

PRODUCTION OF LENTIL-BASED FUNCTIONAL INGREDIENTS FOR CARDIOVASCULAR HEALTH BY HIGH PRESSURE-ASSISTED PROTEOLYSIS



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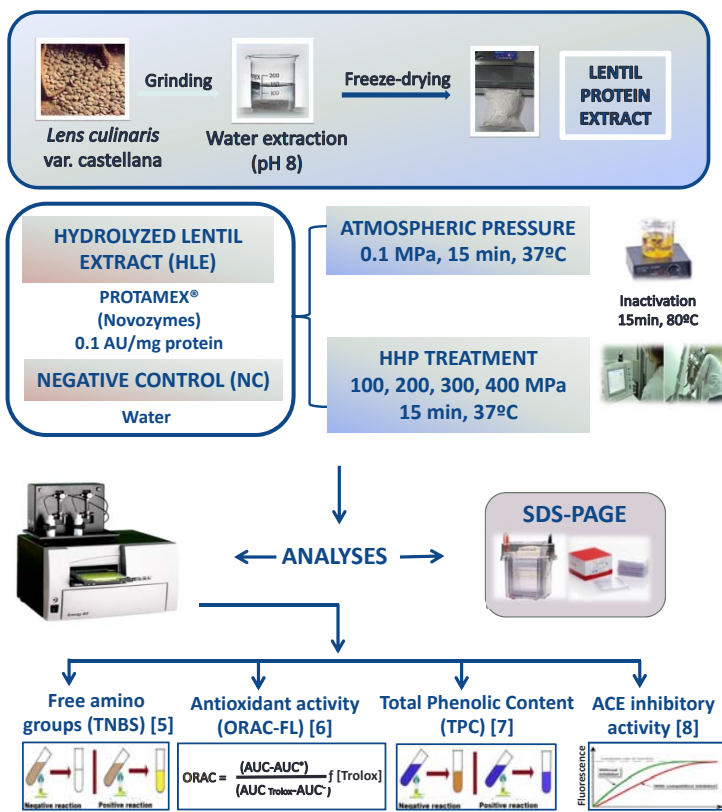
INTRODUCTION

Hypertension is one of the most important problems of public health in the developed countries since it is involved in cardiovascular, cerebrovascular and renal diseases [1]. Angiotensin-converting enzyme (ACE) converts the inactive angiotensin I into the active angiotensin II which increases vasoconstriction and this causes the rise of blood pressure. Therefore, several approaches to release ACE inhibitors from food proteins are encouraged [3]. Legumes are the largest source of proteins from plant origin and enzyme treatment during high hydrostatic pressure (HHP) considerably enhances their hydrolysis [4].

OBJECTIVE

This work investigated the potential of HHP treatment to produce lentil protein hydrolyzates combining angiotensin I converting enzyme (ACE) inhibitory and antioxidant activities for cardiovascular health.

MATERIAL & METHODS



CONCLUSIONS

HHP improved the proteolytic activity of Protamex in lentil protein extracts.

These results suggest that HHP enhances proteolysis of lentil globulins by Protamex® producing peptides with ACE-inhibitory and antioxidant activities that could be applied as functional ingredients for cardiovascular health.

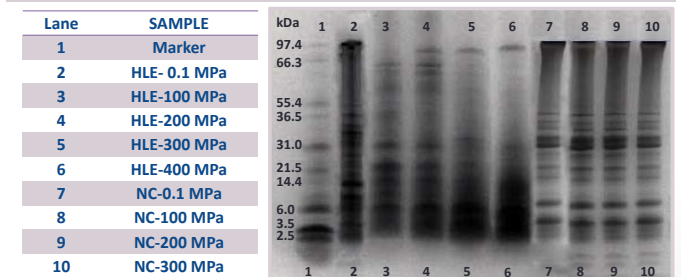
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RESULTS

Figure 1. Protein profile of lentil extracts hydrolyzed by Protamex® at different pressures



- ✓ Lentil proteolysis by Protamex® was enhanced with HHP compared to atmospheric pressure. HHP assisted proteolysis up to 300 MPa produced hydrolysates containing peptides < 20 kDa (lane 5; Figure 1).

Figure 2. Free amino groups in lentil extracts hydrolyzed by Protamex® at different pressures

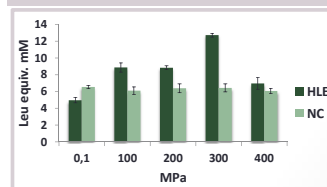
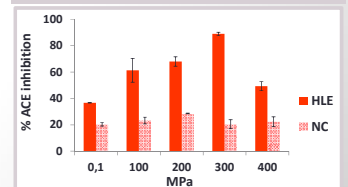


Figure 3. ACE inhibitory activity of lentil extracts hydrolyzed by Protamex® at different pressures



- ✓ Higher HHP intensity led to larger protein hydrolysis up to 300 MPa (Figure 2).
- ✓ ACE inhibitory activity of lentil hydrolysates increased as function of high pressure intensity (Figure 3).
- ✓ Lentil hydrolysates obtained with Protamex® at 300 MPa showed the highest ACE inhibition (89%; Figure 3).

Figure 4. Antioxidant activity in lentil extracts hydrolyzed by Protamex® at different pressures

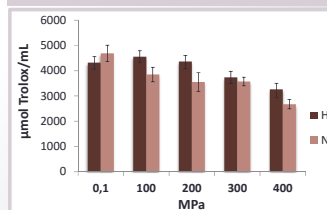
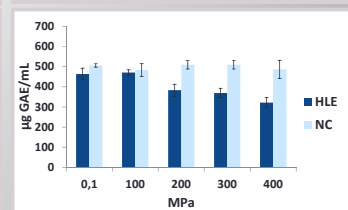


Figure 5. Total phenolic content in lentil extracts hydrolyzed by Protamex® at different pressures



- ✓ HHP assisted proteolysis (up to 200 MPa) improved the antioxidant activity of lentil hydrolysates compared to atmospheric pressure (Figure 4).
- ✓ Total phenolic content was reduced in lentil hydrolysates under HHP treatment.