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Fermentation of Vigna Aconitifolia Legume with Yeast Sp (Saccharomyces Cervisiae)

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ABSTRACT

In this experimental study, V.aconitifolia (Vigna Aconitifolia) was soaked for 24 hours at an incubator with a temperature of 300c. It was cooked at 110°C with water. Yeast (Saccharomyces cervisiae) was introduced into the cooked V.aconitifolia for the period of 24 hours at 370c for fermentation process. Nutrients like moisture, energy, carbohydrate, protein, fat, fiber, ash and iron were estimated respectively. Results revealed that fermentation process enhances the nutritional composition of Protein from 3.6 to 7.8, Total antioxidant found to be very high when compared to unfermented one. Total polyphenols was reduced when compared to unfermented V.aconitifolia seed flour which helps in reducing the toxicity. The pH of the fermented V.aconitifolia was increased step by step periodically from 3.5 to 4.8 percentage. and Hence the study declares that fermentation of V.aconitifolia improves the quality of protein and Antioxidant.

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Keywords- V.aconitifolia, Fermentation, Saccharomyces cervisiciae, Nutritional Assessment.

INTRODUCTION

Processing of legumes with minor or major alteration with its physical characterization enhances the shelf life of legumes in a much more way. Fermentation method of biochemical alteration of foods by bacteria or other microorganisms and with their enzymes. (Kahajdova & Karovicova, 2007).Process like fermentation improves the quality of physical, biochemical, mineral, polyphenols and hence employing with V.aconitifolia a subordinate crop for fermentation process enhances the same. Fermentation improves the availability of nutrients (Hotz & Gibson, 2007) Multiple techniques and traditional methods for processing of cereals and legumes are in practice. Fermentation also reduces the load of antinutritional factors and hence based on the points the study commences with assessing of bioavailability of fermented V.aconitifolia.

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MATERIALS AND METHODS

V.aconitifolia were procured in the local market of Salem, Tamilnadu. Tamilnadu usually cultivates two varieties namely TN 12 and TN 27. TN 12 was selected for the study purpose, on the basis of availability of the seeds throughout the year. The selected variety was cleaned for its dust and other particles.

Fermentation

V.aconitifolia was rinsed and soaked by using portable drinking water. A ratio of 1:2 for the time period of 24 hours was kept under incubation (30^0c). After the samples were cooked by adding water (1:5) at 110°C until soft. The surplus water is drained after cooking. 5g of Sea salt was added for 100g of cooked V.aconitifolia with the presence of yeast as a medium. It was allowed for fermentation at a dark room with the warmer temperature (37^0c) for the period of 18 - 24 hours. the fermented V.aconitifolia was taken for further use.

Biochemical Analysis

V.aconitifolia was analyzed for its nutritional quality like moisture, energy, carbohydrate, protein, fat, fiber, ash and iron respectively. The procedure was followed on the basis of following table.

Table - I Test Methods Used for Biochemical Analysis

Test Parameters/ 100g	Test Method
Moisture(g)	Basic method
Total Ash(g)	Direct method
Fat(g)	Indian Standard
Fiber (g)	Dry weight
Protein (g)	Kjeldahl
Carbohydrate (g)	DGHS MANUAL
Energy (k.cal)	4-9-4 method
Iron (mg)	Atomic absorption spectrophotometry

Total polyphenols, Antioxidants and pH

Qualitative analysis on Total polyphenols was also estimated. The periodical observation of pH was measured and compared with the pH of unfermented V.aconitifolia seed flour.

Table - II Test Methods Used for Other Parameters

Test Parameters/ 100g	Test Method
Total phenols	Spectrophotometric method
Antioxidants	Phosphomolybdate method
pH	Electrometric method

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Determination of Polyphenols

Various Anti nutritional factors such as phytic acid, Saponin and trypsin inhibitor and tannin are present in V.aconitifolia. Soaking the seeds in plain water and mineral salt solution for 12hrs decreased phytic acid by up to 50% whereas sprouting for 60hrs the most pronounced Saponin lower effect to 44-46%. The heat treatment almost eliminated trypsin inhibitor activity while soaking & germination partly removed the activity of the trypsin (khokhar & chuhan1986).

