

## Aspirated And Unaspirated Phoneme In North Central Dialect Of Bodo : An Acoustic Analysis

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**Abstract :** Bodo is a Sino- Tibetan Language spoken primarily by the Bodo people of North-East India .It is an official language of the state of Assam and the Bodoland Territorial Region of India. Since 1975 the language has been written using Devanagari Script . The Bodo has 16 consonants . There are 3 aspirated sounds found in Bodo language. These are - /b, d, g/ and there are 3 unaspirated sounds found in Bodo language these are /p<sup>h</sup>, t<sup>h</sup>, k<sup>h</sup>/. In this topic i am trying to analysis the acoustic value (F1,F2,energy) of Bodo aspirated and unaspirated sounds.

**Keywords:** aspirated , unaspirated, Acoustic analysis, vowel, F1,F2.

### Introduction:

Bodo is a Sino- Tibetan Language spoken primarily by the Bodo people of North- East India. The Bodos are known by different names in some regions of Assam and its few adjacent areas. In this Brahmaputra valley, the Bodo native speakers identity themselves as Bodo while the Hindu Asamiya Speakers and speakers of other linguistic communities address them as Kachari or Boro Kachari.

Since 1975 the language has been written using Devanagari Script . . The Bodo has 16 consonants . These are total 6 aspirated and unaspirated sounds found in Bodo language - /b, d, g, p<sup>h</sup>, t<sup>h</sup>, k<sup>h</sup>/.

### 1. Aims and objectives

- Acoustic analysis of aspirated and unaspirated sounds
- Wave image analysis of aspirated and unaspirated sounds
  - a) Energy -Minimum energy  
Maximum energyMean energy
  - b) Pitch - Minimum pitch  
Maximum pitch
  - c) Frame length
- Finding F1 and F2 value .

### 3. Literature Survey

Here , the selected thesis , books and articles are considered for the purpose of view Pratima Brahma, Ph.D. thesis “phonology and Morphology of Bodo and Dimasa : Acomparative study (2013)”, here she discusses shortly about Bodo phonological and morphological structure.

Phukan Basumatary , he has published many books on language . Among them “ A Introduction to the Boro Language (2005)”, here he discusses descriptively about Bodo phonology.

Swarna Prabha Chainary , She has published many books on language and literature. Among them Boro Raothanthi(2006), Tibeto- Burman language of North-East India (2014), she discusses shortly about Bodo language

Aleendra Brahma , he has published many books which is related with Bodo language . In his book ‘ An introduction to Bodo phonology ’ he discuss shortly about Bodo phonology .

## 4. Methods:

- In this research work Descriptive and Acoustic Analysis methods have been applied.
- The data for the proposed study has been collected from both primary and secondary sources. For Primary data the researcher has visited different places of the Bodo Languagespeaking dominated areas . Secondary data has been gathered from various sources like the Bodo texts,lexicons, Bodo Dictionary , monthly and annual magazines , journal etc.

## 5. Discussion

Acoustic analysis of aspirated and un aspirated phoneme

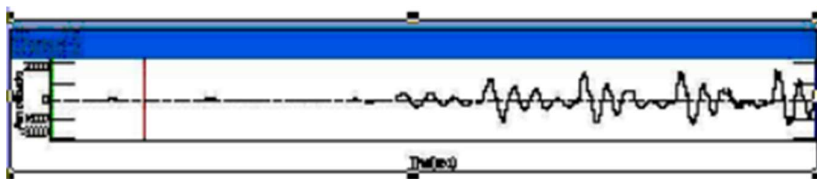
Phonetic Descriptions

- /b/ voiced bi- labial aspirated plosive
- /d/ voiced alveolar unaspirated plosive
- /g/ voiced velar unaspirated plosive
- /p<sup>h</sup>/ voiceless bi-labial aspirated plosive
- /t<sup>h</sup>/ voiceless alveolar aspirated plosive
- /k<sup>h</sup>/ voiceless velar aspirated plosive

**In Bodo ,all plosive phonemes have occurrences in initial and medial position of word . Examples are as follows :**

| Initial                                        | Medial                              | Final           |
|------------------------------------------------|-------------------------------------|-----------------|
| /p <sup>h</sup> / p <sup>hu</sup> (to uproot)  | lap <sup>ha</sup> (leafy vegetable) | .....           |
| /t <sup>h</sup> / t <sup>hang</sup> (go)       | int <sup>hi</sup> (nose ring        | .....           |
| /k <sup>h</sup> / k <sup>hon</sup> (to collect | ak <sup>hu</sup> (conduct)          | .....           |
| /b/ bu(to beat)                                | ebre(to hide)                       | gab(colour)     |
| /d/ dang (to touch)                            | indi(castor plant)                  | srwd (secretly) |
| /g/ gon (stick)                                | agu (before)                        | .....           |

