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An Investigation of the Sensory Properties of Legumes as Influenced by Irish Consumer's Knowledge and Acceptance

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INTRODUCTION



Figure 1 From left to right: raw soya beans, puy lentils and chickpeas used in the study.

- The health benefits related to legume consumption are many and varied, however the acceptability of this nutritive food has received very little attention.
- The aim of this research is to investigate consumer knowledge of the health benefits associated with regular consumption of legumes and to explore consumer acceptability of legumes.
- This study highlights how recipe formulation, consumption patterns, health behaviour and sensory properties all intertwine to shape an individual's acceptance of legumes.

MATERIAL AND METHODS

- One-hundred-fifty** people from the Galway-Mayo Institute of Technology (GMIT), equally divided between student/staff, male/female and <30 and >30 year old participated in the acceptance test of the legumes.
- Three recipe formulations** were applied to each legume: **1)** plain boiled, **2)** plain boiled plus vinaigrette and **3)** pureed into a spread.
- Other questions were used to ascertain consumer consumption patterns, demography, knowledge of legumes and **healthy eating attitude**.

RESULTS

- People interviewed consume legumes mainly canned (76%), followed by fresh (44%), dried (41.4%) and frozen (32.6%). Legumes are mainly used in salads (47.1%) and soups (44%).
- Subjects >30 years old rated each sensory attribute (SA) and overall liking (OL) of each legume recipes higher than subjects <30 years old ($p < 0.05$). Males ranked SA and OL significantly higher ($p < 0.05$) than females overall, taking into consideration all the recipes together.
- Results also indicate that subjects are unaware of many of the health benefits of legumes and that the main extrinsic factors influencing poor consumption of legumes relates to dietary practice and cooking time.