Analysis of Tannin content

V.aconitifolia flour and standard (tannic acid) were diluted with 8ml distilled water and added with 6.5ml Folin – Ciocalteu reagent, 1.5ml 20% Na2CO3 solution. Absorbance was recorded at 775nm and its content was expressed as mg tannic acid equivalents (TAE) per gm of sample (Aastha Agarwal., 2015).

Analysis of Saponin content

V.aconitifolia flour and Standard Saponin were treated with 400µl vanillin- acetic acid reagent and 1.6ml of per chloric acid. This reaction mixture was kept on water bath at 70-75 ° C for several mins. It was then cooled on ice bath for 2min and 2.5ml of glacial acetic acid was poured into it. Absorbance was taken at 550nm after mixing it well. The total Saponin content was expressed as mg Sapogenin equivalent (SE) per gm of Sample (Aastha Agarwal., 2015).

Microbial analysis

Yeast, mold and fungal growth after fermentation of V.aconitifolia were observed visually and also with microscopic examination throughout the time period of 96 hours.

Statistical analysis

Results were examined using independent sample T test to calculate the significance of fermented V.aconitifolia from unfermented V.aconitifolia. It is represented through chart - III.

RESULT AND DISCUSSION

Table - III Biochemical Analysis

Test Parameters/ 100g	*Unfermented V.aconitifolia	Fermented V.aconitifolia
Moisture (%)	10.8	66.94
Total Ash (%)	4.8	1.13
Fat (%)	1.1	0.11
Fiber (%)	4.5	2.90
Protein (%)	3.6	7.86
Carbohydrate (%)	56.5	21.06
Energy (k.cal)	330	166.67
Iron (mg)	9.5	2.71

*Pallavi Badami, 2019

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Table –III shows that mineral content was reduced; fat and carbohydrate also reduced which results in low output of energy value when compared to the unfermented V.aconitifolia. Fermentation process reveals that protein levels might be increased and can be utilized for protein supplementation.

Total polyphenols, Antioxidants and pH

Chart -I Total polyphenols, Antioxidants and pH analysis

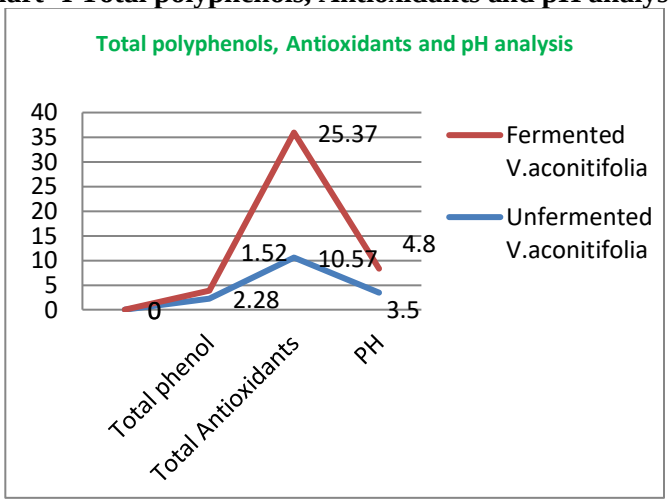
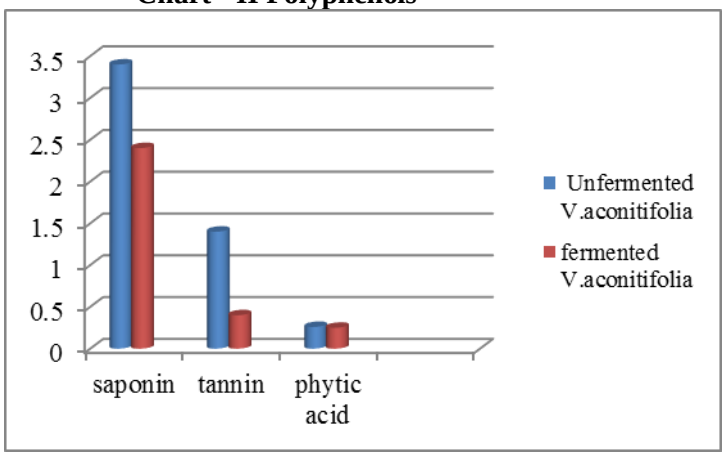


Chart - I shows that ample amount of antioxidant was increased due to the process of fermentation and hence it can be utilized as antioxidant source or to enhance the antioxidant level fermentation process might be utilized for pulses.

