

INFLUENCE OF ROASTING CONDITIONS ON CHEMICAL COMPOSITION AND PHYSICOCHEMICAL PROPERTIES OF BARLEY PRODUCTS

WIEBKE SCHLÖRMANN^{a,b}, SILVANA ZETZMANN^a, BERTHOLD WIEGE^c, NORBERT U. HAASE^c, ANDREA GREILING^d, STEFAN LORKOWSKI^{a,b}, CHRISTINE DAWCZYNSKI^{a,b}, MICHAEL GLEI^{a,b}

^a Institute of Nutritional Sciences, University of Jena, Dornburger Strasse 24-29, 07743 Jena, Germany

^b Competence Cluster for Nutrition and Cardiovascular Health (nutriCARD), Halle-Jena-Leipzig, Germany

^c Max Rubner-Institut, Federal Research Institute of Nutrition and Food, Schützenberg 12, 32756 Detmold, Germany

^d Thuringian State Office for Agriculture and Rural Areas, Naumburger Strasse 98, 07743 Jena, Germany

Introduction

Constantly, the incidence of non-communicable chronic diseases such as diabetes mellitus type 2 (DMT2), cardiovascular diseases or cancer is increasing worldwide (1,2). The development of DMT2 and other chronic diseases may be preventable by a change of lifestyle-factors including a well-balanced, healthy diet rich in dietary fibre from whole grains or whole grain products (3,4,5). Due to the high content of dietary fibre such as β -glucan, the consumption of barley products can contribute to a healthy diet and the prevention of chronic diseases. Therefore in the present study the influence of different roasting conditions on nutritional composition, acrylamide formation and physicochemical properties such as viscosity on different barley products (kernels, thin and thick flakes) was investigated.

Results

Different barley products of a special variety (beta@-barley, Dieckmann, Germany) with low amylose and high β -glucan content were roasted for approx. 20 min in the range of 160-200°C.

Nutrient composition, acrylamide concentration and viscosity of the products are presented in Tab. 1, 2 and 3.

Tab. 1: Nutrient composition of roasted barley products

Product RT (°C)	β -Glucan (%)	TDF (%)	IDF (%)	Starch (%)	Protein (%)
Kernels	5.2	17.8	7.0	68.3	9.6
160	5.2	17.5	6.9	66.8	9.4
170	5.1	17.6	7.0	67.3	9.7
180	5.2	17.8	7.7	67.2	9.8
Thin flakes	5.2	18.9	7.0	67.2	9.9
160	5.3	16.4	5.7	68.2	10.1
170	5.1	17.5	7.2	67.7	10.0
180	5.1	16.5	8.0	67.0	10.0
Thick flakes	5.9	17.6	5.4	68.4	10.6
160	5.9	17.9	6.7	67.6	10.8
170	5.8	18.7	7.1	66.0	10.8
180	6.1	16.8	7.5	63.3	10.7

Tab. 2: Acrylamide concentration (μ g/kg) of roasted barley products

RT (°C)	Kernels	Thin flakes	Thick flakes
Raw	<10	<10	<10
160	27.9	62.5	43.4
170	62.7	153	132
180	109	286	325
190	265	573	752
200	318	579	795

Tab. 3: Dynamic viscosity (mPas) of roasted barley kernels

RT (°C)	5 min	30 min	60 min	90 min
Raw	174	214	224	227
160	129	159	166	170
170	113	133	140	142
180	102	113	116	118

Viscosity of aqueous suspensions of roasted barley kernel flours measured by a rapid visco analyzer with 12% dry matter at 37°C and 960rpm as function of time

Conclusion

In this study the influence of roasting on different barley products (kernels, thin and thick flakes) was investigated. The content of health-related compounds such as β -glucan, dietary fiber (TDF, IDF), starch and protein was not affected by roasting. However, the roasting temperatures should not exceed 170-180°C to avoid excessive acrylamide formation. The viscosity of aqueous slurries significantly decreased with increasing roasting temperatures.

References

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RT = Roasting temperature TDF = Total dietary fiber IDF = Insoluble dietary fiber