Wave image analysis of aspirated and unaspirated sounds



**Word** 'bu'

/b/ image

Here , Results are –

- Energy  
Minimum energy 47.62dB Maximum energy 59.84dB Mean energy 50.81dB
- Pitch  
Minimum pitch 116.33Hz Maximum pitch 132.52Hz
- Frame length 25 M.sec, mean Period 8.23 M.s

Wave image analysis of initial position of /d/ phoneme



Word 'dain'(eight)

/d/ image

Here , Results are –

a) Energy

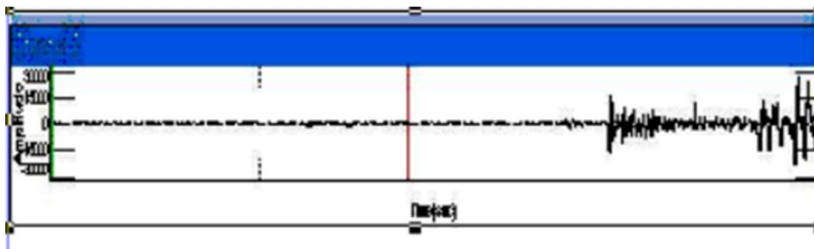
Minimum energy 42.96dBMaximum energy 72.00dBMean energy 54.62db

b) Pitch

Minimum pitch 105.53 Hz Maximum pitch **105.53 Hz**

b) Frame length 25 Msec Mean period 8.22Msec

Wave image analysis initial position of /g/ phoneme



Word 'gong'

/g/ image

Here , Results are –

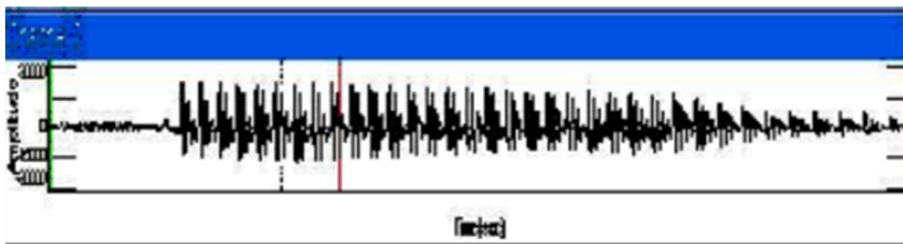
d) Energy

Minimum energy 50.51dBMaximum energy 76.03dBMean energy 58.31dB

e) Pitch

Minimum pitch 137.12Hz Maximum pitch 137.12Hz

f)Frame length 25 M.sec, mean Period 4.10 M.seWave image analysis of initial position of /p<sup>h</sup>/ phoneme



Word 'p<sup>h</sup>ang'

/p<sup>h</sup>/ image

Here , Results are –

c) Energy

Minimum energy 48.66dB Maximum energy 53.38dB Mean energy 50.77db

d) Pitch

Minimum pitch 154.92Hz Maximum pitch 154.92Hz

b) Frame length 25 Msec Mean period 6.46Msec

Wave image analysis of initial position of /t<sup>h</sup>/ phoneme



Word 't<sup>h</sup>ang'

/t<sup>h</sup>/ image

Here , Results are –

e) Energy

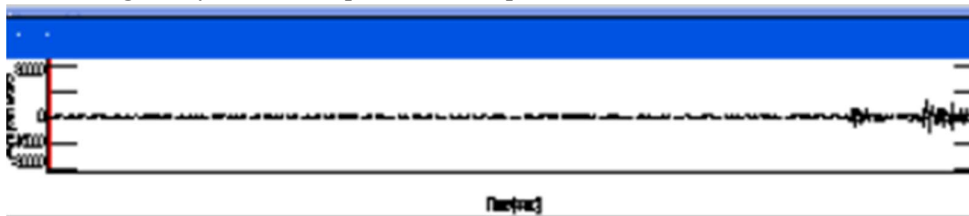
Minimum energy 47.81dB Maximum energy 65.58dB Mean energy 51.98db

f) Pitch

Minimum pitch 317.10Hz Maximum pitch 317.10Hz

b) Frame length 25 Msec Mean period 0.00Msec

Wave image analysis of initial position of /k<sup>h</sup>/ phoneme



Word 'k<sup>h</sup>un'

