

## Curriculum vitae of Eero Puolanne



### T. Eero J. Puolanne

Born on September 15, 1947 in Helsinki, Finland

#### Education

High school graduate, 1966

M.S. in Meat Technology, University of Helsinki, 1971

Licentiate Degree in Meat Technology (major) and Food Chemistry and Technology, University of Helsinki, 1974 (one year program)

Ph.D. in Meat Technology, University of Helsinki, 1977. Thesis: Der Einfluss von verringerten Nitrit- und Nitratzusätzen auf die Eigenschaften der Rohwurst.

#### Professional Career

Professor Emeritus and part time Research Director, University of Helsinki, 8/2011-

Professor in Meat Technology, University of Helsinki, 3/1984-7/2011

Affiliate Professor in Meat Technology, Danish Veterinary and Agricultural University, Department of Food Science/Meat Science, 2006-2010 (Secondary Occupation)

Dean of Faculty of Agriculture and Forestry, University of Helsinki, 1992-94, 1995-7/1998

Acting Professor in Meat Technology, University of Helsinki, 2/1983-2/1984

Senior lecturer (docent) in Meat Technology, University of Helsinki, 1978-1983

Senior Researcher, Academy of Science in Finland, 7/1981-1/1983

Researcher, Academy of Science in Finland, 1976-81

Research Assistant, Academy of Science in Finland, 1972-76

Research Assistant, Department of Meat Technology, University of Helsinki, 8/1970-72

Numerous chairmanships in various boards and workgroups at the university and faculty level, including Viikki Science Library; Education and Research Centre for Rural Development, University of Helsinki; Board of work safety in University of Helsinki; Board of restaurant services in University of Helsinki, and memberships in such organizations, e.g. The Scientific Board of University of Helsinki 1998-2000; NOVA Board, 1995-1998; Nordic Network of Agricultural and Veterinary Universities and NOVA Baltic, 2002-2005, Finnish Academy of Science, 2003-, Board of Finnish National Library 2010-2014.

Military Service (compulsatory) and Officer School, 1967-68. Rank: Second Lieutenant

#### Teaching

Courses (each year): Colloid Chemistry of Meat, 1972-82. (6 ECTS); Preliminary course in Meat Technology, 1983- (3 ECTS); Master's Level course in Meat Science, 1983- (6 ECTS); Master's Level course in Meat Technology, 1983- (4 ECTS); Environmental Technology in Food Industry 1998- (2 ECTS);

#### Supervision

Major Professor (and supervisor/co-supervisor) for 8/1 Doctoral degrees

(2 in 1994, 1 in 1995, 2 in 1996, 1 in 2000, 1 in 2001, 1 in 2006 and 1 in 2007).

Major Professor and supervisor for 4 Licentiate degrees and for about 160 Masters' degrees

Currently the supervisor for 5 Master Students

**Honors** The American Meat Science Association, International Award in 2002

Medal in Gold, Meat Industry Association (Lihakeskusliitto ry) 2005

#### **Publications**

I. Original Scientific Publications

A. Journal Articles, 73 (refereed).

B. Papers and Abstracts in Congress Proceedings, 80.

C. Review Articles, 17 (refereed and non-refereed).

II. Other Publications

A. Lectures, Reports and Articles in Technical Journals and Books, 56.

B. Articles in journals of general interest, 66,

III. Teaching Papers, 11.

IV Edited Books, 29.

## **Other Activities**

Contact Secretary of the International Congresses of Meat Science and Technology, 1986-  
Secretary (1970-1992) and Chairman (1992 -) of the Society of Finnish Meat  
Technologists.

Member of the Board of Trustees, Society of Finnish University Professors, 1989-1994.

Contact Officer, Society of Finnish University Professors, 1999 -

Member of the Board of Trustees, Society of Finnish University Professors, University of  
Helsinki Section, 1985 -, Chairman 1999-2000.

Chairman of the Council, Society of Finnish University Professors, 2011-12.

Member of several Food and Agriculture Scientific Societies in Finland and Scandinavia

Trustee Professor of the Food Science Student Association 1987-92.

Member of Editorial Board

Journal of Muscle Foods 1999 -; Die Fleischwirtschaft, 1983 -2003;

Meat Science, 1991-; Acta Agriculturae Scandinavica, A: Animal Science, 1992-

Chairman of the Organizing Committee

The 33rd International Congress of Meat Science and Technology in Helsinki, 1987

OECD Symposium 'Pork Quality, Genetics, and Metabolic Factors', Helsinki, 1992

Finnish Meat Industry Research Meeting, Biannually 1972-2003

Several minor symposia on meat and food science in Finland

The 50<sup>th</sup> International Congress of Meat Science and Technology in Helsinki, August  
2004.