Polyphenols

V.aconitifolia was low in saponin and other anti-nutritional factors when compared to other legumes (Deshpande and Campbell 1992); (Jain et al. 2009).

Chart - II Polyphenols



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Microbial analysis

It is predicted that no significant yeast, mold and fungal growth were observed throughout the time period of 96 hours in either visual or with microscopic examination and hence it shows that the fermentation process was done with no cross contamination.

Statistical analysis

Chart -III Statistical analysis

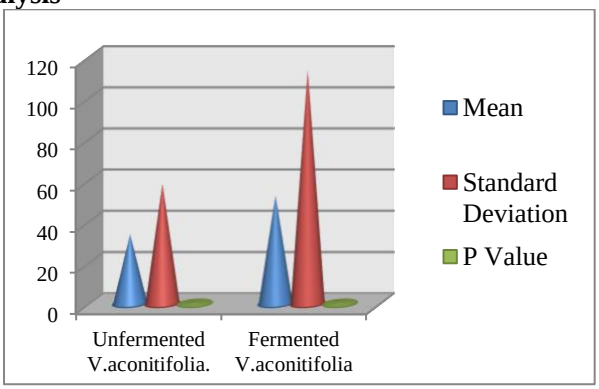

Chart -II shows that there is no significant value between fermented V.aconitifolia and unfermented V.aconitifolia.

CONCLUSION

Evidences shows that fermentation of V.aconitifolia employing yeast sp results in enhanced quality of Antioxidant, Protein and diminished in polyphenols, fat, carbohydrate and mineral content. This potentiality can be brought to play for further studies. Other legumes can be incorporated with yeast sp or with other bacteria to identify the best combination to extract good quality nutrients from legumes. Fermented legumes can be recourse to develop new food products; protein supplementations; Isolation of Antioxidants and so on.

REFERENCES

1. Kahajdova, Z., & Karovicova, J. 2007. Fermentation of cereals for specific purpose. Journal of Food and Nutrition Research, 46, 51–57. [Google Scholar]

2. Deshpande S, Campbell C. Genotype variation in BOAA, condensed tannins, phenolics and enzyme inhibitors of grass pea (Lathyrus sativus) Can J Plant Sci. 1992;72:1037–1047. DOI: 10.4141/cjps92130.[CrossRef] [Google Scholar] [Ref list]

3.Jain AK, Kumar S, Panwar J. Antinutritional factors and their detoxification in pulses - a review. Agric Rev. 2009; 30:64–70. [Google Scholar] [Ref list]

4.Hotz, C & Gibson, R. S,Traditional food-processing and preparation practices to enhance the bioavailability of micronutrients in plants-based diets. Journal of Nutrition, 2007, 137, 1097–1100. DOI: 10.1093/jn/137.4.1097 [PubMed] [CrossRef] [Google Scholar]

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5. Pallavi Badami, Kasturiba B and Vijay Kumar AG, Proximate composition and antioxidant activity of Mothbean (Vigna aconitifolia (Jacq.) Marechal) varieties The Pharma Innovation Journal2019;8(2):222-225https://www.thepharmajournal.com/archives/2019/vol8issue2/ PartD/8-2-35-427.pdf

6. M. Rafiqul Islam, Md. Mezanur Rahman, Mohammed Mohi-Ud-Din, Munny Akter, Erin Zaman, Sanjida Sultana Keya, Mehfuz Hasan, Mirza Hasanuzzama, Cytokinin and gibberellic acid-mediated waterlogging tolerance of mungbean (Vigna radiata L. Wilczek) PeerJ. 2022; 10: e12862. Published online 2022 Feb 4. DOI: 10.7717/peerj.12862

7. Chen Y, Conner RL, Gillard CL et al., A specific sensitive method for the detection of Colletotrichum lendemuthianum in drybean tissue plant disease, The American phytopathological society (APS), 2007, 91,1271 - 6

8.Veena sharma* and Aastha agarwal, Physiochemical and Antioxidant Assays of Methanol and Hydroxymethanol Extract of Ariel parts of Indigofera tinctoria Linn, Article in Indian Journal of Pharmaceutical Sciences, 2015; 5;77(6):729-734
DOI: 10.4103/0250-474X.174995

9. Sima Maleki & Seyed Hadi Razavi (2021), Pulses' germination and fermentation: Two bioprocessing against hypertension by releasing ACE inhibitor peptides, Critical Reviews in Food Science and Nutrition.