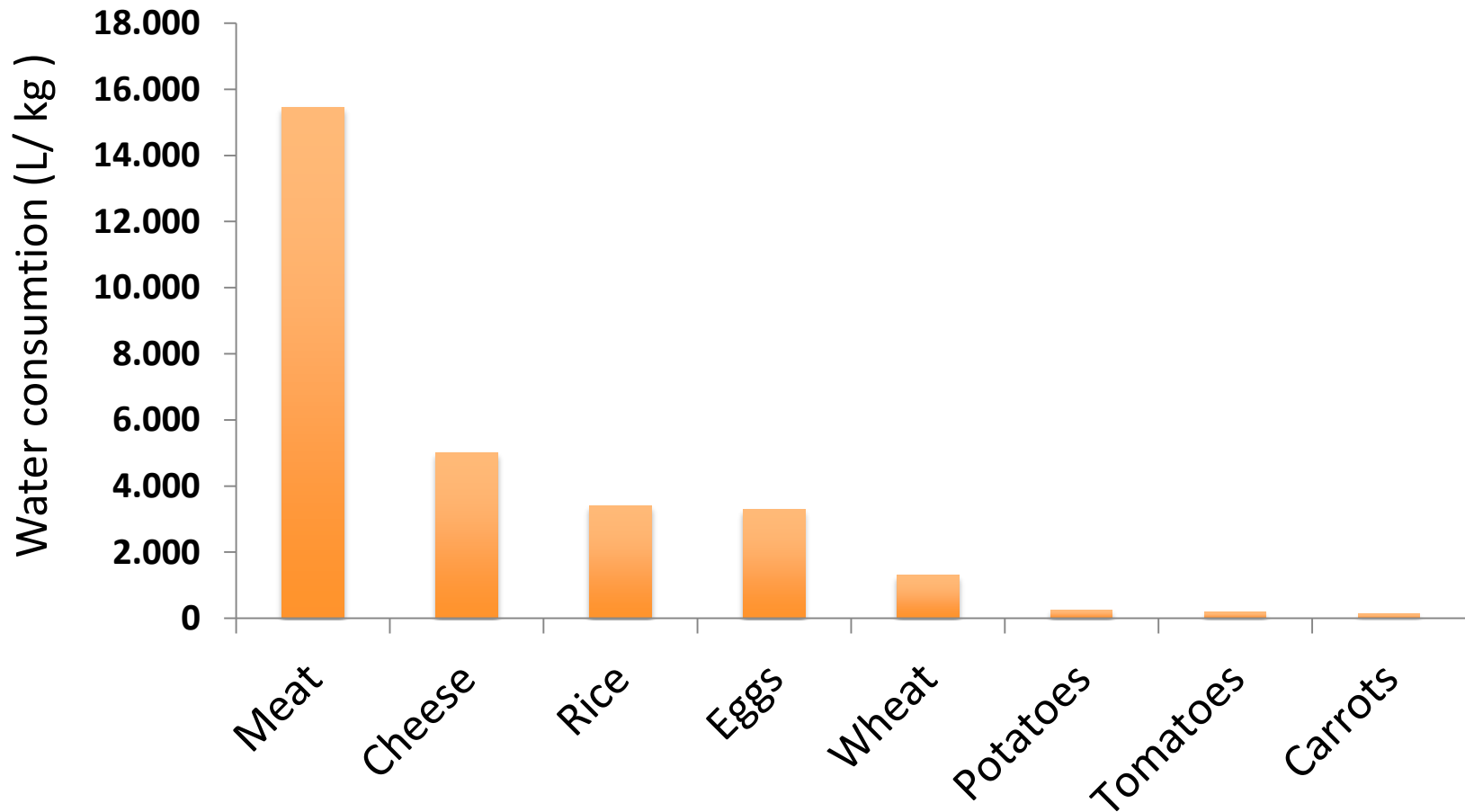


Towards printing a meat-like structure using sustainable plant proteins

3D Food Printing Conference
Venlo, 12.04.2016

Thomas Lötzbeyer, Anna Knäulein

Resource intense meat production



Heinrich-Böll-Stiftung & BUND & Le Monde diplomatique, *Durchschnittlicher Wasserverbrauch bei der Erzeugung von Lebensmitteln (in Litern pro Kilogramm bzw. Liter)*, Statista, <http://de.statista.com/statistik/daten/studie/249969/umfrage/zur-herstellung-von-verschiedenen-nahrungsmitteln-benoetigtes-wasser/> (letzter Besuch 8. April 2016).