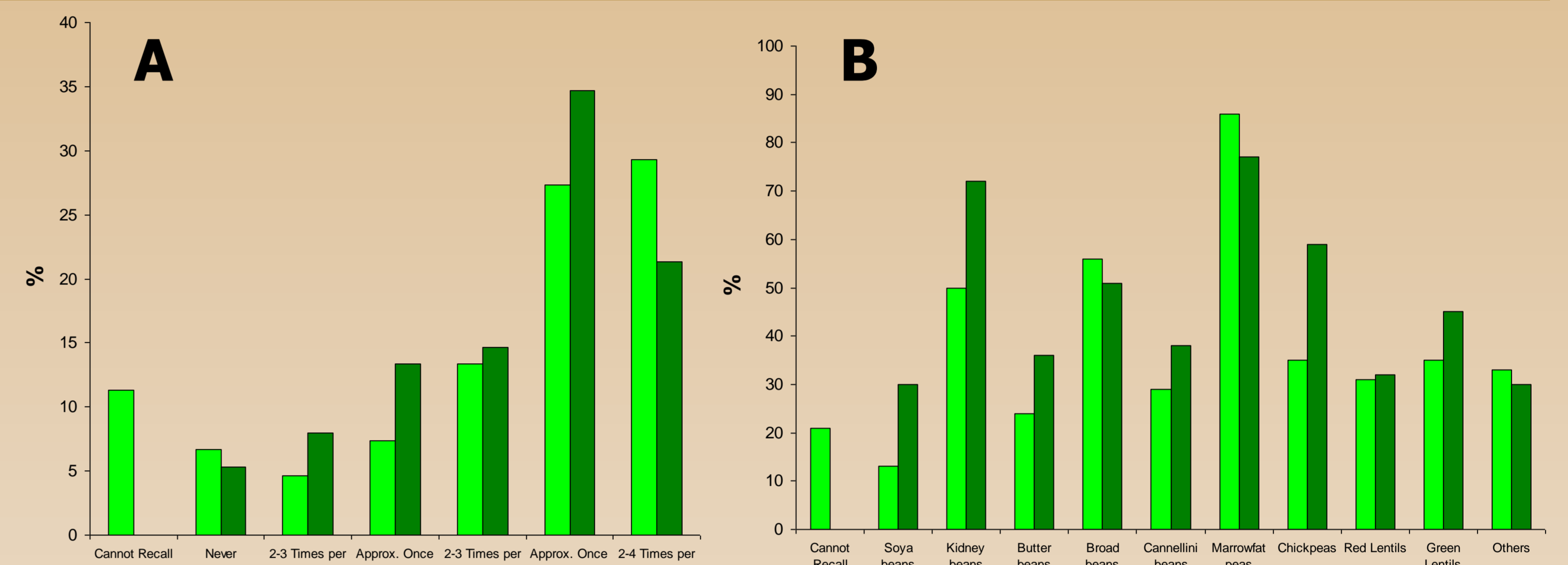


Figure 3 Childhood (light green) and adult (dark green) legumes consumption comparison by frequency (A, $r = 0.828$, $p < 0.05$) and type (B, $r = 0.866$, $p < 0.05$). Notice the high correlation achieved.

Table 1 Sensory attributes scores (on a 9 points hedonic scale) for the nine different legume recipes. Data represent mean \pm SE. Spread formulations received the highest overall liking for soya beans and chick peas but not for lentils. Both spreads received high scores for all the sensory properties except appearance which was rated poorly. Plain boiled lentils with added vinaigrette was the most preferred of the lentil samples.

	Overall Liking	Appearance	Aroma	Taste	Aftertaste	Texture
Soya plain boiled	5,38 \pm 0,14	5,81 \pm 0,13	5,44 \pm 0,12	5,39 \pm 0,15	5,22 \pm 0,13	5,70 \pm 0,15
Soya + vinaigrette	5,55 \pm 0,17	5,68 \pm 0,15	5,42 \pm 0,16	5,29 \pm 0,17	5,26 \pm 0,16	5,77 \pm 0,16
Soya spread	5,96 \pm 0,19	4,88 \pm 0,19	5,52 \pm 0,17	6,15 \pm 0,18	5,82 \pm 0,17	5,91 \pm 0,18
Lentil plain boiled	4,86 \pm 0,16	4,72 \pm 0,17	5,11 \pm 0,14	4,69 \pm 0,18	4,68 \pm 0,16	5,03 \pm 0,17
Lentil + vinaigrette	5,17 \pm 0,17	4,94 \pm 0,17	5,35 \pm 0,15	5,11 \pm 0,18	5,07 \pm 0,17	5,38 \pm 0,16
Lentil spread	4,91 \pm 0,20	4,01 \pm 0,19	5,19 \pm 0,17	5,05 \pm 0,20	4,63 \pm 0,19	5,20 \pm 0,19
Chick pea plain boiled	5,62 \pm 0,17	5,55 \pm 0,16	5,62 \pm 0,12	5,69 \pm 0,16	5,45 \pm 0,17	5,52 \pm 0,17
Chick pea + vinaigrette	5,47 \pm 0,17	5,46 \pm 0,17	5,57 \pm 0,14	5,42 \pm 0,18	5,39 \pm 0,18	5,32 \pm 0,18
Chick pea spread	5,69 \pm 0,20	5,20 \pm 0,19	5,61 \pm 0,16	5,79 \pm 0,20	5,61 \pm 0,19	5,85 \pm 0,19