Official Opponent or Panel Member for 10 Doctoral Theses (of which 7 abroad)

Member of Election Board for the

Professor of Food Technology in Technical Research Centre of Finland

Professor of Meat Science at the Royal and Veterinary University of Denmark in  
2001 and 2003

Professor of Meat Technology at the University of Hohenheim, Germany, 2003

Professor of Meat Science, University of Alberta, 2005

Professor of Meat Science, SLU Sweden, 2005 (part time professorship)

Senior lecturer of Meat Science, SLU, Skara, Sweden, (2006)

Evaluation of Food Science education in KVL and DTU (FOTEK), member of the  
evaluation group, 1998.

Evaluation of Estonian Food Science research (2002), chairman of the evaluation  
committee

Evaluation of Danish Agricultural Research Centre (DIAS), Food Laboratories, member of  
the evaluation group. (2005)

Evaluation of higher food education in Estonia (2007), chairman of the evaluation  
committee

Evaluation group of Quality Assurance, Häme University of Applied Sciences, vice  
chairman (2010)

## **Major visits abroad**

Migros Meat Laboratory, Switzerland, 3 mo. (1971)

Meat and Muscle Laboratory, Texas A&M University, USA, 3 mo. (1982)

The International Congresses of Meat Science and Technology (1972-)

Invited Speaker and Chairman Scientific Meetings and Universities in Europe, North America,  
South America, Japan and Australia

## **Research activities**

### **Nitrite and nitrate**

In 1973–1977 my main research topic was nitrite and nitrate in dry fermented sausages. I was able to show that it is possible to prepare fermented sausage with 150 mg NaNO<sub>3</sub>/kg and 100 mg NaNO<sub>2</sub>/kg and with their 50-percentages combination (75+50). It was also shown that virtually no reduction of nitrate took place below pH 5.2 and 15 °C. The nitrite reduction stopped at pH 5.0. The reaction kinetics of the effects of starter cultures on nitrate reduction was also studied in vitro.

In 2001–2003 I was the project leader in a joint study funded by the Technological Agency of Finland and Finnish meat industry on the reduction of the nitrite levels in Finnish meat products. It was stated that the levels of added nitrite can be reduced to 80 mg NaNO<sub>2</sub>/kg. The nitrite intake of

children of 1–6 years would then reduce by 27% which is a marked reduction from ADI levels of 50–70 to 30–50%.

### **Water binding in cooked meat products**

From 1977 onwards I have studied water-binding in cooked meat products. Salt and salt mixtures other additives and ingredients, meats as such, pH, processing parameters etc. have been studied from a rather practical point of view. Recently, a system of measuring the water-binding capacity of meat trimmings in a multicomponent sausage batter was developed, and the effects of salt and phosphate on water-binding in meats of naturally varying pH-values were studied.

1981–1984 I studied the effects of pre-rigor curing on the water-binding of meat in cooked sausages. It was stated that pre-rigor curing has similar effects on water-binding that the use of phosphate. The amount of salt in meat should be, depending on fat content, at least 1.3–1.5% NaCl in order to establish the heat resistant gel. In lower salt contents a fine raw batter can be obtained, but the structure will break during the heating. Consequently, minced meat products cannot benefit well of pre-rigor meat, because the content of salt needed for heat stability is sensorially too high.

An application of this research line has been the joint study on the reduction of sodium in Finnish meat products, funded by Technological Agency of Finland and Finnish meat industry in 1999–2001. We were able to show that a substantial reduction in sodium can be achieved in most of the Finnish meat products being already now on average internationally low salt products, without compromising the sensory or technological quality of the products.

Currently I participate in the large EU-project Q-PorkChains, coordinated by Dr. Anders Karlsson, University of Copenhagen, Denmark. Title of the topic to be done at the Department of Food Technology is 'Theoretical basis of water-binding in muscle gels'.

### **The effects of stress on meat quality and animal welfare**

Since 1979 the other main research line of mine, in addition of water-binding, has been animal stress and meat quality, related in animal welfare. In 1979-80 we made an extensive study on DFD beef collecting data of 13,200 animals from 14 slaughterhouses. The main conclusion was to recommend the use of individual penning of bulls in slaughterhouses, which is the common practice in Finland now.

From 1990 on we have studied the fibre typing and other biochemical characteristics of porcine muscles in relation to meat quality. Now we concentrate on growth rate, and the specific themes are lactic acid metabolism, bone and connective tissue strength in pigs and poultry. The studies have been funded by the Ministry of Agriculture and Forestry, Finnish Academy of Science and Meat Industry.

In connection to this theme, a couple of articles on meat ethics have been prepared.

### **Other**

Shorter projects have been numerous, including colour measurements in cooked meat products, the effect of pH in beef during cooling on the tenderness and aging was studied comparing of slaughterhouses of different cooling rates. It was stated that the most important factor to follow is that the pH value is not above 5.8 when the temperature decreases to 7 °C or less. The high pH causes cold toughening, not necessarily cold shortening. We were also able to show in vitro that in a carcass-like situation when there are temperature gradient in the muscle, the colder part will cold shorten, and the warmer part will rupture because the shortening in the cold part of the muscle.

I was also leading in 2001–2 a project on the future of food production and food industry in Finland. About 50 leading Finnish experts did a working group project in order to prognosticate the situation in 2030 in Finland.