/k<sup>h</sup>/ image

Here , Results are –

g) Energy

Minimum energy 49.22dB Maximum energy 67.03dB Mean energy 53.32db

h) Pitch

Minimum pitch 84.32Hz Maximum pitch 84.32Hz

b) Frame length 25 Msec Mean period 4.08Msec

## 6. Conclusion

Finding F1 and F2 value of Bodo vowel aspirated and unaspirated sound

F1ঃ

| বর্ণ           | পুরুষ  | মহিলা  | ল'খা   | ছোবালী |
|----------------|--------|--------|--------|--------|
| ব              | 997.49 | 603.48 | 560.03 | 568.54 |
| দ              | 993.58 | 648.07 | 639.75 | 528.47 |
| গ              | 958.00 | 577.44 | 471.80 | 872.39 |
| প <sup>h</sup> | 861.44 | 610.45 | 563.90 | 366.09 |
| ত <sup>h</sup> | 834.83 | 973.21 | 846.92 | 424.85 |
| ক <sup>h</sup> | 555.87 | 799.47 | 664.78 | 915.55 |

F2ঃ

| বর্ণ           | পুরুষ   | মহিলা   | ল'খা    | ছোবালী  |
|----------------|---------|---------|---------|---------|
| ব              | 2293.03 | 1524.73 | 1818.27 | 1920.82 |
| দ              | 2469.40 | 1769.37 | 1881.79 | 1444.57 |
| গ              | 2063.66 | 1291.45 | 2384.22 | 2366.08 |
| প <sup>h</sup> | 2042.41 | 2207.08 | 1911.75 | 2046.63 |
| ত <sup>h</sup> | 2546.70 | 2007.18 | 1874.92 | 1397.67 |
| ক <sup>h</sup> | 1521.39 | 1726.99 | 1212.89 | 1703.24 |

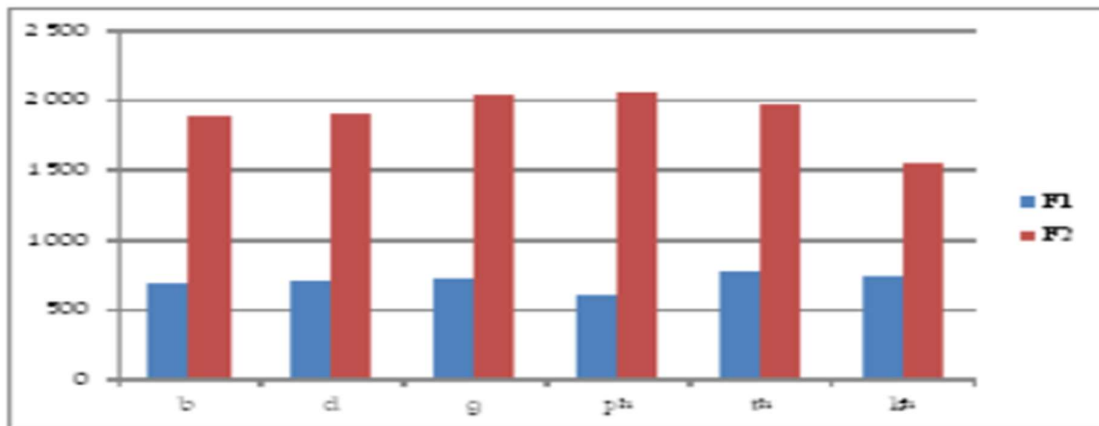
In this topic researcher fined the actual acoustic value of Plosive sound

#### Here are the Findings-

- /b/ voiced bi- labial aspirated plosive
- /d/ voiced alveolar unaspirated plosive
- /g/ voiced velar unaspirated plosive
- /p<sup>h</sup>/ voiceless bi-labial aspirated plosive
- /t<sup>h</sup>/ voiceless alveolar aspirated plosive
- /k<sup>h</sup>/ voiceless velar aspirated plosive
- F1 and F2 value of plosive sounds

| PHONEME           | F1      | F2      |
|-------------------|---------|---------|
| /b/               | 682.385 | 1889.21 |
| /d/               | 702.455 | 1891.28 |
| /g/               | 719.455 | 2026.35 |
| /p <sup>h</sup> / | 600.47  | 2051.96 |

|                   |        |         |
|-------------------|--------|---------|
| /t <sup>h</sup> / | 774.42 | 1956.61 |
| /k <sup>h</sup> / | 733.91 | 1541.12 |



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