Meat replacement products on the market



„Beef“



„Chicken“



„Chicken“

Project objective



Sustainable material



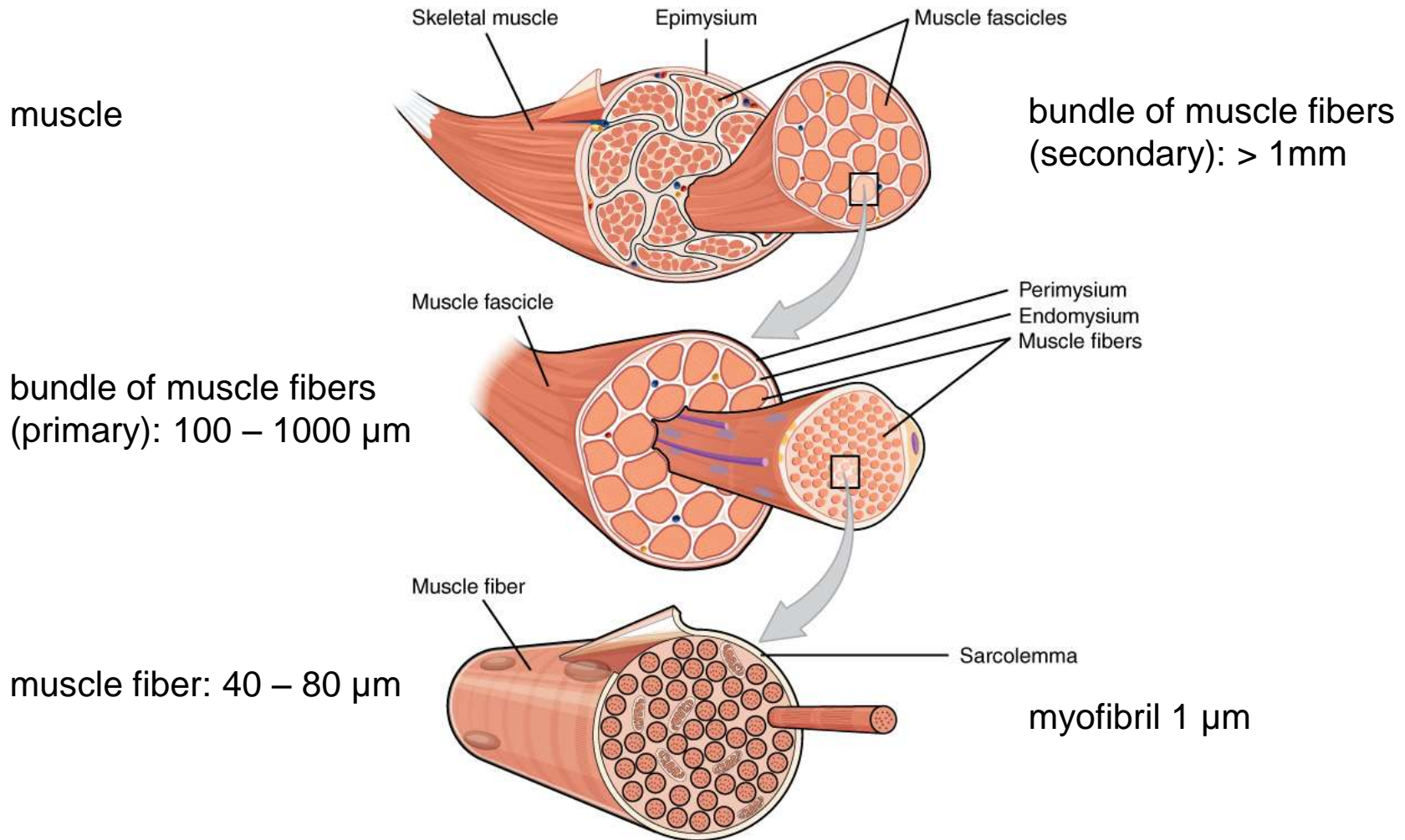
3D printing



Real meat structure (chicken breast)