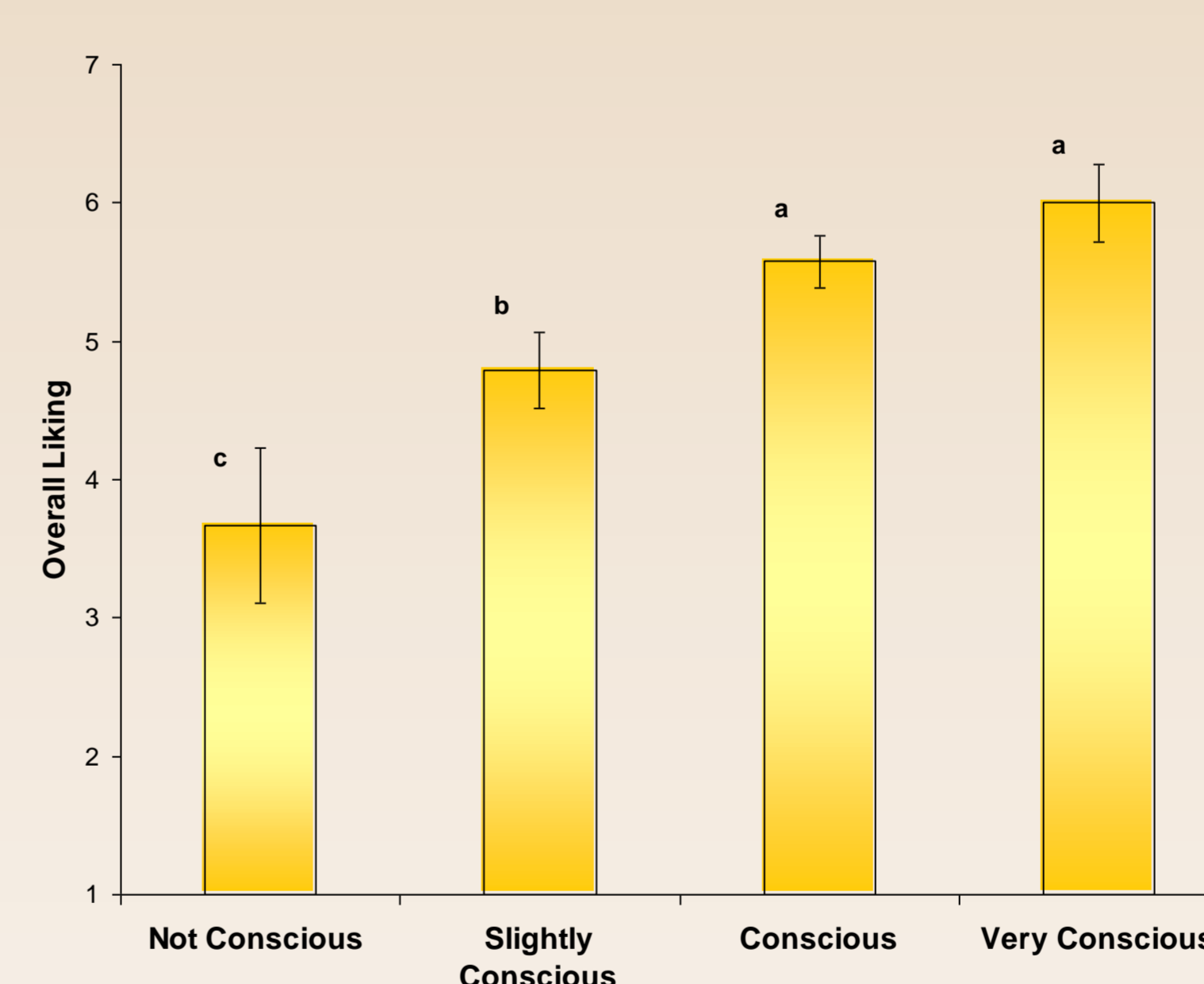


Figure 4 Overall acceptability of the nine legume recipes against health consciousness. Consciousness was measured creating a new variable summing the scores of the eight health-conscious related questions present in the questionnaire. Cronbach's alpha was used to assess internal consistency for the awareness questions ($\alpha = 0.84$). Significance was set at $p < 0.05$.

Figure 2 Health benefit awareness levels of subjects, related to regular legume consumptions. Awareness of some health benefits is very low, especially about cancer, diabetes and menopause symptoms.

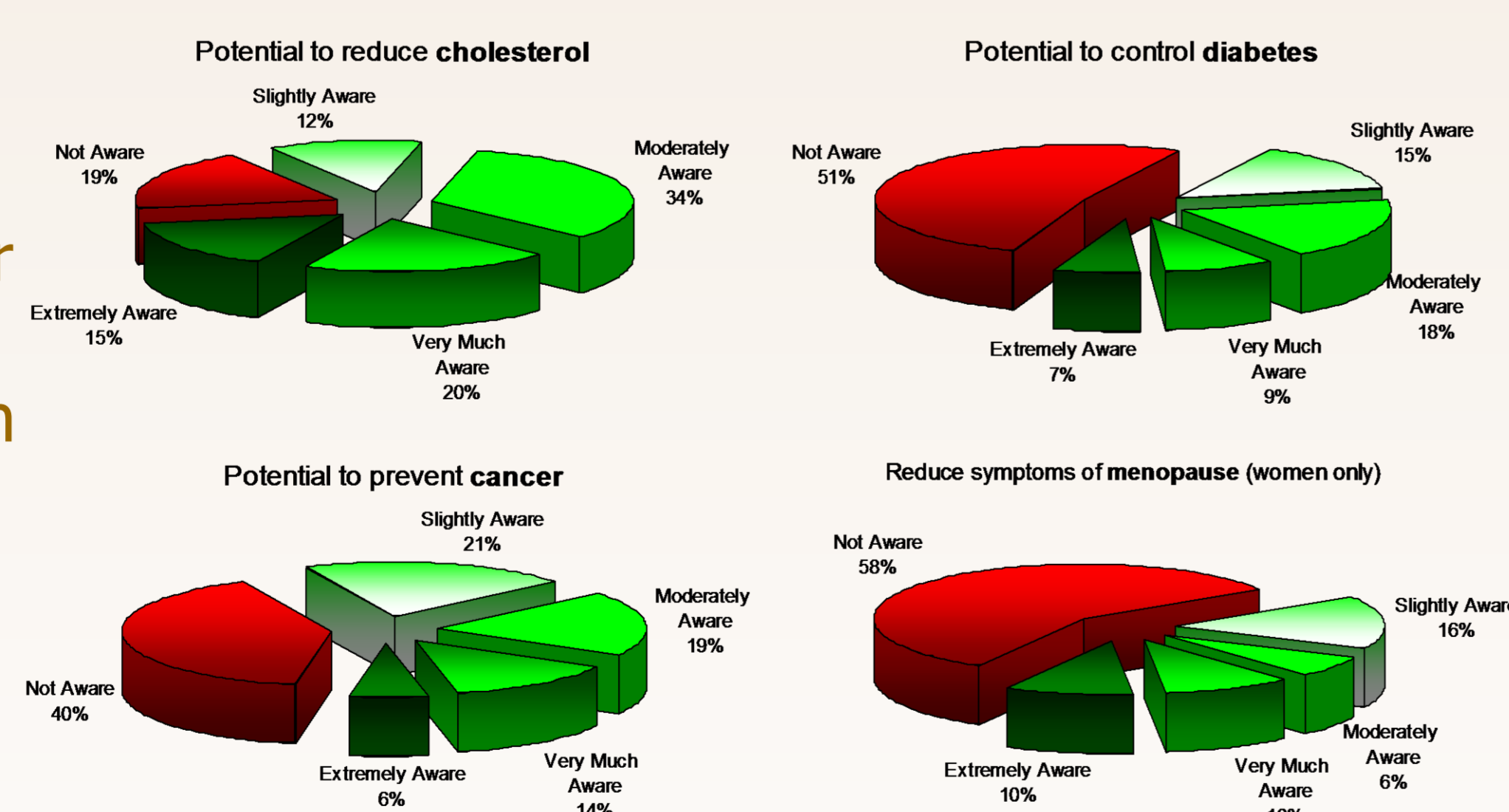
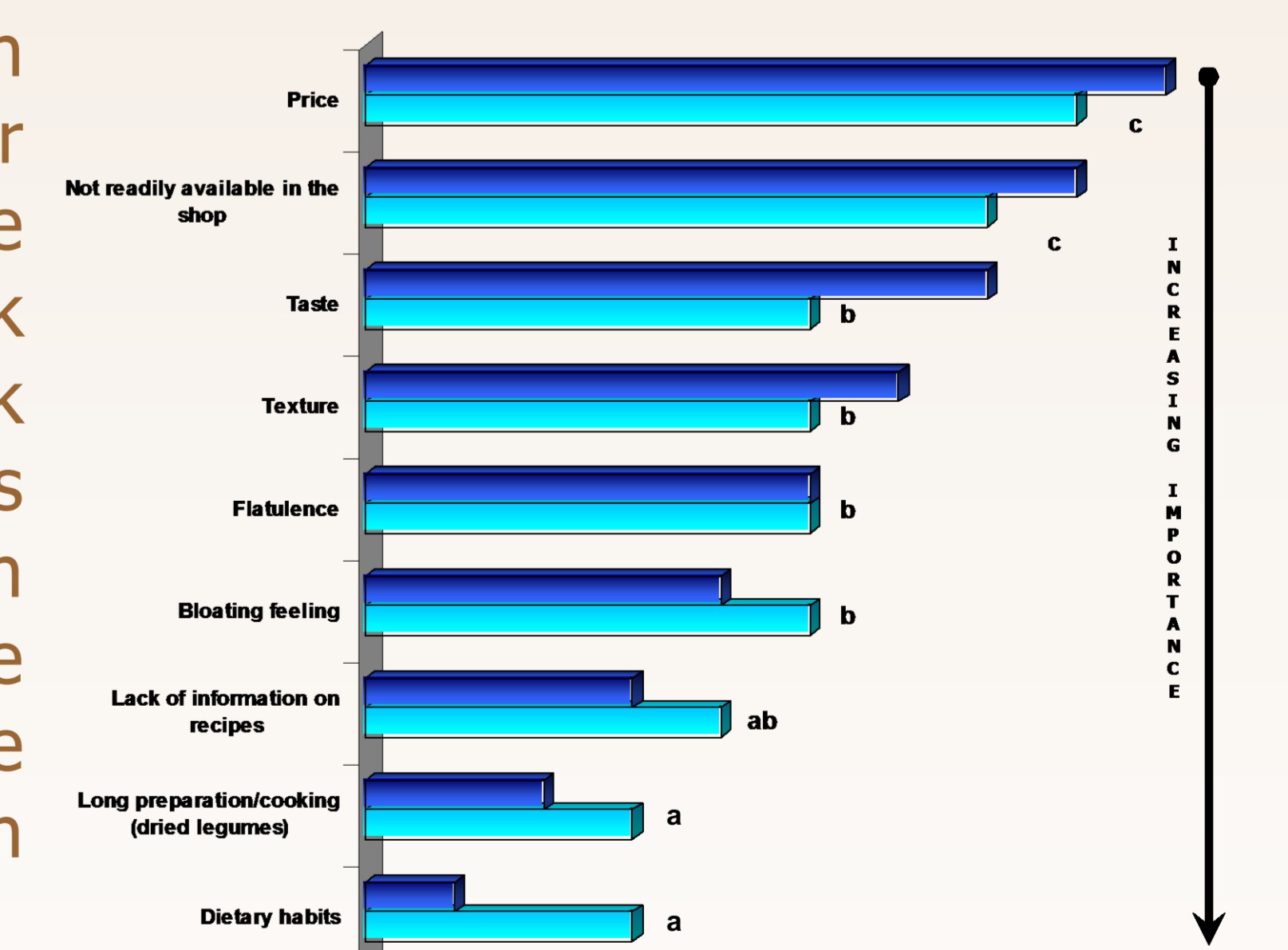


Figure 5 Extrinsic factors involved in legume consumption. Each consumer ranked the nine factors (1 being the most important). Bars indicate rank median (light blue) and rank position (blue). When factors obtained the same median, mean was used to rank graphically the factors. Friedman test with multiple comparison and Bonferroni correction ($p < 0.05$) was used for the analysis.



CONCLUSIONS

- Overall liking for the legume preparations tested was generally low, but this study shows how legume palatability can sometimes be increased with the addition of other ingredients or through preparation. Acceptability of legumes is also influenced by other factors.
- Education during childhood and adolescence plays a very important role in the development of a healthy life style and the liking of certain foodstuffs, as revealed by childhood and adulthood legume consumption correlation (Figure 3). Extrinsic factors like long cooking time (for dry legumes) or lack of preparation knowledge inhibits legume consumption as well (Figure 4).

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