Meat structure



„1007 Muscle Fibes (large)“ von OpenStax College - Anatomy & Physiology, Connexions Web site.
<http://cnx.org/content/col11496/1.6/>, Jun 19, 2013. Lizenziert unter CC BY 3.0 über Wikimedia Commons -



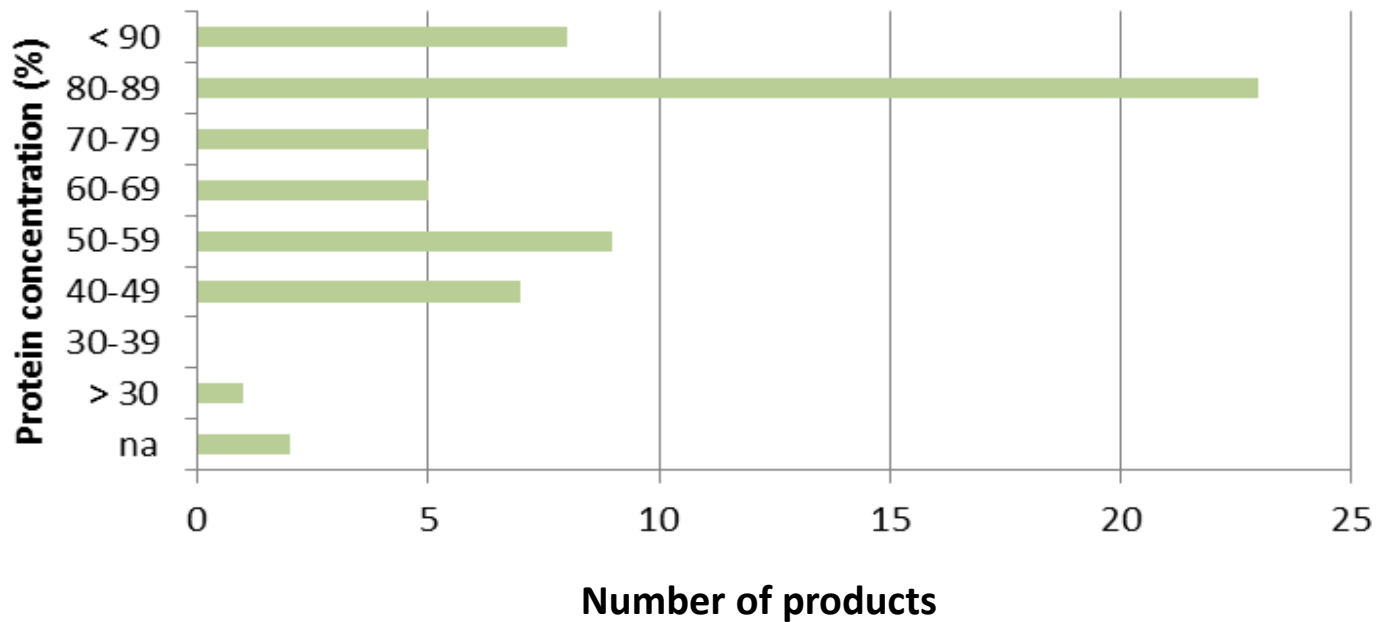
Meat structure



Cooked chicken breast

Selection of plant material

Plant protein preparations with different protein contents:



18 different plant sources



Screening of plant proteins

60 Plant Proteins



Screening procedure



Material properties



Printability



Screening – material properties



Protein powder



Addition of water and other components



Slurry



Heating in water bath



Slurry after heating

Screening – material properties

Effect of pH value:

pH 4.4

pH 6.8

pH 8.9



Effect of protein powder concentration:

10 %

15 %

20 %

25 %



Screening of plant proteins

60 Plant Proteins



Screening procedure



Material properties



Printability



Screening - printability

Manual printing system



Slurry



Printability (cold)



Printability (hot)

Screening – printed structure parts



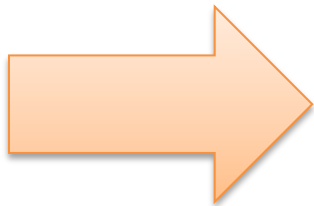
Soy



Pea

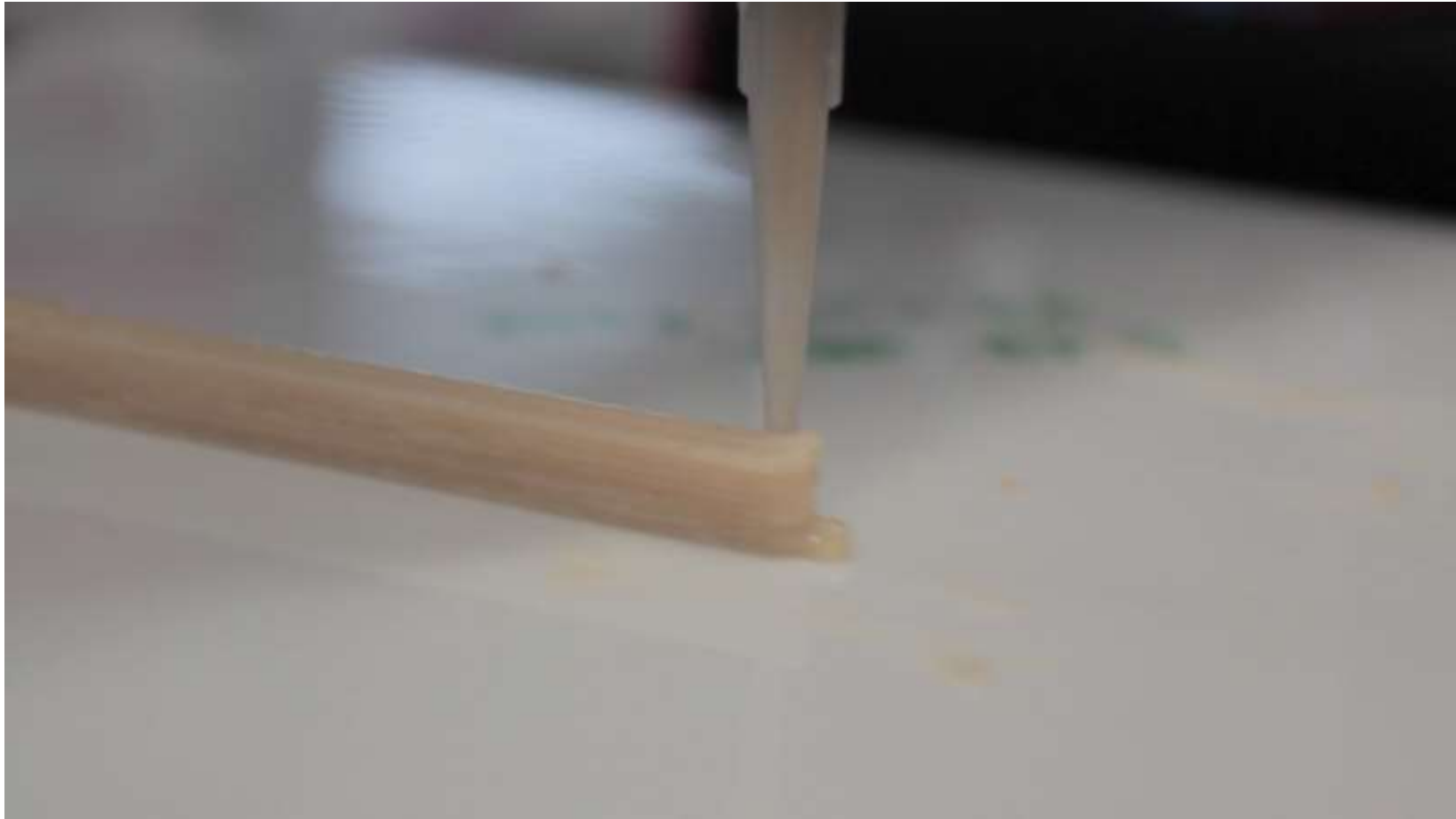


Sesame



Successfully printed sub structures

Transfer to 3D printer



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3D printed plant protein preparations



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Thank you for your attention



GEFÖRDERT VOM



Bundesministerium
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